GENERAL CATALOG

UCDAVIS





2004–2005 · 2005–2006

UC Davis Academic Calendar 2004–2006*

	Fall 2004	Winter 2005	Spring 2005	Fall 2005	Winter 2006	Spring 2006
Class Schedule and Registration Guide and Registration appointment times available						
Pass 1 Registration (assigned appointments) Pass 2 Registration (assigned appointments)						
Quarter begins	**September 27**	**January 3**	**March 29**	**September 26**	**January 3**	**March 28**
Orientation	Sept. 27–29	January 3–4	March 29–30	Sept. 26–28	January 3	March 28
Instruction begins	**September 30**	**January 5**	**March 31**	**September 29**	**January 4**	**March 29**
Last day • to pay fees and enroll without incurring a $50 late fee • to petition for classification to resident status • to file for PELP	September 30	January 5	March 31	September 29	January 4	March 29
Last day • of late fee payment • to drop 10-day-drop courses • to change student status (part-time/full-time)	October 13	January 19	April 13	October 12	January 18	April 12
Last day to add courses	October 15	January 21	April 15	October 14	January 20	April 14
Last day to drop 20-day-drop courses	October 27	February 2	April 27	October 26	February 1	April 26
Last day • to opt to take courses on a P/NP basis • to file to take courses on a S/U basis	November 3	February 9	May 14	November 2	February 8	May 3
Monday classes meet	N/A	January 21	N/A		January 18	May 31
Instruction ends	**December 10**	**March 15**	**June 8**	**December 9**	**March 15**	**June 7**
Final examinations	December 13–18	March 17–23	June 10–16	December 12–17	March 17–23	June 9–15
Quarter ends	**December 18**	**March 23**	**June 16**	**December 17**	**March 23**	**June 15**
Commencement	December 19		§	December 18		§§
Academic and Administrative Holidays	November 11 Nov. 25–26 Dec. 24–27 Dec. 30–31	Jan. 17 Feb. 21 Mar. 25	May 30	November 11 Nov. 25–26 Dec. 23 and 26 December 29–30	January 16 February 20	March 31 May 29

Filing for Candidacy (Graduation)

Filing period for those who expect to complete work for a bachelor's degree to file for candidacy with the Registrar †						
Last day to file minor with the Dean's Office‡						

Undergraduate Admission/Readmission

Last day for new undergraduates to file admission & scholarship applications.	Nov. 30, 2003	July 31, 2004	Oct. 31, 2004	Nov. 30, 2004	July 31, 2005	Oct. 31, 2005
Last day to file readmission applications with the Registrar for undergraduate status	July 31, 2003	Oct. 31, 2004	Jan. 31, 2005	July 31, 2005	Oct. 31, 2005	Jan. 31, 2006

Summer Sessions 2005

June 27–August 5

August 8–September 16

Financial Aid Filing Period

- Filing period for grants, loans, work-study and California Student Aid awards for 2005–2006; January 1-March 2
- Filing period for undergraduate scholarship application for 2005-2006: Sept. 30–Dec. 2, 2004

Key to Symbols

* Dates are subject to change and should be checked with appropriate *Class Schedule and Registration Guide*.

† For students graduating September 2005, the filing period is XX.

‡ For students graduating September 2005, the deadline to file a minor program with Dean's Office is XX.

§ Commemcement Spring 2005

Law—May XX

Medicine—June X

Graduate Studies—June XX

Veterinary Medicine—June XX

Engineering—June XX

Management—June XX

Agricultural and Environmental Sciences—June XX

Biological Sciences—June XX

Letters and Science—June XX

§§ Commencement Spring 2006—TBA

UCDAVIS

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IT IS THE RESPONSIBILITY OF THE INDIVIDUAL STUDENT TO BECOME FAMILIAR WITH THE ANNOUNCEMENTS AND REGULATIONS OF THE UNIVERSITY PRINTED IN THIS CATALOG AND IN THE *CLASS SCHEDULE AND REGISTRATION GUIDE*.

The University of California, Davis, will provide assistance to the visually impaired regarding the information contained in this catalog. Questions should be directed to the office or department concerned.

Copies of the *General Catalog* may be purchased from the UC Davis Bookstore, University of California, Davis, 2828 Cowell Blvd., Davis, CA 95616-4902, telephone 530-752-2944.

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From the Chancellor

Welcome to UC Davis. We're delighted you've chosen the Davis campus as the place to pursue your academic goals. All of us—faculty, staff and administrators—are committed to helping you toward their successful attainment.

In the time you spend at UC Davis, you will acquire knowledge and skills that will help you shape the rest of your life. You will make lifelong friends and have experiences that will determine the direction of your growth as a human being and as a member of the larger community in which you live. For that to happen there must be a partnership among many individuals working together to ensure the most intellectually stimulating, technologically sophisticated and culturally rich environment. That partnership includes you, the student. Your energy and vision are the catalysts that energize and inspire each of us to help make your time at UC Davis challenging, meaningful—and, yes—fun.

We are very proud of UC Davis. Long renowned for its agricultural and veterinary science programs, in recent years we have attained international stature for our programs in engineering, biological sciences, the humanities and the social sciences. Members of our faculty have won MacArthur genius grants, Pulitzer prizes, Fulbright scholarships and election to the nation's top academies of the arts and sciences.
UC Davis is a member of the prestigious Association of American Universities, a select group of 63 institutions of higher learning whose membership is by invitation only. Our alumni have made significant and lasting contributions to society as leaders in government, business, technology, media and the arts. And our students—the cream of California's crop—consistently persist and graduate at among the highest rates of University of California campuses.

UC Davis' character has been built through decades of commitment to a unique core of values and principles. We are using our talents and ingenuity to continue working toward a community that honors our diversity as individuals and reflects our belief in a shared set of values. I'm happy you're about to join our community. Congratulations on becoming an Aggie!

Larry N. Vanderhoef
Chancellor

ADDRESS DIRECTORY

University of California
One Shields Avenue
Davis, California 95616
530-752-1011 (main campus number)
http://www.ucdavis.edu

Visitor Services Office
Buehler Alumni and Visitors Center
530-752-8111
(campus tours, maps and information)

Campus Information Center
Memorial Union
530-752-2222

Offices of the Chancellor and Provost
Fifth Floor, Mrak Hall
530-752-2065

College of Agricultural and Environmental Sciences
150 Mrak Hall
530-752-0107

College of Engineering
1050 Kemper Hall
530-752-0553

College of Letters and Science
200 Social Sciences and Humanities Building
530-752-0392

Division of Biological Sciences
202 Life Sciences Addition
530-752-0410

Graduate Studies
250 Mrak Hall
530-752-0650

Graduate School of Management
106 AOB 4
530-752-7399

School of Law
1013 King Hall
530-752-0243

School of Medicine
102 Medical Sciences 1-C
530-752-4028

School of Veterinary Medicine
Surge IV
530-752-1360

Office of Summer Sessions
207 Third Street, Suite 220
530-757-3305

University Extension
1333 Research Park Drive
530-757-8777

News Service
334 Mrak Hall
530-752-1930

Legal Analyst—Residence Matters
111 Franklin St., 8th Floor
Oakland, CA 94607-5206

Admissions

Undergraduate:	Undergraduate Admissions and Outreach Services 178 Mrak Hall 530-752-2971
	EOP Office of Admissions 175 Mrak Hall 530-752-3710
Graduate:	Graduate Studies Admissions 252 Mrak Hall 530-752-0655
Law:	School of Law Admissions 115 King Hall 530-752-6477
Management:	Graduate School of Management 106 AOB 4 530-752-7399
Medicine:	School of Medicine Admissions 126 Medical Sciences 1-C 530-752-2717
Veterinary Medicine:	School of Veterinary Medicine Admissions 114 Haring Annex 530-752-1383

Office of the University Registrar
12 Mrak Hall
530-752-2973
(registration information, transcripts)

Financial Aid Office
Dutton Hall
530-752-2390
(undergraduate and graduate loans, grants, employment information)

Undergraduate Scholarship Office
Dutton Hall
530-752-2804

Fellowships and Graduate Scholarships
Graduate Studies
250 Mrak Hall
530-752-7481

Teaching and Research Assistantships
Write to department or group concerned.

ASUCD (Associated Students UC Davis)
347 Memorial Union
530-752-1990

Student Disability Center
160 South Silo
530-752-3184 (voice), 530-752-6833 (telephone device for the speech and hearing impaired)

Student Health Service
Cowell Student Health Center
530-752-2300

Student Housing Office
530-752-2033

CONTENTS

DEGREES OFFERED BY UC DAVIS

Undergraduate majors are administered by the colleges of Agricultural and Environmental Sciences (A&ES), Letters and Science (L&S) and Engineering. Professional studies are administered by the schools indicated. All graduate programs are administered by Graduate Studies. The list below indicates the major or discipline, the degree(s) offered and the school or college offering the major.

Degrees offered: A.B.–Bachelor of Arts, B.S.–Bachelor of Science, M.A.–Master of Arts, M.A.M.–Master of Agricultural Management, M.A.T.–Master of Arts in Teaching, M.B.A.–Master of Business Administration, M.Ed.–Master of Education, M.Engr–Master of Engineering, M.F.A.–Master of Fine Arts, M.P.H.–Master of Public Health, M.P.V.M.–Master of Preventive Veterinary Medicine, M.S.–Master of Science, Ed.D.–Doctorate in Education, D. Engr.–Doctor of Engineering, Ph.D.–Doctor of Philosophy, J.D.–Doctor of Law, LL.M.–Master of Laws, M.D.–Doctor of Medicine, D.V.M.–Doctor of Veterinary Medicine. *=closed to new students, †=graduate degree offered under Engineering

Administration
M.B.A. ..... Graduate School of Management

Aeronautical Science and Engineering
B.S.† ..... Engineering

African American and African Studies
A.B. ..... L&S

Agricultural and Environmental Chemistry
M.S., Ph.D.

Agricultural and Resource Economics
M.S., Ph.D.

Agricultural Education
Credential

Agricultural Management and Rangeland Resources
B.S. ..... A&ES

American Studies
A.B. ..... L&S

Animal Behavior
Ph.D.

Animal Biology
B.S. ..... A&ES

Animal Science
B.S., M.A.M., M.S. ..... A&ES

Animal Science and Management
B.S. ..... A&ES

Anthropology
A.B. or B.S., M.A., Ph.D. ..... L&S

Applied Mathematics
B.S. ..... L&S

Applied Mathematics
M.S., Ph.D.

Applied Science Engineering
M.S., Ph.D.

Applied Physics
B.S. ..... L&S

Art
M.F.A.

Art History
A.B., M.A. ..... L&S

Art Studio
A.B. ..... L&S

Atmospheric Science
B.S., M.S., Ph.D. ..... A&ES

Avian Sciences
B.S., M.S. ..... A&ES

Asian American Studies
A.B. ..... L&S

Biochemical Engineering
B.S. ..... Engineering

Biochemistry and Molecular Biology
B.S., M.S., Ph.D. ..... A&ES or L&S

Biological Sciences
A.B. or B.S. ..... A&ES or L&S

Biological Systems Engineering
B.S., M.S., M.Engr., Ph.D., D.Engr. Engineering

Biomedical Engineering
B.S., M.S., Ph.D. ..... Engineering

Biophysics
Ph.D.

Biostatistics
M.S., Ph.D.

Biotechnology
B.S. ..... A&ES

Cell and Developmental Biology
M.S., Ph.D.

Cell Biology
B.S. ..... A&ES or L&S

Chemical Engineering
B.S., M.S., Ph.D. ..... Engineering

Chemical Engineering/Materials Science and Engineering
B.S. ..... Engineering

Chemistry
A.B. or B.S., M.S., Ph.D. ..... L&S

Chicana/Chicano Studies
A.B. ..... L&S

Child Development
M.S.

Chinese
A.B. ..... L&S

Civil and Environmental Engineering
M.S., M.Engr., Ph.D., D.Engr.

Civil Engineering
B.S. ..... Engineering

Civil Engineering/Materials Science and Engineering
B.S. ..... Engineering

Classical Civilization
A.B. ..... L&S

Clinical Nutrition
B.S. ..... A&ES

Communication
A.B., M.A.* ..... L&S

Community and Regional Development
B.S. ..... A&ES

Community Development
M.S.

Comparative Literature
A.B., M.A., Ph.D. ..... L&S

Comparative Pathology
M.S., Ph.D.

Computational Applied Science
B.S. ..... Engineering

Computer Engineering
B.S.† ..... Engineering

Computer Science
B.S. ..... L&S

Computer Science
M.S., Ph.D. ..... Engineering

Computer Science and Engineering
B.S. ..... Engineering

Crop Science and Management
B.S. ..... A&ES

Cultural Studies
M.A., Ph.D.

Design
B.S. ..... A&ES

Dramatic Art
A.B., M.F.A., Ph.D. ..... L&S

East Asian Studies
A.B. ..... L&S

Ecology
M.S., Ph.D.

Economics
A.B., M.A., Ph.D. ..... L&S

Education
M.A., M.Ed.*, Ph.D., Ed.D., Credential

Electrical and Computer Engineering
M.S., Ph.D.

Electrical Engineering
B.S.† ..... Engineering

Electrical Engineering/Materials Science and Engineering
B.S. ..... Engineering

Endocrinology
M.S., *Ph.D.*

Engineering
M.Engr., M.S., D.Engr., Ph.D.

English
A.B., M.A., Ph.D. ..... L&S

Entomology
B.S., M.S., Ph.D. ..... A&ES

Environmental and Resource Sciences
B.S. ..... A&ES

Environmental Biology and Management
B.S. ..... A&ES

Environmental Horticulture and Urban Forestry
B.S. ..... A&ES

Environmental Policy Analysis and Planning
B.S. ..... A&ES

Environmental Toxicology
B.S. ..... A&ES

Epidemiology
M.S., Ph.D.

Evolution and Ecology
A.B. or B.S. ..... A&ES or L&S

Exercise Biology
A.B., B.S. ..... L&S

Exercise Science
M.S. ..... L&S

Family Nurse Practitioner/ Physician Assistant
Credential ..... School of Medicine

Fermentation Science
B.S. * ..... A&ES

Fiber and Polymer Science
B.S. ..... A&ES

Film Studies
A.B. ..... L&S

Food Biochemistry
B.S. * ..... A&ES

Food Science
B.S., M.S., Ph.D. ..... A&ES

Forensic Science
M.S.

French
A.B., M.A., Ph.D. ..... L&S

Genetics
B.S., M.S., Ph.D. ..... A&ES or L&S

Geography
M.A., Ph.D.

Geology
A.B. or B.S., M.S., Ph.D. ..... L&S

German
A.B., M.A., Ph.D. ..... L&S

History
A.B., M.A.*, Ph.D. ..... L&S

Horticulture & Agronomy
M.S.

Human Development
B.S., Ph.D. ..... A&ES

Hydrologic Sciences
M.S., Ph.D.

Hydrology
B.S. ..... A&ES

Immunology
M.S., Ph.D.

Individual Major
A.B., B.S. ..... A&ES or L&S

Integrated Pest Management
M.S.

International Agricultural Development
B.S., M.S. ..... A&ES

International Commercial Law
M.A. ..... Law

International Relations
A.B. ..... L&S

Italian
A.B. ..... L&S

Japanese
A.B. ..... L&S

Landscape Architecture
B.S. ..... A&ES

Law
J.D., LL.M. ..... School of Law

Linguistics
A.B., M.A., Ph.D. ..... L&S

Managerial Economics
B.S. ..... A&ES

Materials Science and Engineering
B.S., M.S., M.Engr., Ph.D. ..... Engineering

Mathematical and Scientific Computation
B.S. ..... L&S

Mathematics
A.B. or B.S., M.A., M.A.T., Ph.D. L&S

Mechanical and Aeronautical Engineering
M.S., Ph.D., M. Engr., D. Engr.

Mechanical Engineering
B.S.† ..... Engineering

Mechanical Engineering/Materials Science and Engineering
B.S. ..... Engineering

Medical Informatics
M.S.

Medicine
M.D. ..... School of Medicine

Medieval Studies
A.B. ..... L&S

Microbiology
A.B. or B.S., M.S., Ph.D... A&ES or L&S

Molecular, Cellular, and Integrative Physiology
M.S., Ph.D.

Music
A.B., M.A., M.A.T.*, Ph.D. ..... L&S

Native American Studies
A.B., M.A., Ph.D. ..... L&S

Natural Sciences
B.S. ..... L&S

Nature and Culture
A.B. ..... L&S

Neurobiology, Physiology and Behavior
B.S. ..... A&ES or L&S

Neuroscience
Ph.D.

Nutrition
M.S., Ph.D.

Nutrition Science
B.S. ..... A&ES

Optical Science and Engineering
B.S. ..... Engineering

Pharmacology and Toxicology
M.S., Ph.D

Philosophy
A.B., M.A., Ph.D. ..... L&S

Physical Education
M.A.*

Physics
A.B. or B.S., M.S., Ph.D. ..... L&S

Plant Biology
A.B. or B.S., M.S., Ph.D. ..... A&ES or L&S

Plant Pathology
M.S., Ph.D.

Political Science
A.B., M.A., Ph.D. ..... L&S

Political Science—Public Service
A.B. ..... L&S

Population Biology
M.S, Ph.D.

Preventive Veterinary Medicine
M.P.V.M. ..... School of Veterinary Medicine

Psychology
A.B. or B.S., Ph.D. ..... L&S

Public Health
M.P.H. ..... School of Medicine and School of Veterinary Medicine

Range and Wildlands Science
B.S.* ..... A&ES

Religious Studies
A.B. ..... L&S

Rhetoric and Communication
M.A.*

Russian
A.B. ..... L&S

Sociology
A.B., M.A., Ph.D. ..... L&S

Sociology—Organizational Studies
A.B. ..... L&S

Soil Science
M.S., Ph.D.

Soil and Water Science
B.S. ..... A&ES

Spanish
A.B., M.A., Ph.D. ..... L&S

Statistics
A.B. or B.S., M.S., Ph.D. ..... L&S

Textile Arts and Costume Design
M.F.A.

Textiles
M.S.

Textiles and Clothing
B.S. ..... A&ES

Transportation Technology and Policy
M.S., Ph.D.

Veterinary Medicine
D.V.M. ..... School of Veterinary Medicine

Viticulture and Enology
B.S., M.S. ..... A&ES

Wildlife, Fish and Conservation Biology
B.S. ..... A&ES

Women's Studies
A.B. ..... L&S

MINOR PROGRAMS OFFERED BY UC DAVIS

Minor programs are offered by both the College of Agricultural and Environmental Sciences (A&ES) and the College of Letters and Science (L&S). The College of Engineering (ENGR), the School of Education (SE) and the Graduate School of Management (GSM) each offer one undergraduate minor. The list below indicates the minor program, the offering department (if the department name is different than the name of the minor) and the college offering the minor.

African American and African Studies, L&S
Aging and Adult Development
(Human & Community Development), A&ES
Agricultural Economics
(Agricultural and Resource Economics), A&ES
Agricultural Entomology and Bee Biology (Entomology), A&ES
Animal Genetics (Animal Science), A&ES
Agricultural Systems and Environment
(Agronomy), A&ES
American Studies, L&S
Animal Biology (Animal Science), A&ES
Anthropology, L&S
Applied Biological Systems Technology
(Biological & Agricultural Engineering), A&ES
Applied Computing & Information Systems
(Agronomy), A&ES
Aquaculture (Animal Science), A&ES
Art History, L&S
Art Studio, L&S
Asian American Studies, L&S
Atmospheric Science
(Land, Air and Water Resources), A&ES
Avian Sciences (Avian Sciences), A&ES
Biological Sciences, A&ES or L&S
Chemistry, L&S
Chicana/Chicano Studies, L&S
Chinese (East Asian Languages and Cultures), L&S
Classical Civilization (Classics), L&S
Communication, L&S
Community Development
(Human & Community Development), A&ES
Community Nutrition (Nutrition), A&ES
Comparative Literature, L&S
Computational Applied Science (Applied Science), ENGR
Computer Science, L&S
Dairy/Livestock (Animal Science), A&ES
Dramatic Art, L&S
East Asian Studies, L&S
Economics, L&S
Education, SE
English, L&S
Environmental and Natural Resource Economics (Agriculture and Resource Economics), A&ES
Environmental Geology (Geology), L&S
Environmental Horticulture, A&ES
Environmental Policy Analysis
(Environmental Science and Policy), A&ES
Environmental Toxicology, A&ES
Equine (Animal Science), A&ES
Exercise Biology, L&S
Fiber and Polymer Science (Textiles and Clothing), A&ES
Film Studies (Humanities), L&S
Food Service Management (Nutrition), A&ES
French, L&S
Fungal Biology and Ecology (Plant Pathology), A&ES
Geographic Information Systems
(Biological & Agricultural Engineering), A&ES
Geographic Studies (Environmental Design), A&ES
Geology, L&S
Geophysics (Geology), L&S
German, L&S
Global and International Studies (Humanities), L&S
Greek (Classics), L&S
History, L&S
History and Philosophy of Science, L&S
Human Development
(Human & Community Development), A&ES
Hydrology
(Land, Air and Water Resources), A&ES
Insect Biology (Entomology), A&ES
Insect Ecology and Evolution (Entomology), A&ES
International Agricultural Development
(Human & Community Development), A&ES
Italian, L&S
Japanese (East Asian Languages and Cultures), L&S
Jewish Studies (Humanities), L&S
Landscape Restoration (Environmental Horticulture), A&ES
Latin (Classics), L&S
Linguistics, L&S
Managerial Economics (Agricultural and Resource Economics), A&ES
Managerial Economics General (Agricultural and Resource Economics), A&ES
Mathematics, L&S
Medical-Veterinary Entomology (Entomology), A&ES
Medieval Studies, L&S
Music, L&S
Native American Studies, L&S
Nature and Culture, L&S
Nematology, A&ES
Nutrition and Food (Nutrition), A&ES
Nutrition Science (Nutrition), A&ES
Philosophy, L&S
Physics, L&S
Plant Biology, A&ES or L&S
Political Science, L&S
Precision Agriculture (Biological and Agricultural Engineering), A&ES
Psychology, L&S
Recreation (Environmental Science and Policy), A&ES
Religious Studies, L&S
Russian, L&S
Science and Society, A&ES
Social and Ethnic Relations (African American Studies, Asian American Studies, Native American Studies, Women and Gender Studies), L&S
Sociology, L&S
Soil Science (Land, Air and Water Resources), A&ES
Spanish, L&S
Statistics, L&S
Technology Management, GSM
Textiles and Clothing, A&ES
War–Peace Studies (International Relations), L&S
Women's Studies, L&S

INTRODUCTION

UCDAVIS





2004–2005 · 2005–2006

Welcome to UC Davis. Founded as the University Farm amid the fertile fields of the state's Central Valley, UC Davis initially emerged as an acknowledged international leader in agricultural, biological, biotechnological and environmental sciences and has now gained similar recognition for excellence in the arts, humanities, social sciences, engineering, health sciences, law and management. *U.S. News & World Report* ranks UC Davis among the top 10 public universities nationally, and the campus is among a select group admitted into the prestigious Association of American Universities. Membership in this group of 62 institutions of higher learning is by invitation only.

The campus owes much of its strength to its deep traditional roots in agriculture and the impressive diversity of academic programs that emerged from this foundation. A distinguished faculty of scholars and scientists, a treasured sense of community and a dedication to the land-grant values of creative, responsive and innovative teaching, research and public service are hallmarks of UC Davis, as is interdisciplinary collaboration; many faculty hold cross-departmental appointments, and students are challenged to explore the relationships between fields of study.

The University of California

UC Davis is one of 10 campuses of the University of California, which was chartered as a land grant college in 1868 and now constitutes the pre-eminent system of public higher education in the country. Together, the campuses have an enrollment of more than 200,000 students, nearly 90 percent of them California residents. Some 150 laboratories, extension centers, research and field stations strengthen teaching and research while providing public service to California and the nation. The collections of the more than 100 UC campus libraries are surpassed in size in the United States only by that of the Library of Congress.

A place for learning

Providing a rich and challenging learning experience for undergraduate and graduate students is critical to UC Davis' mission and is a cherished commitment of the campus. Several programs support this aim, including a $30,000 prize awarded to a faculty member each year by the UC Davis Foundation in recognition of outstanding undergraduate teaching and scholarly achievement, and a campus wide Davis Honors Challenge program through which students elect special courses and have closer contact with faculty.

UC Davis offers more than 110 undergraduate majors and 70-plus graduate programs in the College of Agricultural and Environmental Sciences, the College of Engineering and the College of Letters and Science. The campus's Division of Biological Sciences draws students and faculty from across the campus. UC Davis' five professional schools—the School of Education, the School of Law, the Graduate School of Management, the School of Medicine and the School of Veterinary Medicine—is a combination unique within the University of California system. A proposed Graduate School of the Environment will increase the impact and visibility of the campus's major strengths in environmental science.

A place for discovery

Research is an integral part of teaching at UC Davis. Faculty members share their research findings in the classroom, and students learn firsthand about discovery while working with professors in the laboratory and field. A number of undergraduate research programs offer students the opportunity to work on a research project in a faculty laboratory, in some cases as early as their freshman year.

Research at UC Davis supports California's economic, intellectual and social development. The campus's varied research programs explore and seek solutions to problems in agriculture, resource management, the environment, health, medicine, engineering, business, the economy and public policy. UC Davis scholars also explore the intellectual frontiers of the physical, biological and social sciences, the humanities and the arts.

The campus's reputation has attracted a distinguished faculty of scholars and scientists in all fields. UC Davis ranks 16th among public universities nationwide, according to a multiyear study reported in 1995 by the National Research Council, and UC Davis stands 15th in research funding among universities in the United States, according to the most recent statistics from the National Science Foundation.

Life on campus

Teaching and research provide students with the academic side of their education, and campus life balances the books. Students enjoy a wide range of offerings, including sports, internships, outdoor activities, student government, clubs and creative arts programs.

In 2003, UC Davis joined the big West Athletic Conference, moving from Division II to Division I of the National Collegiate Athletic Association. UC Davis sponsors 13 varsity sports for women and 12 for men. More than 30 club sports, organized by students, compete against other area colleges and amateur clubs, or are recreational and focus on skill development and social interaction. Intramural sports annually draw more than 14,000 students who participate in 26 different men's, women's and coed activities.

Each year roughly 5,000 students interested in gaining work experiences participate in internships locally, nationally and globally through the campus's Internship and Career Center, among the largest campus wide academic internship programs in the country. UC Davis is known for its student-run facilities; the Coffee House, radio station KDVS and Unitrans provide paid employment and real-world experience to hundreds of students each year.

The Mondavi Center for the Performing Arts features internationally known artists and speakers on tour and showcases offerings of the campus's music, theatre and dance departments in its 1,800-seat performance hall and 250-seat studio theater.

Life in Davis

Davis' proximity to Sacramento, the state capital, and the San Francisco Bay Area makes it easy to take advantage of big-city attractions while enjoying the security and friendliness of a university town. The Davis community combines the right blend of safe neighborhoods, convenient retail and service establishments, cultural amenities for a variety of tastes and

plentiful recreational activities. There are 31 parks included in the 521 acres of parks, greenbelts and open space areas owned and maintained by the city. Known as environmentally aware and socially innovative, Davis has a strong history of bicycle use and planning. An estimated 53,000 bicycles are in use in Davis and on the UC Davis campus. City planning integrates bicycle lanes and bike paths on city streets and through community greenbelts. Davis residents are active—in local, national and international political causes, in sports, in the arts and in community organizations. Quality of life is a high priority in this community of more than 62,200 residents. Many citizen committees advise the city council on issues such as quality of child care and natural resources conservation. With students constituting about half the city's population, Davis is one of California's few remaining college towns.

Visiting the Campus

Visitor Services Office
Buehler Alumni and Visitors Center
530-752-8111

You are welcome to pay us a visit. Weekend tours depart from the Buehler Alumni and Visitors Center at 11:30 a.m. Weekday tours depart at 10:00 a.m. and 2:00 p.m. Register for tours one week in advance by calling 530-752-8111 or online at http://visit.ucdavis.edu. You may also visit our Virtual Tour Web site at http://vtour.ucdavis.edu. If you have questions about application procedures or entrance requirements, write or visit Undergraduate Admissions and Outreach Services in Mrak Hall.

THE UNDERGRADUATE COLLEGES

The College of Agricultural and Environmental Sciences

College Office
150 Mrak Hall
530-752-0108; http://www.aes.ucdavis.edu

The College of Agricultural and Environmental Sciences offers a diverse program of majors and courses and is committed to education that emphasizes a spirit of discovery. Based on the premise that tomorrow's citizens will need to anticipate, understand and solve emerging societal problems and contribute to the discovery and application of new knowledge, the college fosters:

- critical thinking and an appreciation for diversity in thought and approaches to problem solving
- an ethos of lifelong learning—of teaching oneself and others while confronting challenges and solving problems
- an ability to move beyond either/or thinking and to pursue innovative and integrative understanding of the agricultural sciences, environmental sciences, and human sciences
- intellectual skills that prepare individuals to secure a life-affirming physical and cultural environment based on sound, respectful management of resources
- a commitment to serve the public with informed and open-minded dedication to understanding, critiquing and addressing complex societal needs and interests

The college is proud of its rich agricultural history. From this foundation, it has expanded its educational offerings to encompass programs that highlight interconnections among the environment, plant and animal sciences, biological sciences, and human sciences. Through a wide array of major programs, the college prepares high-potential students for advanced studies in diverse disciplines and leadership in such arenas as public policy; research and development; managerial and natural resource economics; agricultural systems; environmental protection, safety and design; human nutrition, health and development; and the food, fiber, textile and apparel industries.

Undergraduate students enjoy early contact with faculty advisers, graduate students and postgraduate researchers, enriching and broadening the educational experience of all.

Several levels of academic advising are available that are designed to enhance your undergraduate experience. Advisers help you plan your courses, meet degree requirements and take maximum advantage of the resources available at UC Davis. You are encouraged to meet regularly with your assigned faculty adviser and with the Advising Associates and departmental peer advisers. Through a shared commitment to education for service to society, college faculty, staff and students work together to improve the relationship between humanity and the natural world.

The College of Engineering

Dean's Office
1050 Kemper Hall
530-752-0553; http://www.engr.ucdavis.edu

The College of Engineering is among the largest undergraduate engineering colleges in the University of California system, with an undergraduate enrollment of approximately 3,300 and graduate enrollment of approximately 1,100. The college offers both a friendly atmosphere and the varied academic programs in basic sciences and engineering that have made UC Davis engineering graduates highly valued in private practice and research. The college has eight departments; each has outstanding programs of instruction.

The college integrates teaching, research and service to society with our proud tradition as a land-grant research university, and provides highly qualified students with a firm intellectual and professional foundation, enhanced by an environment of discovery.

With a long-standing commitment to undergraduate students, we provide strong engineering programs that balance scientific principles with practical applications in engineering design. These programs prepare students for entry into both engineering practice and graduate-level research. We challenge our undergraduates to collaborate and communicate effectively as they begin the process of life-long professional growth.

We challenge our graduate students to join with our faculty and staff in advancing the understanding of a broad spectrum of modern technology. We are committed to being one of the world's leading engineering research centers, while contributing to our country's technological leadership and to the benefit of all people.

We are committed to maintain our vision of the college in regular consultation with our students and their families, our alumni and our many partners in academia, industry and government.

University of California, Davis

Principles of Community

THE UNIVERSITY OF CALIFORNIA, DAVIS, is first and foremost an institution of learning and teaching, committed to serving the needs of society. Our campus community reflects and is a part of a society comprising all races, creeds, and social circumstances. The successful conduct of the University's affairs requires that every member of the University community acknowledge and practice the following basic principles:

WE AFFIRM THE DIGNITY inherent in all of us, and we strive to maintain a climate of justice marked by respect for each other. We acknowledge that our society carries within it historical and deep-rooted misunderstandings and biases, and therefore we will endeavor to foster mutual understanding among the many parts of our whole.

WE AFFIRM THE RIGHT of freedom of expression within our community and also affirm our commitment to the highest standards of civility and decency towards all. We recognize the right of every individual to think and speak as dictated by personal belief, to express any idea, and to disagree with or counter another's point of view, limited only by University regulations governing time, place, and manner. We promote open expression of our individuality and our diversity within the bounds of courtesy, sensitivity, and respect.

WE CONFRONT AND REJECT all manifestations of discrimination, including those based on race, ethnicity, gender, age, disability, sexual orientation, religious or political beliefs, status within or outside the University, or any of the other differences among people which have been excuses for misunderstanding, dissension, or hatred. We recognize and cherish the richness contributed to our lives by our diversity. We take pride in our various achievements, and we celebrate our differences.

WE RECOGNIZE that each of us has an obligation to the community of which we have chosen to be a part. We will strive to build a true community of spirit and purpose based on mutual respect and caring.

The "Principles of Community" were prepared and adopted after extensive discussion within the campus community about the need for a statement that reflects UC Davis' commitment to a learning environment characterized by diversity, understanding and the acceptance of all people. This statement of common principles was published on April 20, 1990, carrying the endorsement of Chancellor Theodore L. Hullar and the leadership of the Davis Division of the Academic Senate, the Academic Staff Organization, the UCD StaffAssembly, the UCDMC Staff Assembly, the Associated Students of UC Davis (ASUCD), and the Graduate Student Association.

Mission Statement:

Philosophy of Purpose

The central purpose of UC Davis, as a comprehensive research university, is the generation, advancement, dissemination and application of knowledge. In this, UC Davis is committed to developing and sustaining leading programs in

- the arts, humanities, biological and physical sciences and social sciences—disciplines at the core of all universities;
- agricultural and environmental disciplines and engineering;
- professional studies in education, law, management, medicine and veterinary medicine.

In these programs, the campus integrates three purposes: teaching students as a partnership between faculty mentors and young scholars; advancing knowledge and pioneering studies through creative research and scholarship; and applying that knowledge to address the needs of the region, state, nation and globe. UC Davis is committed to the tradition of the land-grant university, the basis of its founding. This tradition—built on the premise that the broad purpose of a university is service to people and society—guides today the campus's special commitments and emphases.

UC Davis has a history of focused attention on undergraduate education. The central elements of a liberal education—the arts and languages, history and philosophy and the sciences—offer the opportunity for a broad general education combined with specialization in a scholarly discipline. Coupled with this are manifold opportunities for personal development through programs for academic enrichment, including undergraduate research, work-learn experiences and extracurricular student life.

Dedicated to scholarship, the furtherance of knowledge and the education of graduate students who will advance the next generations of research, UC Davis offers a diverse array of post-baccalaureate programs. Drawing upon the wide range of specialized academic fields, stimulating cross-disciplinary approaches, and using its distinctive graduate groups, a structure that permits students to pursue lines of inquiry that cross traditional disciplinary lines, UC Davis continues to follow and redefine the mandate of a major research university.

The campus has a commitment to advancing teaching and scholarly work in the arts, humanities and the social sciences, studies that also enrich the life of each person and society as a whole. Infusing the pursuit of careers in education, law, management and medicine with these insights and values is also emphasized.

Because of its prominence in the biological, physical and engineering sciences—and building on its distinguished programs in the agricultural and environmental sciences—UC Davis plays a leadership role in modern biology, focusing its strength on basic research and related studies in agriculture, human and animal health and the environment. Consonant with this emphasis is UC Davis' enhancement of its strength in the engineering and physical sciences, reflecting the importance of these disciplines for the economic vitality of California and the nation.

The life of UC Davis extends beyond teaching and study to service to the region, state, nation and the world. This is given in many forms: cooperative extension to agriculture and education; medical services to central California and beyond through the multifaceted UC Davis Medical Center in Sacramento; diverse educational programs of University Extension that share knowledge with the region; voluntary contributions of faculty, staff and students; and athletic and cultural programs for the campus and community at large. UC Davis is surrounded by vibrant, local communities and its proximity to Sacramento, the state capital, gives this outreach urgency and opportunity. Collaborative studies and cooperation between UC Davis and state agencies and the Legislature are both a special responsibility and a unique opportunity.

UC Davis is characterized by a distinguished faculty, a dedicated and high-achieving staff and students of great potential and accomplishment. As we move forward, we recognize that our continued excellence is dependent upon our ability to diversify our university community, consonant with the citizenry of California.

UC Davis remains committed to its human values: caring and personal relationships, collaborative and thoughtful work, all within a human-scale environment. These special qualities are sustained by intellectual strength within a collegial community whose members share a deep desire for teaching and learning, for an abiding commitment to discovering and applying new knowledge.

- **The Department of Applied Science** instructs students in broad areas of scientific technology and offers an innovative program for undergraduates in optical science and engineering that prepares students to work in areas such as opto-electronics, lasers and opto-communications.
- **The Department of Biological and Agricultural Engineering** combines study in engineering with instruction in the biological sciences to solve challenging environmental and technical problems.
- **The Department of Biomedical Engineering** educates students in a highly interdisciplinary combination of the biological sciences and engineering as this combination applies to medicine.
- **The Department of Chemical Engineering and Materials Science** offers curricula integrating knowledge of chemistry, biological sciences or materials science and engineering that enable students to solve problems in both current and future manufacturing technologies or to analyze the structure, properties and behavior of materials.
- **The Department of Civil and Environmental Engineering** educates students to plan and design systems that have a direct impact on health and human productivity and on the quality of human life.
- **The Department of Computer Science** offers programs in all aspects of design and use of computer hardware and software systems. The department also plays a significant service role for programs throughout the campus.
- **The Department of Electrical and Computer Engineering** offers programs in research and education crucial for the continued success of high technology industries in California and the nation, preparing students to design, analyze and use electronic and computer systems effectively.
- **The Department of Mechanical and Aeronautical Engineering** educates students in the design and manufacture of complex engineering systems for transport, industry or energy and to design, manufacture and operate aircraft and aeronautical structures.

Every effort has been made to provide engineering students with the maximum flexibility consistent with rigorous professional education standards. The key to flexibility is academic advising. You are strongly encouraged to attend the Summer Advising and Orientation Program, held the summer before your first quarter on campus. Summer Advising sessions can provide you with the information you need to make your academic experience rewarding and effective. As an incoming student, you will be given the name and office hours of your departmental staff adviser; you should arrange to meet with your adviser as soon as you arrive on campus. A well-developed peer advising system supplements the departmental advisers.

Undergraduate education in engineering at UC Davis serves as a sound basis for beginning professional practice in engineering design and development, as a preparation for careers in corporate or governmental operations, or as a foundation for graduate study. To these ends, the college emphasizes fundamental sciences to give students the maximum postgraduate flexibility. Technological developments in recent years have made it clear that engineering education must be based on fundamentals or rapidly become obsolete.

Engineers will continue to face new challenges as society demands improvements in the quality of life and as our state and nation demand greater participation by engineers in efforts toward competitiveness in a global market. As part of a land-grant institution, the College of Engineering must help maintain the technological leadership long enjoyed by the United States, while advancing technology for the benefit of all.

The College of Letters and Science

Office of the Deans
200 Social Sciences and Humanities Building
530-752-0392; http://www.ls.ucdavis.edu

The College of Letters and Science provides students with the opportunity to actively engage the central academic disciplines of the university. The largest of the three undergraduate colleges at UC Davis, the College of Letters and Science offers the majority of the campus's general education courses, more than 50 major programs of study and thousands of courses per year across a broad range of subject areas. Its nearly 500 faculty members are organized into three Divisions—Humanities, Arts and Cultural Studies; Mathematical and Physical Sciences; and Social Sciences—and the affiliated intercollege Division of Biological Sciences. The college confers Bachelor of Arts (A.B.), Bachelor of Science (B.S.) and Bachelor of Arts and Science (B.A.S.) degrees.

The College of Letters and Science is a community of scholars and students sharing a commitment to liberal education rather than to specialized, vocationally oriented training. The college exposes you to the worlds of human experience, of ideas, of artistic accomplishments and of matter and things. Within this curriculum you are able to explore a variety of academic fields, engage in the pursuit of fundamental knowledge, and gain the capacity for independent study and thought. By learning to think carefully and critically, you will be able to continue the ongoing process of education that begins in the classroom but continues over a lifetime. You will have learned how to learn—the ultimate objective of a liberal arts education.

The educational goals of the college are reflected in the three primary groups of requirements established by the faculty: the English Composition Requirement, the Foreign Language and Area Requirements and the Major Requirements.

The **English Composition Requirement** ensures that you are well versed in written communication skills.

The **Foreign Language and Area Requirements** provide you with a broad background of knowledge, guide you in an exploration of the interdependencies of knowledge and acquaint you with other cultures.

The **Major Requirements** provide you with intellectual depth and competence in a selected area of study.

The college has a well-developed system of faculty advisers, student peer advisers and professional staff advisers who are available for individual consultations with undergraduates in a variety of settings, from the deans' office to departmental offices to campus residence halls.

The strength of the college lies in the faculty's commitment to advancing the frontiers of human knowledge through research, artistic expression and other creative endeavors, and to the effective communication and application of that knowledge through teaching and public service. Together, faculty and students in the College of Letters and Science create a climate that enables students to achieve their highest potential.

GRADUATE STUDY

Office of Graduate Studies
250 Mrak Hall
530-752-0650;
http://gradstudies.ucdavis.edu

Graduate students at UC Davis have the opportunity to work with and learn from accomplished faculty, recognized for their contributions to research in their fields. The Office of Graduate Studies oversees more than 80 graduate programs leading to master's or doctoral degrees, which together enroll more than 3,300 graduate students. Many graduate programs are offered through graduate groups, an interdisciplinary concept that allows students to study and work in interrelated areas to broaden their intellectual experiences. See the Graduate Studies chapter.

PROFESSIONAL STUDY

UC Davis has three professional schools—the School of Law (J.D.), the School of Medicine (M.D.) and the School of Veterinary Medicine (D.V.M., M.P.V.M.)—and the Graduate School of Management offers the M.B.A. degree. These schools and programs are described in later chapters.

ACADEMIC RESOURCES

The University Library

530-752-6561; http://www.lib.ucdavis.edu

The General Library at UC Davis is one of the premier research libraries in North America. In addition to Peter J. Shields Library, there are four other General Library facilities: the Physical Sciences and Engineering Library, the Loren D. Carlson Health Sciences Library, the Agricultural and Resource Economics Library and the Medical Center Library in Sacramento. The combined collections of the various General Library facilities total more than 3 million volumes, and more than 41,000 periodical and journal titles are received annually. An extensive variety of government documents, maps, microfilms and CD-ROMs are also part of the collection.

Shields Library houses the collections in the humanities, arts, social sciences, biological sciences, agricultural sciences, mathematics and computer science. The Physical Sciences and Engineering Library collections support teaching and research in engineering, chemistry, geology and physics. The Carlson Health Sciences Library serves the Schools of Medicine and Veterinary Medicine. The library at the UC Davis Medical Center provides a clinical collection of more than 42,000 volumes. The law library, administered by the School of Law, is located in King Hall.

The General Library's HARVEST catalog provides access to campus library holdings. The California Digital Library (CDL) databases, including the MELVYL online catalog, can be used to access the collections of UC Davis and the other eight UC campuses. The HARVEST catalog, the CDL databases and MELVYL can be searched in the libraries, at campus locations, and remotely on the Internet. The libraries also offer access to databases and numerous other electronic resources including more than 10,000 electronic journals. Workstations with Internet access are available for patron use in al library facilities. A wireless network in Shields Library, the Physical Sciences and Engineering Library and the Carlson Health Sciences Library allows for laptop connectivity to library and campus resources.

Information about library services, new full text electronic databases, and important subject-specific World Wide Web sites are available at the library's Web site. The library provides classes on the use of the HARVEST catalog and CDL resources including MELVYL as well as subject specific electronic journals and databases. Librarians are available for consultation on resources for research projects and dissertations.

UC Davis Arboretum

Arboretum Headquarters
530-752-4880; http://arboretum.ucdavis.edu

The 95-acre UC Davis Arboretum, located along Putah Creek's historic north fork, maintains a documented collection of more than 4,000 different kinds of trees, shrubs and perennials for use in teaching and research. Outstanding plant collections include the Shields Oak Grove, the Mary Wattis Brown Garden of California native plants, the Ruth Storer Garden of flowering perennials and small shrubs, and the T. Elliot Weier Redwood Grove. The Arboretum Terrace home demonstration garden promotes sustainable and environmentally appropriate garden practices. Internships are available in nursery management, landscape design and maintenance, environmental education, conservation biology, Integrated Pest Management (IPM) and Geographic Information Systems (GIS).

Information and Educational Technology

IT Express
182 Shields Library
530-754-HELP (754-4357) ithelp@ucdavis.edu
http://scg.ucdavis.edu

Information and Educational Technology (IET) provides computing, communications and digital media services to the campus in support of research and instruction. IET provides the following range of service and support to students.

Computing Help and Information. IT Express, the campus computing help desk, provides assistance with many topics, including Internet software, campus Internet access, and activating and accessing your UC Davis e-mail and computing accounts. A comprehensive source for student computing information, the Student Computing Guide Web site (http://scg.ucdavis.edu), provides campus-related computing and technology news, computer room locations and hours, IT Express hours and much more. Students can also visit the TechNews Web site (http://technews.ucdavis.edu) and sign up to receive a weekly e-mail that includes links to the latest information on computer security, campus wireless and other important service changes and upgrades. MyUCDavis, the campus personalized Web portal (http://my.ucdavis.edu) provides students with access to e-mail, academic information (including grades and class Web sites) and MySpace, a file-storage tool that provides up to 100 MB of storage space for class-related files.

Computer Hardware and Software Needs. Every entering undergraduate student is expected to own a computer that meets certain minimum performance standards and can connect effectively to the Internet. Rather than require a specific system, the campus is stating its expectation in terms of a minimum set of functional requirements. Students should have a computer that will run a word processing program, a spread-

sheet program, an e-mail program, a World Wide Web browser and is equipped with a CD-ROM drive. A printer is also recommended. Equipment feature suggestions for desktop and laptop computers are available at http://computerownership.ucdavis.edu. Desktop systems and laptops that meet or exceed the campus recommended specifications can be purchased at competitive prices at the UC Davis Bookstore Computer Shop. Students who are eligible for need-based financial aid can apply for additional funding to pay for these systems through the Financial Aid Office.

Connecting to the Internet. Students living on campus can connect directly to the Internet from their rooms using ResNet, the high-speed residence hall network. Wireless access to the campus network is also available in many areas on campus, including Shields Library and the Memorial Union; visit http://wireless.ucdavis.edu for more information. Students living off campus need a modem to access the 56K Student Modem Pool.

Campus Computer Rooms. Open-access computer rooms are available on campus for drop-in use and provide access to the Internet and a range of software programs used in UC Davis courses. Many computer classrooms are also available on a drop-in basis when not being used for instruction, and two "media" computer labs are available that specialize in the viewing, editing, and distribution of various types of media.

Computer Security. Guarding against computer viruses and hacker intrusions has become an important part of campus computing life. The campus IT security group maintains a comprehensive Web site (http://security.ucdavis.edu) that provides information on the latest campus security efforts, and helpful instructions on how to prevent a wide range of security issues, including compromised passwords and identity theft.

File-Sharing. Copyright issues surrounding file-sharing and the downloading of music and other digital media are popular topics of discussion at universities nationwide. To help you better understand your rights and responsibilities as a UC Davis student, the Student Computing Guide Web site provides a number of resources on file-sharing.

RESEARCH PROGRAMS AND RESOURCES

Organized Research Units

Organized Research Units (ORUs) are campuswide interdisciplinary research programs that further the university's missions of teaching, research and public service, but do not offer courses of instruction. Members of an ORU come from more than one department and normally from more than one school, college or division.

Agricultural History Center

5202 Social Sciences and Humanities Building
530-752-1827

The center coordinates and administers several research and publication programs that further the study of agricultural and natural resource history. Research activities include studies of comparative farm policy, migration and agricultural development, the history of farm land values, the agricultural-environmental border, rural international borderlands in the Americas, the causes and consequences of agricultural mechanization and other sources of productivity improvements in the 19th and 20th centuries and the impact of scientific research.

Bodega Marine Laboratory and Reserve

Bodega Marine Laboratory
P.O. Box 247
Bodega Bay, CA 94923
707-875-2211; 707-875-2009 (fax); ucdbml@ucdavis.edu;
http://www-bml.ucdavis.edu

The Bodega Marine Laboratory is dedicated to research and teaching in marine biology and related fields. Research areas include population biology/ecology, cell and organismal biology, and aquaculture and fisheries. Well-equipped facilities feature running seawater in two classrooms and most laboratories, a marine science library, lecture hall, housing facilities, greenhouses, experimental freshwater system for anadromous fish studies and a dive locker and air station. Faculty teach a number of undergraduate courses during the academic year and summer session. The laboratory is located in Bodega Bay, Sonoma County, 100 miles west of Davis.

The Bodega Marine Reserve, part of the UC Natural Reserve System, is 362 acres of remarkably diverse habitats, including an excellent rocky intertidal zone, sand beaches, saltmarsh, lagoon tidal flats, freshwater marsh, coastal prairie and dunes. The reserve also administers adjacent subtidal sand and rock habitats in a marine life refuge. Areas of research include a broad spectrum of field studies of plants and animals in coastal marine, intertidal and terrestrial ecosystems.

California National Primate Research Center (CNPRC)

Primate Center
530-752-0447; http://www.cnprc.ucdavis.edu

The California National Primate Research Center investigates selected human health problems for which the nonhuman primate is the animal model of choice. Research programs include behavioral and neurobiology, developmental and reproductive biology, respiratory diseases, virology and immunology, genetics and a variety of biomedical collaborative research projects. Self-sustaining breeding colonies of macaques are available for study of spontaneously occurring disorders.

Center for Geotechnical Modeling

3101 Engineering III
530-752-7929; http://cgm.engineering.ucdavis.edu

At the Center for Geotechnical Modeling, students and faculty from various departments and other universities conduct research in physical and numerical modeling of geotechnical problems. The center operates two centrifuges including the 9-m radius, 4,500-kg payload, 80-g National Geotechnical Centrifuge. These centrifuges are used to study a variety of topics including groundwater, deformations of foundations of bridges and large buildings and the effects of earthquakes on earth structures. The large centrifuge has undergone a $5 million upgrade funded by the National Science Foundation's George E. Brown, Jr., Network for Earthquake Engineering Simulation (NEES; http://nees.ucdavis.edu). The upgrades include installation of a biaxial shaker, a robot, a network of wireless sensors and the ability for researchers to actively participate in earthquake research via the Internet.

Center for Health and the Environment (CHE)

(formerly Institute of Toxicology and Environmental Health)
530-752-1340

CHE coordinates interdisciplinary research on the effect of environmental agents, including chemicals and radiation, on the health of humans, animals and other organisms. Researchers conduct epidemiologic studies in human populations, and experiments are performed with whole animals as well as organisms, cells and molecules to measure environmental exposures and health outcomes associated with them. Research on the development of agents for population control of humans and wildlife seek to mitigate the adverse effects of overabundance on the environment. Studies on toxic, radioactive, mutagenic, carcinogenic and teratogenic compounds are carried out in special animal holding facilities. Laboratories are equipped for studies in analytical chemistry, biochemical toxicology, cell and molecular biology, endocrinology, inhalation toxicology, morphology and reproductive and developmental biology. The center houses a major universitywide program and federally funded center in occupational medicine and a School of Medicine program in reproductive biology.

Center for Image Processing and Integrated Computing

Bernd Hamann and David Rocke
530-752-6298; 530-752-8894 (fax);
http://www.cipic.ucdavis.edu

The Center for Image Processing and Integrated Computing focuses on data analysis, visualization, computer graphics, optimization, and electronic imaging. The central emphasis is the investigation of techniques for the study of large-scale, multi-dimensional data sets. These techniques may be applied to the analysis and visualization of environmental, geophysical, astrophysical, biological, fluid flow, and satellite data. The center seeks to solve complex data analysis and visualization problems in a cross-disciplinary environment, working with researchers in academia, national research laboratories and industry.

Crocker Nuclear Laboratory

530-752-1460

This facility is an interdepartmental laboratory for the application of nuclear science to a variety of disciplines. The laboratory has research programs in nuclear physics and chemistry, air pollution analysis, use of pulsed ultra-violet light as an alternative to pesticides and insecticides, biology, material damage studies, the effect of background radiation on computers and historical studies. Isotopes produced by the variable-energy 76-inch cyclotron are used in clinical and research applications, including pioneering work in brain imaging.

Institute of Governmental Affairs

Alan L. Olmstead, Director
360 Shields Library
530-752-2042; 530-752-2835 (fax)
http://www.iga.ucdavis.edu

The Institute of Governmental Affairs (IGA) serves as a research base for social science faculty at UC Davis. IGA serves approximately 80 faculty from 28 campus departments as well as visiting scholars from throughout the United States and around the world.

Located in the core of the Davis campus, IGA houses eleven formal research programs: Asian Economic Panel; Center for International Data; Center for State and Local Taxation; Center on Rural Economies of the Americas and Pacific Rim; Center on Quantitative Social Science Research; Center on Social Sciences and the Law; Joint Center for International Security Studies; Program on Immigration, Population and the Economy; Program on Pacific Rim Business and Development; Program on Technology, Institutions, and Economic Growth; and Program on Welfare, Education, and Inequality.

Specialized services include grant advising, preparation, and administration; research program development; library and data services; social science computing, programming, and statistical consulting; seminar, workshop, and conference organization; and much more. The institute also enhances the education of students by providing research opportunities. The institute sponsors an active public affairs program. IGA serves as the UC Davis liaison to the systemwide program, Institute on Global Conflict and Cooperation (IGCC).

Institute of Transportation Studies

Daniel Sperling
530-752-6548; 530-752-6572 (fax); dsperling@ucdavis.edu;
http://www.its.ucdavis.edu

The institute conducts multidisciplinary research on complex problems related to traffic congestion and local and global pollution and disseminates research results to the broader academic and professional community. Research priorities are travel behavior, alternative-fueled vehicle technology and policy, energy and environmental projects and advanced vehicle and highway systems. About 40 faculty members and 70 students from more than 10 academic disciplines, including three Engineering departments, Economics, Environmental Science and Policy, Agricultural and Resource Economics, and the Graduate School of Management, participate in the research activities of the institute. The institute also houses the Fuel Cell Vehicle Center and the Graduate Group in Transportation Technology and Policy.

John Muir Institute of the Environment (JMIE)

Dennis E. Rolston
530-754-9135

The institute facilitates the application of research and exchange of information to improve the scientific basis for making decisions on environmental issues. It encourages, facilitates and coordinates multidisciplinary research focused on environmental topics, acts as the administrative unit for specific programs of organized environmental research and facilitates the exchange of information and communication among policy makers, resource agencies, academic scientists and the public through outreach programs.

Program in International Nutrition

Kenneth H. Brown
3150 Meyer Hall
530-752-1992; 530-752-3406 (fax); khbrown@ucdavis.edu;
http://www-nutrition.ucdavis.edu/pin/index.htm

Faculty members of the Program in International Nutrition are studying the epidemiology and causal mechanisms of the major nutritional problems of human populations in developing countries, with the ultimate objective of planning, implementing, and evaluating programs to ameliorate these

problems. Current areas of research include maternal and child nutrition, nutrition and infection, nutritional assessment, and food and nutrition policy. The program manages a small microcomputer center for the analysis of clinical and population-based studies of relevance to international nutrition.

Additional Research Centers and Resources

Adult Fitness Program

Department of Exercise Science
530-752-2540

The Adult Fitness Program serves as an educational laboratory for undergraduate and graduate students engaged in advanced study of the role of exercise and nutrition in the management of optimal physiological function. Basic and clinical research studies focus on cardiovascular, respiratory and metabolic functions. The program emphasizes risk reduction for cardiovascular disease and development of cardiorespiratory endurance. Studies stress fitness, cardiovascular health, and weight reduction and control through appropriate diet and exercise programs that are individually prescribed after extensive medical and physiological testing.

California Agricultural Experiment Station

College of Agricultural and Environmental Sciences
530-752-1610

The California Agricultural Experiment Station has branches in Davis, Riverside and Berkeley. The Davis branch includes 500 faculty in more than 30 departments in the College of Agricultural and Environmental Sciences, the Division of Biological Sciences and the School of Veterinary Medicine. In addition to laboratory facilities, it has approximately 3,000 acres devoted to agricultural research in the areas of experimental crops, orchards and animal facilities. The Experiment Station facilitates research in agricultural production, food processing, nutrition, animal care and disease prevention, consumer sciences and community development and environmental quality, with emphasis on resource conservation and management, water and soil pollution and regional planning.

Center for Child and Family Studies

West House of Child and Family Study Center
530-752-2888; http://ccfs.ucdavis.edu

The Center for Child and Family Studies is a research, teaching and demonstration laboratory of the Division of Human Development and Family Studies in the Department of Human and Community Development. At the laboratory, students enrolled in human development courses develop observational techniques and participate with peers, children, parents and professionals in a fully integrated laboratory of developmental programs for young children. Students study theories of development in a naturalistic setting, linking theory to principles of interaction and developing a recognition and respect for individual differences. Selected undergraduate students participate in faculty and graduate student research at the laboratory.

Center for Developmental Nutrition

TB 33
530-752-7516

The Center for Developmental Nutrition supports predoctoral and postdoctoral research in nutrition and development. The laboratory promotes collaborative research on the study of how nutrients influence the development of individuals at multiple life stages.

Center for Neuroscience

Edward G. Jones, Director
1544 Newton Ct.
Davis, CA 95616
530-757-8708; 530-757-8827 (fax);
http://www.neuroscience.ucdavis.edu

The Center for Neuroscience is an interdisciplinary unit that serves as the focal point for the study of the neurosciences at UC Davis. Faculty affiliated with the center are from 13 departments and sections. The center sponsors a seminar series, conferences and symposia, distributes a quarterly newsletter, provides research space for center members and supports graduate students, postdoctoral scholars and distinguished visitors.

Faculty and students are engaged in the study of brain mechanisms responsible for normal human cognitive and perceptual processes and in the study of fundamental aspects of nerve cell function and development. A core group of cognitive neuroscientists uses various imaging techniques and electrophysiological techniques to study both the normal and lesioned cerebral cortex to understand how the normal brain controls behavior. Other faculty members use either animal models to understand how information is processed in the brain or simple systems to study the fundamental biology of nerve function and development and disorders affecting them.

Health Sciences Research Laboratories

The Health Sciences Research Laboratories are biological science facilities with research staff and assistance for faculty, staff and students.

- **Animal Surgery Laboratory**
  Buildings H and J—Animal Resources Service
  530-752-7756; latalken@ucdavis.edu; jesdavis@ucdavis.edu

This unit is a surgical research facility in compliance with NIH, AAALAC, and USDA standards. Instruction in surgical techniques is available. Surgical instruments, drapes, anesthesia machines, scrub suits, and equipment for monitoring vital signs and physiologic parameters are available. Staff are available to perform or assist with both survival and non-survival surgical procedures depending on the investigator's requirements. Staff are available for post-operative care and collection of samples and data as required.

- **Biochemistry and Special Instrumentation Laboratory**
  TB 161
  530-752-0320

This central facility provides investigators access to certain common but expensive laboratory equipment, including ultracentrifuges and high-speed centrifuges with rotors, scintillation and gamma counters, UV/VIS spectrophotometers, densitometers, Betaplate and Elisa readers.

Human Performance Laboratory

164 Hickey Gym
530-752-0965/530-754-8675

The Human Performance Laboratory (HPL) was founded in 1963 and has a long history of basic and applied research and outreach in exercise physiology, biomechanics and psychology. The HPL has been involved in a variety of research areas since its inception including metabolism, heat stress, fluid balance, injury prevention, body composition and health benefits of physical activity and fitness. The HPL is represented by full-time and adjunct faculty members with varying research backgrounds and scientific interests. The HPL facilities allow measurement of a comprehensive list of human performance characteristics. Investigators have access to advanced data acquisition systems for evaluation in the areas of biomechanics, motor learning, environmental physiology, cardiopulmonary and thermoregulatory physiology, human nutrition and exercise and muscle metabolism. Specific technologies and capabilities include a biochemistry lab, extensive computing facilities, high speed 3-D video motion analysis, ground reaction force measurement, ultrasound imaging, a temperature and humidity controlled environmental chamber and systems for measurement of oxygen consumption, body composition and psychomotor performance. The HPL meets the needs of today's creative researcher and has the capacity to assist in answering tomorrows research questions.

Humanities Institute

227 Voorhies Hall
530-752-2295; 530-752-4263 (fax)

The Davis Humanities Institute organizes interdisciplinary research seminars open to faculty and graduate students and promotes creative exchanges among the humanities, social sciences and environmental sciences. Its fellowship program enables campus fellows and distinguished visitors to participate in year-long seminars on designated themes. The institute also sponsors distinguished visiting lecturers, develops conferences and colloquia, supports interdisciplinary research clusters and a graduate student research assistantship program, co-sponsors lectures with other departments, organizes a Friday noon series of talks entitled "Problems and Paradigms," produces a calendar of events and publishes a newsletter, *Humanities at Davis*.

Intercampus Institute for Research at Particle Accelerators

Richard L. Lander
325 Physics/Geology Building
530-752-1780

The institute conducts research using the unique facilities at national and international accelerator laboratories, particularly the Enrico Fermi National Accelerator Laboratory and the Large Hadron Collider to be built in Europe. High-energy particle physics is the dominant area of research. The institute also promotes seminars and lectures by visiting researchers.

Mann Laboratory

104 Mann Laboratory
530-752-1410; 530-752-4554 (fax)

Plant scientists in the Louis K. Mann Laboratory study the physiology, biochemistry and molecular biology of harvested fruits, vegetables and seeds to improve and maintain their quality during storage, processing and marketing. The six faculty housed in this facility are members of the Department of Vegetable Crops and are assisted by numerous students, postdoctoral researchers and visiting scientists. Research ranges from the basic molecular biology of fruit ripening and seed development to practical storage technologies for whole and lightly processed fruits and vegetables. Results are of interest to other researchers in the plant sciences and to growers, shippers, marketers and consumers of fresh fruit and vegetables. The facility is equipped with 18 controlled-temperature rooms, eight research laboratories and a conference room and library.

Molecular Structure Facility

8 Hutchison Hall
530-752-6392

The Molecular Structure Facility (MSF) provides state-of-the-art instrumentation for the structural elucidation and identification of biological and organic molecules. Protein/proteome analysis is a particular focal point of the facility. The MSF keeps abreast of the latest technological advances in proteomics including mass spectrometers and liquid chromatography systems such as MALDI-TOF, ESI-TOF, TOF-TOF, and 2-D LC/MS/MS and also provides advanced biotechnological instrumentation for protein sequencing, amino acid analysis, 2D-gel electrophoresis and DNA synthesis. As a core instrumentation and biomolecular resource facility, the MSF supports various research programs across the campus and is open to off campus researchers as well.

Natural Reserve System

Virginia Boucher
2112 Wickson Hall
530-752-6949; http://nrs.ucop.edu

The Davis campus administers six reserves that are available for teaching and research.

- Bodega Marine Reserve, located at Bodega Bay, 100 miles west of campus, consists of coastal dune vegetation and bay and coastal tidal areas with facilities for overnight and longer stays. (See Bodega Marine Laboratory in "Organized Research Units" section.)
- Eagle Lake Biological Field Station is on the shore of Eagle Lake in northeastern California and has boats, a small laboratory and facilities for overnight and longer stays.
- Jepson Prairie Reserve, located in Solano County 13 miles south of Dixon, consists of native California bunchgrass grasslands, vernal pools, playa lakes and freshwater sloughs.
- Donald and Sylvia McLaughlin Reserve, located near Clear Lake about 70 miles northwest of campus, consists of Inner Coast Range habitat with a mix of serpentine and non-serpentine soils. The reserve has a facility for long-term overnight stays with a well-equipped kitchen, full bath, and a camping area for class groups.
- Quail Ridge Reserve consists of Inner Coast Range habitat located about 30 miles west of campus on a peninsula jutting into Lake Berryessa. The reserve has a facility with a well-equipped kitchen, full bath, 3 four-wheel drive vehicles and camping areas for groups.
- Stebbins Cold Canyon Reserve, located about 24 miles west of campus, has representative populations of several different plant communities found in California's Inner and Outer Coast Ranges.

The university maintains over 34 reserves throughout the state, many of which are available for teaching and research.

Nuclear Magnetic Resonance Facility

Medical Sciences 1D
530-752-7677; http://www.nmr.ucdavis.edu

The Nuclear Magnetic Resonance Facility provides researchers in the biological, medical and physical sciences access to state-of-the-art NMR instrumentation for spectroscopy and imaging. At present, the facility operates six spectrometers of varying purposes and capabilities. Two horizontal magnet bore spectrometers are used for imaging and *in vivo* spectroscopy of small animals and materials. Two vertical bore spectrometers are used primarily for solution studies of biomolecules, with an additional vertical bore instrument for *in vitro* studies of perfused organs. One spectrometer is used for spectroscopy of solids. All of the spectrometers are multi-nuclear, and a large variety of high resolution, surface and imaging coils are available for use. The facility also has workstations for off-line data processing. Three full-time staff members are available to assist campus researchers in utilizing the instrumentation.

Social Science Data Service

105 Social Sciences and Humanities Building
530-752-6063; http://www.ssds.ucdavis.edu

The Social Science Data Service (SSDS) is a unit of the Institute of Governmental Affairs (IGA). SSDS provides consulting, computing and specialized support services to faculty and graduate students involved in quantitative social science research on the UC Davis campus. SSDS staff provides consulting on a wide range of software used by social scientists and assists with questions regarding the use of SSDS computers, as well as statistical and data-related programming. SSDS manages a UNIX system that provides a platform for quantitative social science computing. Specialized support is available for extramurally funded research projects managed by IGA.

Student Farm

530-752-7645; studentfarm@ucdavis.edu
http://studentfarm.ucdavis.edu

The Student Farm offers students a wide range of educational and research opportunities in sustainable agriculture through numerous internship offerings, formal courses (e.g., in organic crop production, sustainable agriculture and environmental education) and research efforts. Opportunities include working in several staff-supervised hands-on projects such as year-round production and marketing of organic vegetables, on-farm composting, tractor operations and environmental education tours for school children. In addition, students may conduct field and greenhouse experiments in various aspects of sustainable agriculture or other individual projects. The farm is located on the west edge of the campus core, near the Rec Pool, and is open to all students, regardless of major or background.

UC Agricultural Issues Center

132 Social Sciences and Humanities Building
530-752-2320; http://aic.ucdavis.edu; agissues@ucdavis.edu

The UC Agricultural Issues Center, headquartered at Davis, is a universitywide research and outreach unit that draws on expertise from many disciplines. The center focuses on agricultural issues related to science and technology, international trade, agribusiness trends, rural-urban issues, natural resources and the environment, human resources and commodity policy and markets.

UC Davis Herbarium (Center for Plant Diversity)

Section of Plant Biology
530-752-1091/0617;
http://herbarium.ucdavis.edu

The UC Davis Herbarium provides information on the names, uses, toxicity and distribution of plants. Anyone can visit the herbarium to use its dried plant collections (250,000 specimens), botanical library and microscopes, but a phone call is suggested to make sure staff will be available to assist you. The collections are used most commonly to check plant identifications, but they are also used by campus faculty and students for teaching and research in plant systematics and ecology. Herbarium staff answer hundreds of public service requests each year (especially identification of weeds and poisonous plants). Collections include vascular plants, bryophytes, lichens and algae. The majority of these specimens are angiosperms (flowering plants), mainly from California, but the collections are worldwide in scope, with strong holdings from North America, Ecuador, Baja California and regions with Mediterranean climate regimes. The herbarium is well known for its collection of weeds and poisonous plants, although it also has world-class collections of grasses, oaks and spurges. The Herbarium's support group, the Davis Botanical Society, hosts a wide range of botanical events, workshops, and trips each year.

Veterinary Genetics Laboratory

DNA Laboratory, Armstrong Tract,
530-752-2211

The laboratory is recognized for its pioneering research on animal blood groups and biochemical polymorphisms. Current research activities include studies of the genetic basis of animal diseases, development of DNA marker screening tests and gene mapping. The knowledge acquired is applied to genetic disease diagnostics and parentage verification for domestic animals (horses, cattle, sheep, goats, elk, llamas, alpacas and dogs) and wildlife. In the mid 1990s, VGL began development of a small-scale animal forensics service program that handled minor civil cases, and is now involved in high profile criminal cases both nationally and internationally.

Veterinary Medicine Teaching and Research Center (VMTRC)

UC Davis VMTRC
18830 Road 112
Tulare, CA 93274
559-688-1731; http://www.vmtrc.ucdavis.edu

VMTRC is a clinical teaching and research center within the UC Davis School of Veterinary Medicine. The center offers a forum for teaching, research and service programs for D.V.M. students, M.P.V.M. students, graduate students, residents, university faculty and visiting researchers interested in food animal medicine. VMTRC programs emphasize herd health medicine, epidemiology and preventive medicine, production management, agricultural economics, environmental protection, food safety and animal welfare.

X-Ray Crystallographic Facility

Marilyn Olmstead
Department of Chemistry
530-752-6668

The X-Ray Crystallographic Facility, located in the Department of Chemistry, provides crystal structure determinations for researchers. Single crystals from all branches of chemistry are studied. Recently, the facility acquired a Bruker SMART X-ray diffraction system with a low temperature accessory and a high powered stereomicroscope. The facility also has three older X-ray diffractometers, one of which is equipped with a rotating Cu anode source. Consultation and collaboration on a variety of single crystal related projects can be arranged.

UNDERGRADUATE ADMISSION

UCDAVIS





2004–2005 · 2005–2006

UNDERGRADUATE ADMISSION

Undergraduate Admissions and Outreach Services
One Shields Avenue
University of California
Davis, CA 95616-8507
530-752-2971; 530-752-4360 (TTY),
530-752-1280; 530-752-3712 (fax); uaos@ucdavis.edu;
http://my.ucdavis.edu

Applying to UC Davis

You can apply online at http://www.ucop.edu/pathways, or you can print your own copy of the application at http://www.ucop.edu/pathways/getapp.html.

The Application for Undergraduate Admission and Scholarships can also be obtained from any California high school, community college or from any UC admissions office.

The initial filing periods to apply for admission and scholarships for fall quarter at UC Davis are as follows:

Quarter	Initial Filing Period
Fall 2005	November 1–30, 2004
Fall 2006	November 1–30, 2005

UC Davis is usually closed to new undergraduate applicants for winter and spring quarters. To seek admission for winter or spring quarter, you will need to submit a completed application with fee and an appeal letter directly to Undergraduate Admissions and Outreach Services during the appropriate initial filing period. The filing periods to submit your application for admission and scholarships for winter or spring quarters at UC Davis are as follows:

Quarter	Initial Filing Period
Winter 2005	July 1–31, 2004
Spring 2005	October 1–31, 2004
Winter 2006	July 1–31, 2005
Spring 2006	October 1–31, 2005

Application Fees

The application fee of $40 entitles you to apply to one University of California campus. If you want to apply to more than one UC campus, you must pay an additional $40 for each campus you select. These fees are not refundable. You must include the fee with the application or it will not be processed. Attach a check or money order made payable to the Regents of the University of California to the application form.

The University of California will waive application fees for up to four campuses for qualified students who otherwise would be unable to apply for admission. To be accepted for the fee waiver program, you must meet specific requirements related to your family income and size. The fee waiver program is for United States citizens and permanent residents only. Go to http://www.ucop.edu/pathways/impinfo for more information.

Preparing for University Work— Freshman

A carefully planned program of high school courses provides you with the best preparation for university work. As a prospective university student, you should give priority to completing the high school courses required for admission—known as the "a–g" subject requirements; see http://www.ucop.edu/pathways/impinfo/freshx.html.

You should take college preparatory courses that will challenge you to work hard and will prepare you beyond minimum levels of competence in reading, writing and mathematics. A student who is well prepared for university work will have taken four years of English in high school, three to four years of mathematics, two to three years of foreign language, two to three years of laboratory science, two or more years of history/social science, one or more years of visual or performing art and one or more years of college preparatory electives.

Reading: You should become proficient in reading and understanding technical materials and scholarly works. Learn to read analytically and critically, actively questioning yourself about the author's intentions, viewpoint, arguments and conclusions. Become familiar and comfortable with the conventions of standard written English, and with various writing strategies and techniques. Your reading experience should include original works in their entirety, not just textbooks and anthologies, and should encompass a wide variety of forms and topics.

Writing: Effective critical thinking and proficiency with the written language are closely related, and both are skills that every university student must master. By university standards, a student who is proficient in English composition is able to understand the assigned topic; select and develop a theme by analysis and argument; choose words that aptly and precisely convey the intended meaning; construct effective sentences (i.e., sentences that economically and successfully convey the writer's ideas and display a variety of structures); and demonstrate an awareness of the conventions of standard written English.

If you plan to attend the university, you must take English courses in high school that require the development and practice of these skills. You must take at least four years of English composition and literature classes that stress expository writing.

Mathematics: Many undergraduate majors require preparation in mathematics beyond the three years required for admission to the university. All majors in the natural and life sciences, engineering and mathematics require calculus. Many majors in the social sciences require statistics or calculus, or both. Calculus is also required for undergraduates preparing for careers in the environmental sciences, dentistry, medicine, optometry, pharmacy and biostatistics. If you select a major that requires either calculus or statistics, you should expect to take that course during your first year at the university.

Prepare yourself for university courses in mathematics while you are still in high school. Good preparation includes a year of mathematics beyond second-year algebra (such as precalculus, mathematical analysis, analytic geometry) and definitely a course in mathematics during your senior year.

Algebra is necessary for success in university mathematics courses. Students who do not take a mathematics course during their last year in high school often find they need to take a preparatory course at the university in order to renew their algebra skills. The need to take such a course at the university could delay your undergraduate studies that require mathematics as a prerequisite.

Finally, take advantage of any guidance your high school offers in study skills and diagnostic tests designed to help you assess your preparation for college. Managing your time well and

studying effectively are critical to excelling at the university. Together with solid academic preparation, these skills should enable you to realize your educational goals and, ultimately, fulfill your career aspirations.

ADMISSION AS A FRESHMAN

The University of California defines a *freshman applicant* as a student who has graduated from high school but has not enrolled since then in a regular session in any college-level institution. Summer session immediately following high school graduation is excluded in this determination.

Admission requirements for California residents are different from those for nonresidents. Nonresidents must meet higher scholarship requirements.

The following describes the minimum requirements to establish eligibility at the University of California. Applicants to UC Davis generally must perform well above these minimums in order to gain admission since the number of eligible applicants exceeds the number of students we can admit. We give priority to students on the basis of highest academic achievements and test scores.

Minimum Requirements for California Residents

To be minimally eligible for admission to the University of California as a freshman, you must meet the subject requirements, scholarship requirement and examination requirements that are described on this and the following pages.

Subject Requirements: a–g

You must complete at least 15 high school units in the subject areas listed below. One unit is equal to one year's worth of coursework. At least seven of the required 15 units will have to be taken in the last two years of high school. The required course sequence is often referred to as the "a–g" pattern. Go to http://www.ucop.edu/doorways to view the "a–g" pattern for the UC approved course list for California high schools.

Courses taken in the 9th grade and completed with a grade of *C* or better can satisfy a subject requirement; however, the grades will not be used in computing your grade point average. If you receive a grade of *D* or lower in a 9th-grade course, you have not satisfactorily completed the subject requirement until you repeat the course (or, in some cases, complete a more advanced course) with a grade of *C* or better.

a. History/Social Science—2 years

One year of United States history, or one-half year of United States history and one-half year of civics or American government; and one year of world history, cultures and geography.

b. English—4 years

Four years of English—composition and literature. Classes should stress preparation for university study, including frequent and regular practice in writing expository prose compositions of some length. Not more than one year will be accepted from the 9th grade and no more than one year may be ESL-type coursework.

c. Mathematics—3 years; 4 years recommended

Three years of mathematics—elementary algebra, geometry and intermediate algebra. (Courses taken in grades 7 and 8 may partially satisfy the requirement if they are accepted by the high school as equivalent to its own courses.)

d. Laboratory Science—2 years; 3 years recommended

Two years of laboratory science providing fundamental knowledge in at least two of these three areas: biology, chemistry and physics. Not more than one year of laboratory science taken in the 9th grade may be used to meet this requirement.

e. Language other than English—2 years; 3 years recommended

Two years of the same language other than English. Courses should emphasize speaking and understanding, and include instruction in grammar, vocabulary, reading and composition. (Courses taken in grades 7 and 8 may satisfy this requirement if they are accepted by the high school as equivalent to its own courses.)

f. Visual and performing arts—1 year

Courses should enable you to understand and appreciate artistic expression, and to talk and write with discrimination about artistic materials studied. Courses that develop creative artistic ability or artistic performance may be used. (Courses that are recreational or are offered under physical education are not acceptable.)

Note: For graduates in 2004 or 2005, the university will allow two semesters of any approved VPA coursework in the same area. Graduates in 2006 or later will be required to complete a year long VPA course where the first semester is a prerequisite for the second semester.

g. College Preparatory Electives—1 year

Two years in addition to those required in "a" through "f" above.

UC Eligibility Index and Conversion Table

"a-f" GPA	SAT Total*	ACT score	Equivalent SAT I score
2.80-2.84	4640	36	1600
2.85-2.89	4384	35	1580
2.90-2.94	4160	34	1520
2.95-2.99	3984	33	1470
3.00-3.04	3840	32	1420
3.05-3.09	3720	31	1380
3.10-3.14	3616	30	1340
3.15-3.19	3512	29	1300
3.20-3.24	3408	28	1260
3.25-3.29	3320	27	1220
3.30-3.34	3248	26	1180
3.35-3.39	3192	25	1140
3.40-3.44	3152	24	1110
3.45-3.49	3128	23	1070
3.50 or higher	3120	22	1030
		21	990
		20	950
		19	910
		18	870
		17	830
		16	780
		15	740
		14	680
		13	620
		12	560
		11	500

*SAT total: (SAT I composite) + (2x (SAT II English + SAT II math + third SAT II)). SAT I composite is highest combined mathematics and verbal scores from a single sitting. See conversion table (right) to convert ACT scores to SAT I composite score.

- **History and English:** courses that fit the general description for courses above.
- **Advanced mathematics:** trigonometry, linear algebra, pre-calculus (mathematical analysis), calculus, statistics, computer science and similar courses. (Courses containing significant amounts of material for arithmetic or from shop, consumer or business mathematics are not acceptable.)
- **Laboratory science:** courses in the biological and physical sciences. A general science course taken in grade 9 as preparation for a laboratory science maybe used.
- **Language other than English:** courses may be in either the same language used to satisfy the "e" requirement or a second foreign language. If a second language is chosen, however, at least two years of work in that language must be completed.
- **Social science:** courses that serve as preparation for lower division work in social science at the university. (Courses of an applied, service or vocational nature are not acceptable.)

If you are a California high school graduate, the courses used to satisfy the subject requirement must appear on a list that your high school principal has certified meets the course descriptions above, and has been accepted by the university's Office of Student Academic Services. If you submit courses from an out-of-state school, Undergraduate Admissions and Outreach Services will determine if your courses fulfill the subject requirement.

Scholarship Requirement

You must have earned a grade of *C* or better in all high school courses to satisfy the "a–g" requirements above. The grades earned in these courses that are taken in grades 10 through 12 will be used to evaluate your grade point average for minimum eligibility.

Applicants to UC Davis generally must perform well above minimums in order to gain admission.

If you are a California resident and your grade point average is 2.80 or above in the required "a–g" subjects taken after the 9th grade, you will meet minimum requirements for the university if you achieve the specified scores on the standardized tests (see the UC Eligibility Index).

The university calculates your grade point average (GPA) in the "a–g" subjects by assigning point values to the grades you earn, totaling the points, and dividing the total number of "a–g" course units. Points are assigned as follows" *A*=4 points, *B*=3 points, *C*=2 points, *D*=1 point, *F*=0 points. The university assigns extra points for up to four units of university certified honors level and advanced placement courses taken in the 10th, 11th, and 12th grade: *A*=5 points, *B*=4 points, *C*=3 points. No more than two units of UC approved honors level courses taken in the 10th grade may be given extra points. A grade of *D* in an honors or advanced placement course does not earn extra points.

In determining the required grade point average, the university will use a semester grade of *A* in one course to balance a semester grade of *C* in another. Grades you received in courses taken in the 9th grade or earlier are not used in determining your grade point average. (However, these courses may be used to satisfy subject requirements.) The grades that appear on your official high school transcript, including those earned in accelerated and advanced courses, are the grades the university will use in evaluating your record. Grades are counted on a semester basis unless your school gives only year grades.

To meet the subject and scholarship requirements you may repeat courses in which you received a grade of *D* or lower. The grade achieved in the repeated course will be calculated into the grade point average. There is no limit to the number of repeated courses that may be used in the "a–g" pattern, but each course may be repeated only one time.

Examination Requirement

All freshman applicants must submit official scores from the College Board (SAT-I, SAT-II) or the American College Testing (ACT) Program. If you are applying for admission to the fall quarter, take the tests no later than December of your senior year (earlier testing is strongly recommended). Applicants to UC Davis generally must perform well above the minimum requirements to gain admission. The following tests are required:

- Scholastic Assessment Test-I (SAT-I–College Board)—The verbal and mathematics tests scores you submit must be from the same sitting,

  OR

- American College Test (ACT)—the composite score is used,

  AND

- Three Scholastic Assessment Tests-II (SAT-II–College Board), which must include (a) writing test, (b) mathematics (level I, Ic or IIc) and (c) one test from the social studies or science or foreign language, or the test in English literature (not mathematics). The English Language Proficiency Test is not an acceptable option.

The UC Eligibility Index incorporates SAT II test scores. If you are a California resident, and your grade point average is 2.80 or above in the required "a–g" subjects taken after the 9th grade, you will meet the minimum requirements for the university if you achieve the specified scores on the standardized tests (see UC Eligibility Index).

Make arrangements to take the required SAT-I and SAT-II with your high school or by writing to College Board SAT, Princeton, NJ 08541; http://www.collegeboard.com. For the American College Test (ACT) write to American College Testing Program, Registration Unit, P.O. Box 168, Iowa City, IA 52240; http://www.act.org. UC Davis' College Board code is 4834 and the ACT code is 0454.

Examination Requirement for Fall 2006 Freshmen and Beyond.

For students entering UC as freshmen in fall 2006, each applicant must submit scores on an approved core test of mathematics, language arts and writing. This requirement can be satisfied by taking either of the following:

- the ACT Assessment plus the new ACT Writing Test,

  OR

- the new SAT I (critical reading, mathematics and writing)

In addition, all applicants must complete two SAT II Subject Tests in two different subject areas: history/social science, English literature, mathematics, laboratory science or language other than English.

College Board Advanced Placement (AP) Examination Credit

Examination	Score	UC Davis Course Equivalencies*	Continuing Course	Credit Toward Degree
ENGLISH				
A score of 3, 4, or 5 on the English AP examination satisfies the unversity Subject A requirement.				
English	5, 4	English 1, 3		8 units
College of Agricultural and Environmental Sciences: 4 units—Satisfies first half of English composition requirement.				
College of Engineering: 8 units—Satisfies English 1 or 3. *College of Letters and Science:* Satisfies first course toward English Composition requirement.				
English	3			8 units
FOREIGN LANGUAGES				
College of Agricultural and Environmental Sciences: 4 units of credit allowed toward Breadth requirement or Unrestricted electives for each foreign language examination passed.				
College of Letters and Science: Examinations (except for Latin) satisfy the Foreign Language requirement.				
French	5	French 22	French 23, or consultation with adviser	8 units
French	4	French 21	French 22	8 units
French	3	French 3	French 21	8 units
German	5, 4	German 20	German 21, upper division literature courses	8 units
German	3	German 3	German 20	8 units
Latin (Vergil)	5, 4, 3	Latin 2	Determined by consultation with Classics adviser	4 units
Latin (Lyric)	5, 4, 3	Latin 2	Determined by consultation with Classics adviser	4 units
Spanish	5, 4, 3	Spanish 3	Spanish 21, 22, 23, 24, 31, 32, 33 or consultation with adviser	8 units
HUMANITIES				
College of Agricultural and Environmental Sciences: 8 units of credit allowed toward Breadth requirement or Unrestricted electives for each humanities examination passed.				
Art Studio	5	Art Studio 2, 5		8 units
College of Letters and Science: partially satisfies Area (breadth) requirements for A.B. degree.				
Art Studio	4	Art Studio 2		8 units
College of Letters and Science: partially satisfies Area (breadth) requirements for A.B. degree.				
Art Studio	3			8 units
Art History	5	Art History 1A, 1B, 1C		8 units
College of Letters and Science: partially satisfies Area (breadth) requirements for A.B. degree.				
Art History	4, 3			8 units
American History	5, 4, 3	History 17A, 17B		8 units
Satisfies the university American History and Institutions requirement. History 17A and 17B may be taken for full credit.				
European History	5, 4, 3	History 4B, 4C		8 units
All colleges: History 4A and 4B may be taken for full credit.				
Music	5, 4, 3	Music 10		8 units
College of Letters and Science: partially satisfies Area (breadth) requirements for A.B. degree.				
NATURAL SCIENCES				
All colleges: 4 units of credit toward Natural Sciences Credit or Preparatory Course Work allowed for science majors for each Natural Sciences examination passed, except 8 units of credit allowed for Mathematics BC and Physics B examinations.				
Biology	5, 4, 3	Biological Sciences 10		8 units
Biological Sciences 1A is the first course taken by most students contemplating majors in the Life Sciences.				
Chemistry	5	Chemistry 2A	Determined by consultation with adviser	8 units
Although Chemistry 2A may be taken for full credit, students are strongly encouraged to enroll in the 2HA, 2HB, 2HC sequence.				
Chemistry	4, 3	Chemistry 10		8 units
Computer Science AB	5, 4	Engineering: Computer Science 30	Engineering: Computer Science 40	4 units
Credit for Computer Science and Engineering 30 may serve as prerequisite for Computer Science and Engineering 40 with consent of instructor				
Computer Science AB	3			4 units
College of Engineering: examination awards units towards the unrestricted electives requirement.				
Computer Science A	5, 4, 3		Engineering: Computer Science 30	2 units
Environmental Sciences	5, 4, 3	Environmental and Resource Sciences 10, 10G	Environmental and Resource Sciences 60	4 units
Mathematics AB	5, 4	Mathematics 12, 16A, 17A or 21A	Mathematics 16B, 17B or 21B	4 units
Mathematics 16A, 17A or 21A may be taken for full credit. Credit for Mathematics 16A, 17A or 21A equivalents may serve as prerequisite for Mathematics 16B, 17B or 21B.				
Mathematics AB	3		Mathematics 16A, 17A or 21A	4 units
Mathematics BC	5	Mathematics 12, 16A-16B, 17A-17B or 21A-21B	Mathematics 16C, 17C or 21C	8 units
Mathematics 16A, 16B, 17A, 17B, 21A, or 21B may be taken for full credit. Mathematics 16A, 16B, 17A, 17B, 21A, or 21B equivalents may serve as a prerequisite for Mathematics 16B, 16C, 17B, 17C, 21B, or 21C.				
Mathematics BC	4, 3	Mathematics 12, 16A, 17A or 21A	Mathematics 16B, 17B or 21B	8 units
Mathematics 16A, 17A or 21A may be taken for full credit. Credit for Mathematics 16A, 17A or 21A equivalents may serve as prerequisite for Mathematics 16B, 17B or 21B.				
Physics B	5	Physics 1A, 1B, 7A, 7B, 7C, 10	Determined by consultation with adviser	8 units
Physics 7A, 7B, 7C may be taken for full credit.				
Physics B	4, 3	Physics 10		8 units
Physics CI	5	Physics 1A, 7B, or 9A		4 units
College of Engineering: only a score of 5 on Physics CI and CII Examinations applies toward Physics requirement.				
Physics CI	4	Physics 1A or 7B		4 units
Physics CI	3			4 units
Physics CII	5, 4	Physics 1B or 7A		4 units
Physics CII	3			4 units
Statistics	5,4	Statistics 13		4 units
Statistics 13 may be taken for full credit.				
Statistics	3			4 units
SOCIAL SCIENCE				
College of Agricultural and Environmental Sciences: 4 units of credit allowed toward Breadth requirement or Unrestricted electives for each Social Science examination passed.				
American Government and Politics	5, 4, 3	Political Science 1		4 units
Political Science 1 satisfies American History and Institutions requirement.				
Comparative Government and Politics	5, 4, 3	Political Science 2		4 units
Economics (Micro)	5, 4, 3	Economics 1A	Economics 100	4 units
Economics (Macro)	5, 4, 3	Economics 1B	Economics 101	4 units
Psychology	5	Psychology 1		4 units
Psychology	4, 3			4 units

* Scores of 5, 6, and 7 on International Baccalaureate (IB) Higher Level examinations may be considered essentially equivalent to scores of 3, 4, and 5, respectively, on the comparable Advanced Placement examinations. Where no comparable Advanced Placement test is indicated, a passing score on an IB test will yield units toward graduation, but no course credit.

Limitations. Due to the changes in the SAT I, which will include sections on critical reading, mathematics and writing, UC will expect students to take this new exam in March 2005 or later.

The ACT Assessment is acceptable for fall 2006 admission. Students may complete the current ACT at any time but must also complete the ACT Writing Test no later than December 2005. Applicants for freshman admission in fall 2007 and later will be expected to complete both the ACT Assessment and the Writing Test at the same sitting.

UC will not accept the SAT II: Writing Test as an alternative to the ACT Writing Test for fall 2006 applicants.

SAT II: Math Level IIC may be used to fulfill the subject test requirement, however, the SAT II: Writing (with essay) and SAT II: Math Level IC may NOT be used to meet the fall 2006 subject test requirement.

For information regarding the impact of the revised examination requirement on the UC eligibility index, or for further exam requirement updates for freshmen and transfer visit http://www.ucop.edu/pathways.

Eligibility in the Local Context

The top four percent of students at each participating California high school are designated UC eligible and are highly encouraged to apply to one of the nine UC general campuses under the Eligibility in the Local Context (ELC) pathway.

To be considered for ELC, you must complete eleven specific units of the subject requirement by the end of your junior year. With the assistance of each participating high school, the university will identify the top four percent of students on the basis of GPA in the required coursework.

The eleven units include one unit of history/social science; three units of English; three units of mathematics; one unit of laboratory science; one unit of language other than English; two units chosen from among other subject requirements.

The university will notify ELC students of their status at the beginning of their senior year. If you are designated UC-eligible through ELC, you must submit the university's undergraduate application during the November initial filing period and complete remaining eligibility requirements including the subject and examination requirements.

The ELC designation is one of the criteria considered by selective campuses when the number of applicants exceeds the spaces available.

Minimum Requirements for Residents of Other States

If you are a freshman applicant who does not claim California residency, you must meet the following requirements for minimum admission eligibility to the University of California. Applicants to UC Davis generally must perform well above the minimum in order to gain admission to UC Davis:

- Graduate from a regionally accredited or state-accredited high school
- Satisfactorily complete the subject requirements listed under Requirements for California Residents
- Earn a grade point average of at least 3.40 in the courses used to meet the subject requirements
- Complete the examination requirements listed for California residents
- Meet the UC Eligibility Index

Minimum Eligibility by Examination Alone

If you do not meet the minimum scholarship and subject requirements for admission, you can meet minimum requirements for eligibility as a freshman by examination alone. The examinations must be taken before you graduate from high school. (If you have completed transferable college courses, College Board subject tests cannot be taken in academic subjects covered in those courses.) You must take the same College Board tests discussed above and receive a total score of at least 1400 on the SAT-I, or a score of 31 on the American College Test (ACT). Your total score on the SAT-II must be 1760 or higher with no score less than 530 on an individual test. If you are a nonresident applicant, your score on the SAT-II must be 1850 or higher with no score less than 530 on an individual test.

This information is subject to change with the revision of the freshman exam requirements for fall 2006. To determine how students may qualify for eligibility by examination alone using the revised examination requirement, visit http://www.ucop.edu/pathways.

High School Proficiency Examination

The University of California will accept the Certificate of Proficiency or the General Education Development (GED) certificate awarded by the State Department of Education in lieu of the regular high school diploma. However, you must also meet all other university entrance requirements (subject, scholarship and examination).

Transfer Credit

Transfer credit may be granted to a freshman applicant for an acceptable college course taken while still in high school when an official transcript is received from the college that conducted the course. Transfer credit is granted for each College Board Advanced Placement Examination completed with a score of 3, 4 or 5. International Baccalaureate Higher Level Examinations with scores of 5, 6 or 7 will also receive transfer credit. If students take college courses in combination with Advanced Placement or International Baccalaureate Examinations in the same subject areas, transfer credit may be limited due to duplication of credit.

Advanced Placement Examinations

If you take one or more of the College Board Advanced Placement (AP) Examinations and score 3, 4 or 5, you will be awarded college credit. The credit will become part of the minimum 180 quarter units you need in order to receive a bachelor's degree. The credit from the AP Examinations may also be used to satisfy specific degree requirements.

Consult the chart to learn how many units you will receive for an AP Examination (see the column headed: Credit Toward Degree). How those units will be applied toward specific degree requirements in each college is explained for each exam category and in the notes below each exam listing. Please note

that the courses for which AP credit has been granted may not be used as a substitute for courses required as part of the UC Davis General Education Requirement. (See General Education in the "Undergraduate Education" chapter.)

In general, you may not earn university credit for college courses that duplicate credit already earned through AP. There are, however, a few exceptions to this general rule. Since it is often difficult to know exactly which UC Davis course you should take when you have earned AP credit, you should talk with an academic adviser in your major department or dean's office before selecting and en-rolling in classes.

Deferred Enrollment

The Deferred Enrollment program allows newly admitted undergraduate students to postpone their initial enrollment at the university for up to one year. The purpose is to allow time to pursue other activities and opportunities that will assist students in clarifying their educational goals (e.g., job opportunities and experience away from campus, time to resolve personal or medical problems), however, students are not allowed to enroll at another college during this time. To be eligible for deferred enrollment, students must return their affirmative Statement of Intent to Register with the deposit by the deadline and must satisfy all university admission and entrance requirements. The processing fee for this program is $40, and the deadline to submit an application is the 10th day of instruction of the student's first quarter. For more information or to receive an application contact Undergraduate Admissions and Outreach Services (530) 752-3710.

ADMISSION AS A TRANSFER STUDENT

The University of California defines a *transfer applicant* as a student who has been a registered student in a regular term at a college, university or in college-level extension classes since graduating from high school. Summer session attended immediately following high school graduation is excluded in this determination. If you are a transfer applicant, you may not disregard your college record and apply for admission as a freshman.

California residents must meet the requirements that follow. If you are not a California resident, see "Minimum Requirements for Residents of Other States" below. Applicants to UC Davis generally must perform well above the minimums in order to gain admission, since the number of eligible applicants exceeds the number of students we can admit.

The highest priority for admission is given to California community college junior-level transfer applicants with 90 quarter (60 semester) units of transfer work with the highest academic achievement, as well as, in some areas, the completion of lower division major program.

UC Minimum Requirements for California Residents

Transfer applicants must meet one of the following conditions:

- Students who were eligible for admission to the university when they graduated from high school—meaning they satisfied the subject, scholarship and examination requirements or were identified by the University during the senior year in high school for the Eligibility in the Local Context (ELC) program—are UC minimally eligible to transfer if they have a *C* (2.00) in their transferable college course work.
- Students who met the scholarship requirement but did not satisfy the subject requirement must take transferable college courses in the missing subjects, earning a *C* or better in each required course, and have an overall *C* average in all transferable coursework to be eligible to transfer.
- Students who were not eligible for admission to the university when they graduated from high school because they did not meet the scholarship requirements must:

  a. complete 90 quarter (60 semester) units of transferable college credit with a grade point average of at least 2.40 (no more than 21 quarter (14 semester) units may be taken Passed/Not Passed),

  and

  b. complete the following course pattern requirement, earning a grade of *C* or better in each course:

     1. two transferable college courses (4-5 quarter or 3 semester units each) in English composition; and,
     2. one transferable college course (4-5 quarter or 3 semester units) in mathematical concepts and quantitative reasoning; and,
     3. four transferable college courses (4-5 quarter or 3 semester units each) chosen from at least two of the following subject areas: the arts and humanities, the social and behavioral sciences, and the physical and biological sciences.

Go to http://www.assist.org to verify UC transferable courses for California community colleges.

Minimum Requirements for Residents of Other States

If you meet the requirements for admission as a nonresident freshman, you must have a grade point average of 2.80 or better in college courses that are accepted for transfer credit by the University of California.

If you do not meet the minimum requirements for admission as a nonresident freshman, you must have completed at least 90 quarter (60 semester) units of transferable work with a grade point average of 2.80 or better and have completed the subject requirements for California residents. Applicants to UC Davis generally must perform well above the minimums to gain admission to UC Davis.

Transfer Admission to the College of Engineering

The College of Engineering, in screening applicants, gives priority to junior-level California community college students who have completed a minimum of 90 quarter (60 semester) units of transfer work and the specified required lower division engineering courses with high GPAs.

The lower division programs and required courses are specified in the "Programs and Courses" section of this catalog, under the specific engineering major. You can also find this information on the World Wide Web at http://registrar.ucdavis.edu/ucdwebcatalog. Direct questions about courses required for transfer admission to your counselor, to the Engineering Undergraduate Office (530-752-0556) or go to http://www.assist.org.

Unit Credit for Courses Taken Elsewhere

The university gives quarter unit credit to transfer students for courses they have completed at other accredited colleges and universities. To be accepted for credit, your courses must be comparable to those offered at the university, as determined by Undergraduate Admissions and Outreach Services. You can find information about transferable credit from California community colleges at http://www.assist.org.

A total of 105 quarter (70 semester) transferable units toward a university degree may be earned at a community (two-year) college. Only subject credit will be granted for courses taken in excess of these amounts.

UC Intercampus Transfer

If you are an undergraduate student currently or previously registered at another UC campus and have not since been registered in another institution, you may apply for transfer to the Davis campus. Filing dates, the application, fees and admission requirements are the same as those listed for new applicants.

ADMISSION AS AN INTERNATIONAL STUDENT

International students attend the University of California, Davis, from many countries around the world. There were 87 different countries represented on the Davis campus in the 2000-2001 academic year, by an international student population of approximately 1,400 students, as well as an equal number of visiting international faculty and researchers. To be eligible for admission to the University, international students need to meet specific academic and financial qualifications.

Freshman Admission

To be considered for freshman admission, applicants must complete secondary school earning superior marks in academic subjects and receive a certificate of completion that grants admission to university-level studies in that country. All freshman applicants are considered using the same eligibility requirements and are included in the same selection process. If applicants have attended both foreign and U.S. high schools, then both foreign and U.S. courses and grades will be considered. Demonstration of English proficiency may also be required.

Transfer Applicants

Priority is given to prospective California community college transfer students who are prepared to begin their junior or third year of study. Coursework from other colleges and universities is considered transferable if the applicant completed the course at an institution that is recognized by the University of California and is comparable to coursework offered at UC Davis. Students attending colleges or universities outside of the U.S. should be aware that many foreign technical institutes are not recognized and that vocational coursework is not transferable.

International students applying to transfer to UC Davis from California colleges or universities are considered for admission using the same eligibility criteria as domestic students. Applicants who have attended both foreign and U.S. colleges and universities will be evaluated using both foreign and U.S. academic records.

Note: It is not possible to disregard any college or university work undertaken within the U.S. or abroad.

Required Academic Records

International students are responsible for providing UC Davis with official academic transcripts and/or certificates beginning with secondary school records. College and university records should indicate subjects taken; grades or marks earned; rank in class; number of academic terms per year; number of weeks in each academic term; and number of hours per week devoted to lecture and laboratory. Certifications must be provided for any university or government examinations the student has undertaken. Certified English translations of all academic records are required.

Opportunities for International Students in Engineering

The College of Engineering at UC Davis receives many more applications for undergraduate admission than can be accommodated. As a result, the college can only accept a few applications for the fall quarter from international students who have superior records. International students who wish to study in the College of Engineering must be studying at a U.S.-accredited high school, college or university as their last school attended prior to UC Davis.

If you are interested in applying for admission in Engineering majors at other University of California campuses, you must contact each campus directly for information about admission.

English Proficiency

Applicants who have been studying in the U.S. for less than two years and whose native language and school language of instruction prior to study in the U.S. was not English, must demonstrate English proficiency. Applicants may do so in one of the following ways:

- Complete two transferable college courses (3 semester or 4–5 quarter units each) in English composition with *C* grades or better at an accredited U.S. college or university.
- Achieve a minimum score of 550 on the paper-based Test of English as a Foreign Language (TOEFL) or 213 on the computer-based TOEFL. For more information, visit http://www.toefl.org.
- Achieve a minimum score of 7 (academic module) on the International English Language Testing System (IELTS). For more information see http://www.ielts.org. Your IELTS score must be sent directly to the following address:

  Undergraduate Admissions and Outreach Services
  University of California
  One Shields Avenue
  Davis, CA 95616-8507
- Achieve a score of 3, 4 or 5 on the Advanced Placement International English Language (APIEL) exam. For more information, visit http://www.collegeboard.com/ap/students/apiel.
- Achieve a minimum score of 560 on the SAT II: Subject Examination in Writing

Estimated Costs for 2004–2005

For the 2004–2005 academic year, international students seeking nonimmigrant visas must guarantee $29,000 is on deposit, in a bank, available for their support for the first year of study. It is estimated that tuition and fees will be $15,500 and minimum living expenses will be $13,500. Financial aid is not available to international students. International students with nonimmigrant visas must anticipate paying full fees for the duration of their stay at UC Davis. Fees are subject to change without notice.

CAMPUS ADMISSION STANDARDS

The University of California makes every effort to provide a place for all California resident applicants who meet the minimum UC admission requirements and file an application during the initial filing period. Given the severity of recent state budget cuts—and the lack of state funding for enrollment growth in 2004-2005—the University may no longer be able to guarantee admission to all eligible students.

In recent years, UC Davis has received more applications than the number of spaces available. When UC Davis cannot accept all eligible applicants, it uses standards that are more demanding than the minimum requirements to select students. These standards, which are called selection criteria, identify those students who have demonstrated the capacity for high academic achievement and who have a variety of other qualities that can contribute to the strength and diversity of the campus community.

The selection criteria described below were used for applicants for the fall 2004 term. The criteria may differ for the winter and spring terms because enrollment targets and applicant qualifications change. Applicants for winter or spring should contact Undergraduate Admissions and Outreach Services for more information.

Selection Guidelines

Each campus, in consultation with the Office of the President, develops enrollment targets that specify the number of new freshman and advanced standing students expected to enroll. UC Davis receives more applications than required to meet our enrollment target and therefore admits students using the criteria described below.

Freshman Applicants

Freshmen are selected based on a comprehensive assessment of their academic and personal accomplishments and the context in which those accomplishments have been achieved.

The assessment honors academic achievement and offers foremost consideration to students with commendable academic records. Academic accomplishments are considered in the context of the opportunities and challenges a student has experienced, and the full range of each student's personal achievements are used to assess merit and likely contribution to the campus community.

No single personal or academic characteristic guarantees admission to UC Davis, and while factors reflecting academic progress and intellectual development continue to be of primary importance, no applicant will be admitted on the basis of academic criteria alone. No eligible applicant will be denied admission without complete review of application materials.

The academic factors considered in the review are high school GPA calculated on UC "a–g" courses completed; scores on required entrance tests; breadth of academic preparation, including coursework in the senior year; number of courses completed beyond the minimum UC eligibility requirements; honors, AP, IB or college coursework completed or in progress; and Eligibility in the Local Context (ELC) status.

Some examples of personal factors included in the assessment are demonstrated leadership; disabilities affecting educational life and goals; perseverance in overcoming life challenges and hardships; significant volunteer or community service; marked improvement in a consistently challenging academic program; and honors and awards in recognition of academic achievement or special talents.

Transfer Applicants

Academic Criteria: UC-eligible California community college junior level transfer applicants with 90 quarter (60 semester) transferable units of work are given top priority for admission consideration. Other UC-eligible transfer applicants will be admitted if space is available.

Applications far exceed the number of spaces available in majors such as biological sciences, biotechnology, communication, computer science, engineering, international relations, psychology and viticulture and enology. Applicants must complete specific lower division preparatory courses with a specific GPA in the major and an overall required GPA. Check your intended major on the Web at http://why.ucdavis.edu/academics/majors.cfm or http://why.ucdavis.edu/admissions/trfrSelProcess.cfm, or through http://www.assist.org, which provides articulation with California community colleges.

Supplemental Criteria: The same supplemental criteria described above for freshmen are used with the exception of the high-school record.

Notification and Acceptance of Admission

Upon completion of a review of your academic records, you will be notified of your admission status by an e-mail or letter. Throughout the admissions process, you can check your application status online at http://myadmissions.ucdavis.edu. The length of time before admission notification varies depending upon the completeness of your application. For example, most applicants for fall quarter will be notified of their admission status between March 15 and the end of March.

When you receive your notification of admission you will be directed to http://myadmissions.ucdavis.edu to declare your Statement of Intent to Register (SIR) and pay the required *nonrefundable* $100 deposit. This advance deposit is applied to your university registration fee as long as you register in the quarter to which you are admitted. EOP applicants are not required to submit the $100 advance deposit; however, they will pay full registration fees at the time of registration.

Declare your Statement of Intent to Register (SIR) by May 1 (freshman) or June 1 (transfer). You may not file SIRs at multiple UC campuses for the same term. Students admitted to winter or spring quarter must return the SIR by the date specified on the letter of admission.

SPECIAL PROGRAMS

Open Campus—Concurrent Enrollment

Concurrent courses are regular university courses open to the community on a space-available basis through UC Davis Extension. This program allows an individual to pursue academic interests and to test academic abilities at the university. For information, visit http://extension.ucdavis.edu/Opencampus or write to the University Extension office, Research Park, University of California, Davis, CA 95616 (530-757-8777).

Limited Status

Students in limited status are those whose special attainments qualify them to take certain courses in the university toward a definite and limited objective. To apply for limited status admission, you must either have a bachelor's degree but not be a candidate for an advanced degree, or have completed a substantial amount of college work with a satisfactory grade point average. You must submit an undergraduate application with fee as well as a limited status petition and official transcripts from all schools attended. As a limited status student you will be expected to maintain a certain scholarship average during a predetermined time of enrollment.

Application filing dates are the same as those for new undergraduate applicants. Fees for limited status students are the same as those for new applicants. You will not be admitted to limited status for the purpose of raising a low scholarship average.

Admission to the College of Agricultural and Environmental Sciences requires the approval of the undergraduate admissions director and the dean of the college.

The College of Engineering, the College of Letters and Science and the Division of Biological Sciences do not accept Limited Status applicants.

Second Baccalaureate

If you have a bachelor's degree substantially equivalent to one that is granted by the University of California, you may be allowed to enroll as an undergraduate seeking a second bachelor's degree. Admission in this category will depend upon a superior academic record and clear evidence of a change in objective.

Admission to the Colleges of Agricultural and Environmental Sciences or Engineering requires the approval of the undergraduate admissions director and the dean of the college. You

ADMISSION CHECKLIST

☐ **1.** Apply or download an application via the World Wide Web at http://www.ucop.edu/pathways. You can also obtain the Application for Undergraduate Admissions and Scholarship from your local high school, community college, or a campus of the University of California. If you are a non-resident and are unable to apply via the Web, request an application from Undergraduate Admissions and Outreach Services, University of California, One Shields Avenue, Davis, CA 95616-8507.

☐ **2.** Complete the application, the essay, and list the college and major you prefer. You may pay the application fee online. If you apply with the paper application, attach a check or money order to cover the application fees with your application materials, and return them in the preaddressed envelope during the priority filing period for the quarter in which you are interested; do not attach any other documents.

☐ **3.** Keep a copy of your application and essay.

☐ **4.** Keep the notices you receive from both the Undergraduate Application Processing Service and the Undergraduate Admissions office, including those received by e-mail.

☐ **5.** If you are applying from high school, do not send a preliminary transcript unless asked to do so by Undergraduate Admissions and Outreach Services. Please arrange to have official test scores forwarded by the testing agency. If you are applying as a transfer student, arrange to have all official college or university transcripts sent to each UC campus to which you applied.

☐ **6.** High school applicants for the fall quarter should take the SAT-I or ACT and the three SAT-II tests no later than December. We strongly encourage you to complete these tests by the November test date. For information regarding the revised examination requirement for freshmen beginning fall 2006, visit http://www.ucop.edu/pathways.

☐ **7.** Undergraduate Admissions and Outreach Services may request additional information, such as official transcripts, or confirmation of work in progress. Send this information right away so your application can be evaluated without delay. Your eligibility for admission cannot be evaluated until all your application materials are received; i.e., completed application form, filing fee, essay, official transcripts (if required), work in progress, and test scores (if required).

☐ **8.** If you are admitted, keep your admission letter for your records.

☐ **9.** Using http://myadmissions.ucdavis.edu, declare your "Statement of Intent to Register" (SIR) and pay your nonrefundable advance deposit of $100 (if required). Sign up for an e-mail account, complete your "Statement of Legal Residence" (SLR), Photo ID form, Hepatitis Immunization form (if applicable), and other required forms no later than the dates stated at http://myadmissions.ucdavis.edu so you can be authorized to complete registration and obtain housing.

☐ **10.** As part of online admissions procedures, you will complete Hepatitis B Immunization requirements, and be linked to information regarding the student health insurance coverage requirement.

must submit an undergraduate application, a second baccalaureate petition (except College of Engineering) as well as official transcripts from all schools attended. The second baccalaureate petition can be downloaded from http://why.ucdavis.edu/admissions/trfrSpecSituations.cfm. Application filing dates are the same as those for new undergraduate applicants.

The College of Engineering will accept applicants if their first degree is not in engineering and if they complete the lower division engineering program at a California community college. The College of Letters and Science and the Division of Biological Sciences do not accept Second Baccalaureate applicants.

Special Status

The special status classification is for applicants 21 years of age or older who have not had the opportunity to complete a satisfactory high school program or who have not completed a substantial amount of college work, but by reason of special attainment or background may be prepared to undertake certain courses at UC Davis toward a definite and limited objective.

You will not be admitted to special status for the purpose of fulfilling requirements for admission as a regular student. Conditions for admission are determined by the admissions director and are subject to approval by the dean of Agricultural and Environmental Sciences. Admission is for a specified time only and a prescribed scholastic average must be maintained. Application, special status petition, fees and filing dates are the same as those for new applicants.

The College of Engineering, the College of Letters and Science, and the Division of Biological Sciences do not accept Special Status applicants.

Educational Opportunity Program (EOP)

The Educational Opportunity Program (EOP) assists students from economically, socially or educationally disadvantaged backgrounds. EOP provides help with the admission application process and offers academic, social and cultural support. Application fee waivers and financial aid are available for individuals with demonstrated financial need. Contact Undergraduate Admissions and Outreach Services for information on fee waivers and the Financial Aid Office for information on financial assistance. Once enrolled, contact the EOP Information Office for access to extensive tutoring, advising and support resources. (See "Academic Advising and Student Resources" for more information.)

To apply for EOP, complete the regular UC admission application and answer all questions related to EOP. In addition, we advise you to use your personal statement to explain your reasons for requesting EOP assistance. To apply for EOP after enrolling at UC Davis, contact the Undergraduate Admission and Outreach Services.

READMISSION

If you are a former UC Davis undergraduate student planning to resume studies at the Davis campus as an undergraduate, you must file an Application for Readmission, available in the Office of the University Registrar, and pay a nontransferable, nonrefundable fee of $40. (You are a former student if you have interrupted the completion of consecutive terms of enrollment on the Davis campus.) Official transcripts of all work you may have attempted in the interim must be submitted to the Office of the University Registrar.

Students applying for readmission must file their applications on or before the following deadlines:

Quarter	Deadline Date
Fall 2004	July 31, 2004
Winter 2005	October 31, 2004
Spring 2005	January 31, 2005
Fall 2005	July 31, 2005
Winter 2006	October 31, 2005
Spring 2006	January 31, 2006

FEES, EXPENSES AND FINANCIAL AID

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2004–2005 · 2005–2006

FEES AND EXPENSES

Give careful consideration to the total financing of your university education. If you will need funds beyond those that you and your family can provide, you should apply for financial aid well in advance of enrollment. The deadlines for applying for financial aid (grants, loans, Work Study and scholarships) are listed on the following pages.

The most up-to-date information is available on the World Wide Web at http://www.ormp.ucdavis.edu/studentfees. At the time of registration each quarter, every student must pay the quarterly fees. (A Registration Fee Deferred Payment Plan, which allows students to pay quarterly fees in three monthly installments, is available.)

Course Materials Fees

Students may be charged fees in some courses for the use, rental or consumption of materials, tools or equipment, or for the costs of materials or services necessary to provide a special supplemental educational experience. For example, course materials fees may cover the purchase of chemicals and glassware for a science laboratory or of art supplies for an art studio class. They might also cover film rentals, field trips, or the purchase or rental of specific equipment. Courses that may be subject to the course materials fee are listed in the *Class Schedule and Registration Guide*.

Part-Time Students

Students approved for enrollment on a part-time basis pay the same fees as full-time students, but pay only one-half of the Educational Fee. Part-time nonresidents pay one-half of the

Student Fees

As of the date of publication, the Registration, Educational, and Professional School Fees, Nonresident Tuition, and the Health Insurance fees for 2004-05 have not been finalized. The amounts listed below for these fees are the 2003-04 fees. The campus-based fees reflect fees approved for 2004-05. Certain fees are subject to regental, legislative, and gubernatorial action, these fees may change without notice. Go to www.ormp.ucdavis.edu/studentfees for the most up-to-date information.

	Undergraduate		Graduate		Law*	Medicine	Management	Veterinary
	Resident	Nonresident	Resident	Nonresident	(Semester)			Medicine
Registration Fee†	$238.00	$238.00	$238.00	$238.00	$356.50	$238.00	$238.00	$238.00
Educational Fee†	$1,424.00	$1,584.00	$1,502.00	$1,584.00	$2,375.50	$1,584.00	$1,584.00	$1,584.00
ASUCD Fee	$35.00	$35.00						
GSA Fee			$6.50	$6.50			$6.50	
LSA Fee					$10.00			
Memorial Union Fee	$28.50	$28.50	$28.50	$28.50	$42.75	$28.50	$28.50	$28.50
Facilities and Campus Enhancements Fee	$105.00	$105.00	$105.00	$105.00		$105.00	$105.00	$105.00
Campus Expansion Initiative	$92.00	$92.00	$22.00	$22.00		$22.00	$22.00	$22.00
Legal Education Enhancement and Access Program Fee					$183.50			
Student Services Maintenance Fee and Student Activities & Services Initiative Fee	$94.00	$94.00						
Student Facilities Safety Fee	$22.00	$22.00	$22.00	$22.00	$33.00	$22.00	$22.00	$22.00
Student Health Services Fee	$41.00	$41.00	$41.00	$41.00	$61.50	$41.00	$41.00	$41.00
Health Insurance[1]	$183.00	$183.00	$300.00	$300.00	$450.00	$300.00	$300.00	$300.00
Disability Insurance Fee [2]						$61.00		
Professional School Fee † [3]					$4,924.50	$2,851.00	$3,120.00	$2,189.00
Veterinary Medicine Course Materials Fee †								$667.00
School of Medicine Course Materials Fee †						$167.00		
Total Full-time Student Fees, CA Resident	**$2,262.50**		**$2,265.00**		**$8,437.25**	**$5,419.50**	**$5,467.00**	**$7,973.00**
Nonresident Tuition†		$4,577.00		$4,082.00	$6,122.50	$4,082.00	$4,082.00	$4,082.00
Total Full-time Student Fees, Nonresident		$6,999.50		$6,429.00	$14,559.75	$9,501.50	$9,549.00	$12,055.00
Total Part-time Student, CA Resident	$1,550.50		$1,514.00					
Total Part-time Student, Nonresident		$3,884.00		$4,387.75				
Total Employee-Student	$605.50		$631.50					

* The Law School operates on the semester system.

† Fees for which tax credit can be claimed under the Taxpayer Relief Act of 1997.

1 Undergraduates and graduates must purchase the Student Health Insurance Plan (SHIP) unless they are able to prove comparable coverage under another insurance plan. Go to http://healthcenter.ucdavis.edu/insurance.html for information.

2 The Disability Insurance Fee is $61.00 per year, assessed annually fall quarter. This fee applies only to medical students, not interns, residents or health science academics.

3 Includes School of Law and School of Medicine surcharges.

4 Students enrolled in the Graduate School of Management Working Professionals Program pay a flat rate of $1,790.00 per course in lieu of the fees above.

6 Effective fall quarter 1997, nonresident Ph.D. candidates who have advanced to candidacy by the first day of the quarter will be assessed 25% of the 2002–2003 Nonresident Tuition charge. The reduced nonresident tuition will be applied for three calendar years, after which enrolled nonresident advanced doctoral students will again be charged the full Nonresident Tuition in effect at that time.

Nonresident Tuition Fee. Undergraduates file their part-time petition with the Office of the University Registrar, 12 Mrak Hall. Graduate students file their petition with Graduate Studies, 250 Mrak Hall.

UC Employee-Student Fees

Reduced fees are available to UC career employees and certain UC retirees who are qualified for admission to the university. Once admitted, the employee-student must file a petition for the reduction in fees before each quarter of enrollment. Employee-students pay one-third of the full-time Registration Fee and one-third of the full-time Education Fee. Employee-students also pay the Memorial Union Fee and the Student Facilities Safety Fee.

Employee students may enroll for up to nine units or three courses per quarter or semester, whichever is greater. Information is in *Personnel Policies for Staff Members* (section 51), available in department offices, at Shields Library, the Staff Development and Professional Services Office, and on the World Wide Web. Petitions are also available on the World Wide Web.

Motor Vehicle Parking Permit and Bicycle Licensing Fees

Parking permit rates are available at Parking Services, at http://www.taps.ucdavis.edu or by calling (530) 752-8277.

A California State Bicycle License fee is required for all bicycles on campus (initial license, $8; renewals, $4). Call (530) 752-2453 for more information.

Costs for a Year at UC Davis

The costs listed are average costs, and your own living expenses may differ somewhat from these. Cost of living expenses are adjusted annually, and fees are subject to change without notice. More information on living expenses can be found in the section on housing or from the Financial Aid Office.

International Student Expenses

International students are responsible for all of their expenses while studying at UC Davis. The expenses include non-resident tuition, educational fees, room and board and a modest amount for personal expenses. For the 2004–05 academic year, we estimate the cost will be $32,500. Because the exact cost for tuition and fees is not determined until just before the beginning of the academic year, $32,500 is only a preliminary figure. This minimum allowance may be increased without advance notice.

During the admission process, most international undergraduate students are required to complete the "Financial Statement for Students Seeking Nonimmigrant Status" form certifying that funds are available for twelve months support. It is very important that students have adequate, reliable, and continuing financial support for the whole time they are here. After students arrive in the United States, it is extremely difficult to obtain additional funding. The university does not offer grants or financial aid to international undergraduate students.

All students need to be aware that there are numerous initial expenses during the first few months, including tuition and fees, an initial down payment for housing, food and personal expenses. We suggest that you bring a minimum of $7,000 for immediate expenses. Careful budgeting is essential for international students.

Fee Refunds

Cancellation, Withdrawal and Fee Refunds

To cancel your registration before the first day of instruction or to withdraw from the university on or after the first day of instruction, you must complete a Cancellation/Withdrawal form and return the form to the Office of the University Registrar. If you don't submit a Cancellation/Withdrawal form, you will be liable for fees according to university policy (below). No exceptions will be made to this policy.

For students who pay fees and then cancel or withdraw with official approval before the end of any quarter, fees may be refunded according to the Schedule of Refunds (see explanation on opposite page).

The effective date for determining a refund of fees is the date you file a completed Cancellation/Withdrawal form with the Office of the University Registrar, and it is presumed that no university services will be provided to you after that date. The percentage of fees that may be refunded is determined by the number of calendar days (not school days) elapsed, beginning with the first day of instruction.

If you enrolled in classes, you will be dropped from all of your courses automatically when the Cancellation/ Withdrawal form is processed. If you enrolled but have not paid fees in full by

Average Student Costs Annually**

Undergraduate

Fees*	$6,403
Books and supplies	$1,214
Housing and Food	$10,652
Personal expenses	$1,242
Transportation	$945
Total (on-campus residence)	$19,214
Total (off-campus residence)	$16,529
Graduate (single; living off campus)	$19,970
Graduate School of Management	$30,117
Graduate School of Management (evening program)	$22,849
School of Law	$29,992 to 32,388 (depending upon the year in school)
School of Medicine	$30,603 to 35,553 (depending upon the year in school)
Family Nurse Practitioner/Physician's Assistant (FNP/PA): First year: $25,361; Second year $18,925	
School of Veterinary Medicine	$30,371 to 32,801 (depending upon the year in school)

* Undergraduate fees include a $550 Health Care Allowance. Nonresident Undergraduate fees total $20,612.50

** These costs are accurate as of February 2004; however, they are likely to change once the California State budget passes in July. Students are advised to visit the Financial Aid web site at http://financialaid.ucdavis.edu for the most current information.

the tenth day of instruction, your registration will be cancelled for non-payment and you will be officially withdrawn from the university.

New Undergraduate Students:

The nonrefundable $100 deposit paid when you accepted admission and returned your Statement of Intent to Register (SIR) is withheld from the registration fee and the Schedule of Refunds is applied to the balance of fees assessed.

Thus, before or on the first day of instruction, registration fees paid are refunded in full minus $100. After the first day of instruction, the nonrefundable $100 deposit is withheld from the registration fee and the Schedule of Refunds is applied to the balance of fees assessed.

All Continuing Students, Readmitted Students and New Graduate Students:

On or before the first day of instruction, registration fees are refunded in full minus a $10 service charge for cancellation/withdrawal. *After the first day of instruction,* the Schedule of Refunds is applied to the total of fees assessed.

Planned Educational Leave Program

The Schedule of Refunds also applies to students who participate in the Planned Educational Leave Program (PELP). Thus, for a full refund of registration fees paid, you must file a completed approved PELP form with the Office of the University Registrar before or on the first day of instruction. See Planned Education Leave in the "Academic Information" chapter.

Schedule of Refunds

The Schedule of Refunds applies to all continuing and readmitted students and new students who do not receive federal financial aid.*

The Schedule of Refunds refers to calendar days beginning with the first day of instruction. The number of days elapsed is determined from the date the completed Notice of Cancellation/Withdrawal form is returned to the Office of the University Registrar. Percentages listed (days 1-35) should be applied respectively to University Registration Fee, Educational Fee, Nonresident Tuition, and other student fees.

University Registration Fee, Educational Fee, Nonresident Tuition and other student fees:

Calendar Days Elapsed	Percentage of Fees Refunded
0-1	100% less $10.00
2-7 days	90%
8-18 days	50%
19-35 days	25%
36 days and over	0%

* New students who receive federal financial aid and withdraw during their first academic term may be refunded fees according to a Modified Fee Refund Schedule, available at the Financial Aid Office.

Refund of Health Insurance Fee

If you paid the health insurance fee and you are cancelling your registration on or before the first day of instruction, you are entitled to a 100 percent refund of this fee. **Undergraduates** must contact the Health Insurance Office at 530-752-2612 to receive the refund. **Graduates** will get an automatic refund from the Accounting Office.

After the first day of instruction, no refund of the health insurance fee will be issued. Any questions regarding the refund of health fees for withdrawals should be directed to the Student Health Center.

FINANCIAL AID

Financial Aid Office
1100 Dutton Hall
530-752-2390; 530-754-6073 (Hearing Impaired)
http://financialaid.ucdavis.edu

The Financial Aid Office provides financial assistance in the form of scholarships for undergraduates, loans, grants and Work-Study employment. To apply, undergraduates and graduate students are required to file the Free Application for Federal Student Aid (FAFSA), which is available online at http://www.fafsa.ed.gov. Paper FAFSAs are also available at local high schools, community colleges, and the Financial Aid office. UC Davis students can obtain the FAFSA from the Financial Aid office in December.

The priority-filing period is January 1 to March 2 each year; however, students are encouraged to apply even if the deadline has passed. Although state and university funding may be depleted, Federal Pell Grants and Direct Loans are available throughout the year for eligible applicants.

UC Education Finance Policy for Undergraduates

UC Davis uses the University of California Education Finance Policy to determine financial aid awards for undergraduates. The policy looks at four factors to choose the type and amount of aid for each student:

1. cost of attendance
2. Expected Family Contribution (EFC) as assigned by the federal processor based on the FAFSA
3. federal and state grant eligibility based on the FAFSA
4. Undergraduate Self-Help and Loan Contribution, which is the amount that undergraduates are expected to contribute toward their cost of education at UC Davis.

The Financial Aid Office can assist students with dependents or childcare costs that exceed the standard student budgets.

Undergraduates with outstanding academic records are encouraged to apply for scholarships. See "Scholarships and Awards" at the end of this chapter for information about scholarship applications.

Graduate students and students in the professional schools at UC Davis (Medicine, Law, Veterinary Medicine, and the School of Management) apply for financial aid by completing the Free Application for Federal Student Aid (FAFSA).Financial need is based on the information provided on the FAFSA, and the student is sent a Student Aid Report (SAR) with the Student Contribution (SC) assigned by the federal processor. The SC is subtracted from the UC Davis Student Expense Budget (for the student's graduate program) to determine need-based eligibility. Graduate scholarships, fellowships and teaching and research assistantships are administered through the Office of Graduate Studies.

Satisfactory Academic Progress

Federal regulations require that undergraduate and graduate student financial aid recipients meet the published Standards for Satisfactory Academic Progress for Financial Aid concerning units, grade point average and maximum quarters of attendance allowed to obtain a degree. A copy of these standards is available online at http://financialaid.ucdavis.edu/sap.html. Review the policy in detail and discuss it with your academic adviser.

For more information, contact the Financial Aid Office. Regulations and deadlines are subject to change.

Types of Financial Aid

Grants

A grant is an award that does not have to be repaid as long as the student remains eligible. Whenever criteria and funding levels permit, a student's financial aid award includes grants.

Federal Pell Grants. All undergraduate financial aid applicants are required to apply for a Federal Pell Grant each year by filing the FAFSA. Recipients must be enrolled at least half time and must maintain good academic standing and make satisfactory academic progress. Eligibility is determined by the federal government according to a formula developed by the Department of Education and approved annually by Congress. The UC Davis Financial Aid Notice (FAN) informs the student of the Pell Grant award amount. All undergraduate financial aid applicants who are California residents are encouraged to apply for a Cal Grant by submitting the FAFSA and a GPA Verification form before March 2. Cal Grants are awarded by the California Student Aid Commission (CSAC) and may be renewed each year for four years. Visit the CSAC Web site at http://www.csac.ca.gov for more information.

Cal Grant A awards are based on financial need and academic achievement and can be extended for one year for students entering a teaching credential program. Cal Grant A pays partial registration fees.

Cal Grant B awards are based on financial need and are for undergraduate students primarily from low-income backgrounds. Recipients are required to complete at least 12 units each quarter. Cal Grant B pays a quarterly stipend for living expenses for first-year students, and a portion of the registration fees plus a quarterly stipend for living expenses for students in their second through fourth years.

Cal Grant A and B recipients who plan to enroll in a Teaching Credential Program (TCP) may be eligible to renew their Cal Grant award for an additional year. The additional year of payment is provided to students who are seeking an initial teaching credential and cannot be used for other graduate level courses of study.

University Grants (UC Grant). The university determines grant eligibility for undergraduates by subtracting a student and parent contribution, any federal or state resources the student receives, and a standard work and loan contribution from the cost of attendance. Any remaining eligibility would be funded with UC Grant. UC Grant funding for graduate students is determined and awarded through their academic programs.

Bureau of Indian Affairs (BIA) Grants are awarded to students who are at least one-fourth American Indian, Eskimo or Aleut as recognized by a tribal group served by the Bureau of Indian Affairs and who show financial need. Applicants must submit a Free Application for Federal Student Aid (FAFSA) and provide supporting documents. Students are advised to write to the agency that administers their tribal affairs to request a BIA Higher Education Assistance application. The BIA Financial Aid officer on campus can help complete the application. The amount of BIA grant depends on need and availability of funds at each BIA agency.

Loans

Financial Aid almost always includes a long-term loan. Repayment of these loans (with the exception of Federal Direct PLUS loans) begins after graduation or withdrawal from school. Students are encouraged to work as much as possible (while remaining full-time students) and to develop modest personal budgets to keep final loan indebtedness within a manageable range.

Federal Perkins Loans are for U.S. citizens or permanent U.S. residents. Loans may be limited to a percentage of student's need because of demand and limited funds. This is a *subsidized* loan, which means the federal government pays the interest on the loan while the student is enrolled in school. Repayment starts nine months after graduation or withdrawal from school and may be extended over 10 years. Additional deferments are possible for temporary total disability or volunteer service in a private, non-profit organization, VISTA or the Peace Corps. Some teachers of students from low-income families and full-time teachers of handicapped children may also qualify for partial loan cancellation.

Annual Federal Perkins Loan Limits

- $4,000 for undergraduate students
- $6,000 for graduate/professional students

Aggregate (Maximum) Loan Limits

- $8,000 for a student who has not completed the first two years of undergraduate work and for programs that are less than two years in length
- $20,000 for a student who has successfully completed two years of a program of education leading to a bachelor's degree but who has not completed degree work
- $40,000 for a graduate/professional student (includes loans borrowed at the undergraduate level)

Health Profession Student Loans (HPSL) are awarded to students in the School of Veterinary Medicine who demonstrate financial need. Parental income information is required for all applicants regardless of age and dependency status.

- $2,500 plus fees maximum
- 5 percent interest
- Repayment begins twelve months after receipt of the degree or withdrawal

Federal Direct Subsidized and Unsubsidized William D. Ford Student Loans (Direct Loans) are available through the Financial Aid Office. Subsidized loans are based on financial need, and interest accrued while the student is in school is paid by the federal government. Unsubsidized loans are available to students regardless of income and assets, and there is no interest subsidy.

- Undergraduate students may borrow up to annual maximums of $2,625 for freshmen, $3,500 for sophomores, and $5,500 for juniors and seniors, up to a maximum aggregate indebtedness of $23,000.
- Independent undergraduate students may borrow unsubsidized Direct Loans up to annual maximums of $4,000 for freshmen and sophomores, and $5,000 for juniors and seniors.
- Graduate and professional students with need-based eligibility may borrow up to $8,500 per year in subsidized direct loan, not to exceed a maximum aggregate of $65,500 for combined undergraduate and graduate borrowing.
- Graduate and professional students may borrow unsubsidized Direct Loans up to an annual maximum of $10,000.
- Variable interest rate is adjusted annually, capped at 8.25 percent.
- A 3% loan fee is charged on all Direct Loans. The fee is deducted proportionately from each disbursement.
- For Direct Loans, repayment begins six months after graduation or withdrawal from school.

Federal Direct Parent Loans for Undergraduate Students (Direct PLUS) are government-insured loans that are made to parents of dependent students.

- Parents may borrow Direct PLUS up to the cost of education minus other financial aid received during the years the dependent student is an undergraduate.
- The maximum interest rate is 9%. There is no interest subsidy for this loan.
- A 4% loan fee is charged and deducted proportionately from each disbursement.
- Repayment begins within 60 days after loan disbursement.

Short-Term Loans meet temporary or emergency financial needs of registered students. Loan funds are provided by UC Davis alumni, ASUCD, the Cal Aggie Foundation, the Regents of the University of California, and private donors.

- Emergency Loans: $300 maximum. The maximum repayment period is 30 days.
- Short-Term Loans: $300 maximum; exceptions to the maximum amount can be made if financial aid funds are expected. The maximum repayment period is five months or the end of the academic year.
- Assistant Loans: graduate students who are in the teaching assistant, research assistant, readership, associate-instructor or postgraduate researcher classifications can apply for a maximum of one month's salary. The maximum repayment period is six months or the end of the academic year, whichever occurs first.

For applications and information about applying, go to http://financialaid.ucdavis.edu/PDF/STLAPP.pdf.

Federal Work-Study

Student Employment Center
1210 Dutton Hall
530-752-0520; sec@ucdavis.edu;
http://jobs.ucdavis.edu

Undergraduate Work-Study

The Federal Work-Study program allows students to earn part of their financial aid through part-time employment. To participate, students must file a Free Application for Federal Student Aid (FAFSA) and receive Work-Study as a part of their financial aid package. Work-Study awards offer both money for education and work experience. Work-Study recipients should obtain a Work-Study job or ask to defer the Work-Study before December 1 or the award will be canceled. The Student Employment Center coordinates the Federal Work-Study program for undergraduates at UC Davis.

Community Service. A wide variety of community service jobs are available for students who apply for Work-Study funding. These jobs provide educational and rewarding work experience and help students connect with the community at large. Students applying for community service jobs also receive priority consideration for Work-Study funding.

Graduate Work-Study

Work-Study funds for graduate students are allocated directly to the chairpersons of the graduate programs. Graduate students seeking Work-Study funding should contact their respective departments for further information. Students must file a FAFSA and have financial need to be considered for Work-Study funding.

Undergraduate Scholarships and Awards

Scholarship Office
Dutton Hall
530-752-2804; ugscholofc@ucdavis.edu; http://financialaid.ucdavis.edu/schol.htm

Mailing address:
Undergraduate Scholarship Office
University of California
One Shields Avenue
Davis, CA 95616-8696

UC Davis recognizes outstanding students with scholarships awarded on the basis of academic excellence and exceptional promise. The Scholarship Office administers approximately 220 different undergraduate scholarships. Many more scholarships are handled through outside agencies.

Scholarship recipients are chosen by committees made up of both students and faculty. In addition to academic records (a minimum grade point average of 3.25 is required), selection may be based on letters of recommendation, test scores, and a personal essay in which your university goals and objectives are stated. *Some awards are limited to students in specific majors or colleges, residents of certain geographical areas, students of a particular class standing, or students with demonstrated financial need.* Most scholarships are not renewable and you must reapply each year for scholarship aid.

Students applying to the university for the fall quarter are considered for scholarships using the same forms completed for admission purposes. Winter and spring quarter admission applicants should contact the Scholarship Office for instructions no later than November 1. Continuing students should obtain scholarship applications online in October. These applications are due in early December. Announcement of winners is usually made beginning in April.

Graduate students are also eligible for various scholarships and fellowships. (See the Graduate Studies chapter.)

Regents Scholarships, among the highest honors that undergraduates at the university can receive, are granted to exceptionally promising freshmen or juniors enrolling in the fall

quarter. Awards may be honorary (honorarium) or may be accompanied by a stipend, generally covering the difference between family resources and yearly educational costs based on in-state fees. These scholarships are renewable as long as you maintain a 3.25 grade point average.

- Dollar amounts vary—up to full financial need
- 2-year and 4-year renewable scholarships

Alumni Scholarships, provided by the alumni association in cooperation with the university, are based primarily upon leadership and scholastic achievement. Your financial need and extracurricular activities may also be considered.

- $1,000 minimum
- New undergraduates only
- Selection by local alumni association chapters

Military Scholarships are awarded to outstanding high school seniors without regard to financial need, as well as to UC Davis students who have demonstrated exceptional leadership and scholastic achievement during their freshman and/or sophomore years. Eligible high school seniors apply for the full 4-year scholarship and must file applications by November. UC Davis scholarship students participate in the Military Science (ROTC) Program. Information and applications are available from the Department of Military Science, 125 Hickey Gymnasium, 530-752-5211.

- Full fees, books and supplies
- $1,000 per year for miscellaneous expenses
- 1-, 2-, 3-, or 4-year scholarships

Other Scholarships are made possible by individual donors, private corporations, and various agencies. Many organizations and groups conduct their own scholarship programs. In most cases, you apply directly to these sponsoring groups. Free scholarship search services are available through our Web site.

- Generally $300 to $4,500

Special Prizes at UC Davis recognize outstanding performance, achievement and promise in special programs or majors. The most prestigious prize is the University Medal, presented to the most outstanding graduating senior.

- Plaques or certificates and cash awards
- College and school medals to outstanding graduates

STUDENT LIFE

UCDAVIS





2004–2005 · 2005–2006

LIVING AT DAVIS

On-Campus Housing

Residence Halls

Student Housing Office
530-752-2033; studenthousing@ucdavis.edu;
http://www.housing.ucdavis.edu

Living on campus adds a measure of convenience to your life and helps familiarize you with the campus. Some 4,500 undergraduate students live on campus each year, including about 90 percent of freshman students. In each of the residence hall complexes, students and staff help create and maintain an environment conducive to personal growth and educational achievement.

Rooms are furnished with a bed and mattress, desk and chair, bookcase, chest of drawers, study lamp and wastebasket for each resident. Cost depends on room occupancy (single, double, triple) and which of the eight meal plans you choose. Rates for the next academic year have not yet been formally approved.

All new freshmen whose Statements of Intent to Register (SIR) are received on time are guaranteed residence hall housing as long as they complete all of the instructions that accompany their contracts and return the materials and reservation fee by the due date. Freshmen housing contract offers will be mailed out between May 3 and May 19. Transfer students who return their SIR by June 1 will receive contract offers after all on time freshmen have been accommodated. Transfer student housing contract offers are made based on a student's chronological order on the waiting list, eligibility and space availability. We encourage transfer students to contact Student Housing Residential Services to add their names to the waiting list as early as possible. Student Housing information is included with your admissions packet. If you have a physical disability or special dietary needs that require special accommodation, please send a detailed letter of explanation to Residential Services, 160 Student Housing, when you return your housing contract.

Student Housing

Orchard Park/Solano Park Apartments
530-752-2033

Orchard Park and Solano Park Apartments offer 476 university-operated, unfurnished on-campus apartments for UC Davis student families.

- Orchard Park
  two-bedroom unfurnished apartment
- Solano Park
  one-bedroom unfurnished apartment
  two-bedroom unfurnished apartment

New rates, subject to approval by the UC Regents, will be available at http://housing.ucdavis.edu/Parks in mid-March. Once approved, they will be effective starting August 1. While our first priority is to house students with children, Student Housing supports the University's commitment to provide on-campus housing to graduate students. Our waiting list is prioritized as follows: students with children; graduate students; undergraduate students. Vacancies in Orchard Park/Solano Park Apartments are filled from a waiting list based on the date the application is received. For a fall assignment, you should apply at least nine to twelve months in advance. For an assignment during the remainder of the year, the waiting period is usually shorter. You may submit an application before you are admitted to the university. If a member of your family has a physical disability that requires special housing accommodation, please attach a detailed letter of explanation to your application.

Russell Park

530-753-7322

Privately owned and managed on-campus living accommodations are available for student families. Russell Park features one-, two-, and three-bedroom unfurnished units.

Primero Grove

530-754-8455
primero@ucdavis.edu

Privately owned and operated, Primero Grove offers affordable on-campus housing for continuing undergraduate, graduate, and professional students. Apartment sizes range from studios through four bedrooms.

Graduate Student Apartment Housing

The Atriums
530-753-0659

The Atriums offers on-campus living accommodations for single graduate students. The *privately owned and managed* apartments feature studio and two-bedroom unfurnished units.

The Colleges at La Rue

530-754-5797
www.tandemproperties.com/colleges

The Colleges at La Rue is on-campus housing owned and operated by Tandem Properties. The Colleges, a place where people and ideas come together, is an academic living-learning community that offers one-, two-, three- and four-bedroom apartments.

Off-Campus Housing

The majority of UC Davis students live off campus. The City of Davis has ample apartments for rent, from one-person studio apartments to 5- or 6-person suites. Townhouses, duplexes and houses throughout the city are also available for student rental. ASUCD maintains a list of available community housing.

Transportation and Parking

Transportation and Parking Services (TAPS)
Extension Center Drive
530-752-8277; http://www.taps.ucdavis.edu
Motorist Assistance Program: 530-752-8277
Bicycle Program: 530-752-BIKE

The central campus is closed to motorized vehicles. Walking and bicycling are the most common ways to traverse the campus, though some students prefer inline skates.

Bicycles. All bicycles ridden or parked on campus must have a current California state bicycle license. You may buy a license or renewal tag at TAPS. Bicycle traffic and parking regulations are strictly enforced. Bikes may be parked only in designated parking areas and may only be secured to bike racks and pods. The Bicycle Program rents bicycle lockers on a quarterly or annual basis for storage of bicycles only. The ASUCD Bike Barn offers repairs and rentals, and sells used bikes, bicycle parts

and accessories. Students can also check out tools to do their own repairs or maintenance.

Parking. If you park a vehicle (including a motorcycle or moped) on campus, you must display a valid UC Davis parking permit or pay for time at a meter. Parking is permitted in marked spaces only, with permits clearly displayed on the driver's side dashboard or rear bumper. You may purchase a daily visitor permit at permit dispensers in any visitor parking lot or at Parking Services. Visitor permits are valid in visitor lots and in "C" areas. All other lots require long-term permits, which you may purchase at Parking Services. Parking lots on campus are financed solely by user fees collected from parking permits sales and meter use.

Ridesharing. UC Davis encourages ridesharing. Registered carpools and vanpools receive reduced parking rates and preferential parking. For information on transportation alternatives, public transit, or commuter match assistance, call 752-MILE (752-6453).

Shuttles. The UCD/UCDMC Shuttle provides hourly service Monday through Friday between the Davis campus and the medical center in Sacramento. The shuttle is available to all members of the UC Davis community. You may purchase shuttle passes at Parking Services or the Cashier's Office. Departmental business passes are available at Parking Services.

The Intracampus Bus provides transportation between the Davis campus and the Berkeley campus for university employees, registered students and other university affiliates. Call Fleet Services at 752-8287 for schedule information and reservations.

Buses

Unitrans
5 South Hall
530-752-BUSS; unitrans@ucdavis.edu
http://www.unitrans.edu

Unitrans, 13 bus lines operated by the Associated Students, serves the campus and city year round. Unitrans is free to undergraduate students with a valid photo ID card; others may ride by paying the single ride fare or by purchasing passes from TAPS or at the Campus Box Office. Full service is provided each UC Davis school day (Monday through Friday) and Monday through Thursday night during the regular school year. Reduced schedule service operates during the summer, finals week, all academic break periods and on Saturdays. Unitrans also operates a shuttle from Amtrak on Sundays and designated holidays. Schedules are available at the MU Campus Information Center, bus terminals, Davis City Hall, the Unitrans office and at the Unitrans Web site.

Student Employment

Student Employment Center
First Floor, Dutton Hall
530-752-0520; http://jobs.ucdavis.edu

The Student Employment Center advertises student employment opportunities both on and off campus. Full-time or part-time students, students on PELP and students with a letter of acceptance for the following quarter who have not yet registered are eligible.

Full-time, part-time and temporary jobs are available year-round. New listings are posted daily. Listings of employment opportunities for the summer with government agencies, camps and resorts throughout California are located online. Registered students may access employment opportunities online at the World Wide Web address given above and use their student identification number as their password.

Child Care and Family Services

Human Resources Administration Building
530-752-5415;
http://www.hr.ucdavis.edu/childcare

Child Care and Family Services is the principal resource on campus for information, referrals, and advising, and serves as the university's liaison with the on-campus day care centers and City of Davis Child Care Services.

On-Campus Child Care Programs and Resources

- **LaRue Park Child Development Center** (753-8716; laruecdc@ucdavis.edu) and Russell Park Child Development Center (753-2487; russellcdc@ucdavis.edu) are privately owned and operated with university oversight, serving infants through kindergarten-age children.
- The **Center for Child and Family Studies** (752-2888), a teaching and research laboratory for the Department of Human and Community Development, offers part-time programs for children aged six months to five years. Children are selected from a waiting list according to criteria designed to meet academic goals.
- The **UC Davis Breastfeeding Support Program** (752-5415) provides lactation sites with electric breast pumps, registration and orientation sessions, private consultation, and sales of supplies for mothers who wish to continue breastfeeding their infants after returning to school or work.
- The **Women's Resources and Research Center** (752-3372) sponsors the Child Emergency Notification Service, which offers schools and child care providers a way to contact student parents in class if their child has a health-related emergency.
- The **Student Employment Center** (752-0520) posts listings for parents seeking license-exempt providers.

Community Child Care Programs

City of Davis Child Care Services
600 A Street
Davis, CA 95616
530-757-5695;
http://www.city.davis.ca.us/pcs/childcare

City of Davis Child Care Services maintains information on licensed family child care homes, day care centers, nursery schools, playgroups, support groups, and other family-related services for all of Yolo County. Additional services include parenting workshops and handouts; a bi-monthly newsletter; a parenting resource library; and a book, video and toy lending library. The program provides referrals to licensed family child care homes and administers the UC Davis Child Care Subsidy Program and the Child Care Grant, both of which can help low-income families pay for child care. Applications for subsidies are available at the grant office (600 A Street, 757-5695).

COUNSELING AND HEALTH SERVICES

Counseling And Psychological Services (CAPS)

219 North Hall
530-752-0871;
http://www.counselingcenter.ucdavis.edu

Counseling and Psychological Services (CAPS) offers free, confidential psychological and psychiatric services to all registered students having problems that affect their academic progress and sense of well-being. Staff members provide short-term individual counseling, group counseling and psychotherapy for academic, personal and interpersonal concerns. Students often seek counseling to examine issues such as relationships, family problems, stress, cultural differences, assertiveness, self esteem, intimacy, depression and anxiety. Additionally, staff can assist with educational concerns such as coping with university life, academic performance, test anxiety, reentry adjustment. Career testing and counseling are available to help students explore and clarify career concerns and options. Services for relationship issues are also offered to students and their partners. Psychiatry services are available to students by referral. Staff can provide assistance with off-campus referrals.

Confidentiality is strictly maintained in accordance with state laws and ethical standards. To use the services provided by CAPS, students should contact the receptionist for an intake appointment. Walk-in (emergency) services are available Monday through Friday from 8:00 a.m. to 5:00 p.m. if immediate assistance is needed. Peer counseling services are also available Monday through Friday from 8:00 a.m. to 5:00 p.m. through The House and the Educational Opportunity Programs (EOP) information office.

Students, faculty or staff who are concerned about a student or desire consultation or assistance in making a referral are encouraged to contact CAPS.

Cowell Student Health Center

Cowell Student Health Center
530-752-2300; http://healthcenter.ucdavis.edu

Cowell Student Health Center is conveniently located on campus and provides UC Davis students with wellness, illness, and injury care. Student health services are available to all registered students. Student fees subsidize the services of Cowell Student Health Center. Students pay small fees for most services.

All students must purchase a mandatory health insurance plan as part of registration. Waivers may be granted to students with comparable coverage. For more information, go to http://healthcenter.ucdavis.edu/insurance.html, call 752-6055, or visit the Insurance Services Office at Cowell Student Health Center.

Advice Nurse (752-9649), Acute Care and After Hours (752-2300). Services are for acute medical illness and injury care. Appointments are not required, but students are encouraged to call the Advice Nurse before coming for care. Patients are seen according to severity and urgency.

Primary Care Clinics/Specialty Clinics (752-2349). Appointments can be scheduled for routine primary care, nutrition and fitness, men's/women's health/physical exams, allergy care, sports medicine, travel immunizations, and other services. Physician specialists are available upon referral from a primary care provider. Services include dermatology, gynecology, internal medicine, orthopedics, minor surgery, podiatry, neurology and acupuncture. Laboratory, x-ray, pharmacy, physical therapy and massage services are also available.

Health Education and Promotion

Cowell Student Health Center, Cowell Annex
530-752-9652

Health Education and Promotion (HEP) serves as a primary resource to assist you in understanding and acting upon your own health needs and interests. HEP provides information, peer counseling, and referrals. HEP services offer confidential peer counseling by telephone or in-person on topics such as nutrition, exercise, sex and sexuality, contraception, alcohol/other drugs, stress management, bicycle safety and injury prevention. Appointments can be made in advance, and callers and drop-in visitors are always welcome. HEP also offers outreach programs on various college health topics. All services are confidential and provided free of charge to registered students and organizations.

One-on-One Confidential Peer Health Education (752-1151). Confidential peer counseling, peer support and community resources are available to students on a variety of health issues, including sexual health, contraception, pregnancy, nutrition and wellness, fitness, stress management, self-esteem and body image, massage, alcohol and other drug and other wellness topics.

Outreach Presentations (752-9652). Peer Health Educators and professional staff are available to present small and large group presentations and workshops to residence halls, fraternities and sororities and other student organizations. For a complete list of programs offered, or if you would be interested in attending a program or having one given for your organization, call 752-9652.

Birth Control Education. Birth Control Education (BCE) is a 50 minute class in a one-on-one or couples format discussing contraceptive options. Call 752-9652 or visit the Health Education office at the Cowell Annex to schedule a BCE appointment. The free BCE service also fulfills part of the process for receiving prescription birth control at Cowell Student Health Center.

Alcohol and Drug Abuse Prevention and Treatment (professional staff: 752-6334; student coordinators: 754-7104). Alcohol and Drug Abuse Prevention and Treatment (ADAPT) organizes campus-wide substance abuse prevention programs. The program provides assessment, education and referrals for students with identified needs related to alcohol or other drug abuse. ADAPT administers specific educational programs designed for students referred for alcohol/drug incidents.

Peer Counselors in Athletics (754-7103). Peer Counselors in Athletics is a program designed especially for athletes by athletes. PCAs give dynamic outreach presentations on alcohol, tobacco, steroids, racism and other issues affecting student athletes. Through the use of audience interactive presentation methods, PCAs address issues in relationships, competitive performance and healthy lifestyles.

The House

Temporary Building 16 (two-story house by Housing Office)
530-752-2790

The House is a professionally supervised peer counseling program of the Counseling Center. Students receive confidential support, information and referrals regarding personal or social problems. Well-trained student volunteers assist fellow students through individual peer counseling and a wide variety of workshops held in an informal setting. Stress reduction and wellness resources include a listening room with relaxation and educational CDs and an automatic massage chair. No appointment is necessary and services are offered on a drop-in or telephone basis from 8:00 a.m. to 5:00 p.m., Monday through Friday, during fall, winter and spring quarters.

Volunteers for peer counselor positions at the House are selected winter quarter. Students are trained in basic counseling skills and can receive units for training. Transcript notation is also available for quarters working as a peer counselor volunteer.

ARTS AND RECREATION

Whatever your recreational bent—horseback riding, outdoor activities, music, arts and crafts, or sports—there's a place or program on the Davis campus for you to enjoy your favorite activities.

Social, physical, creative, intellectual and cultural activities and programs provide many healthy activities to offset the stresses associated with a rigorous academic environment. These programs complement the academic mission of the university and enhance the quality of life for the campus.

In addition, the City of Davis has 31 parks with various facilities, including tennis courts, playgrounds, swimming pools, playing fields, and a skateboard facility. The city has several movie theaters, art galleries, the Davis Art Center, Davis Comic Opera Company and Davis Musical Theatre.

Campus Recreation

Memorial Union Programs
and Campus Recreation
Memorial Union, Room 457
530-752-1730;
http://campusrecreation.ucdavis.edu

The following programs are offered through Memorial Union Programs and Campus Recreation. A catalog of activities is published quarterly, mailed to all residences in Davis and distributed throughout campus.

Outdoor Adventures

The Barn (on the corner of California and Hutchison)
530-752-1995/1730

Outdoor Adventures will help you develop your outdoor skills and plan your outdoor excursion. You can rent equipment of professional quality and arrange for custom-designed trips and group rates. An up-to-date library contains topographic maps, trail guides and other materials. Classes, excursions and clinics in backpacking, rock-climbing, whitewater rafting, sea kayaking, mountaineering, cross-country skiing and other sports are offered. Outdoor Adventurers also offers training classes in wilderness first aid, EMT, CPR and swift water rescue. Outdoor Adventurers Retail Store has items you might need for your next trip.

Equestrian Center

Garrod Dr. (southwest of Veterinary Medical Teaching Hospital)
530-752-2372/1730

The Equestrian Center is open year round, offering trail rides, practice sessions and instruction in both English and Western riding. Group and private lessons are available for beginning through advanced levels, along with training in horse care and stable management. The Equestrian Center sponsors clinics, horse shows, summer youth equestrian camps and special events, and coordinates the Equestrian Club.

Craft Center

South Silo
530-752-1475/1730

The Craft Center is an ideal place to channel your creative energy. Facilities are available on a day or quarter use basis. Ceramics is available for quarter use only. Workshops and classes are offered each quarter in woodworking, weaving, jewelry-making, art and graphics, computer imaging, ceramics, photography, silkscreen printing, welding, leatherworking, stained glass and other crafts.

Recreation Swimming Pool

Corner of La Rue Road and Hutchison Drive
530-752-2695 or 530-752-1706/1730

Located on campus, the Rec Pool's unique organic shape allows for a wide variety of water activities. The pool includes lap lanes, diving boards, an island, a large grass area for sunbathing and a shallow wading pool. Picnic tables and a barbecue are also available on a first come first served basis. The Rec Pool offers aqua aerobics classes and swim lessons for all ages. The pool opens for the season in mid-April and closes in mid-October.

Hickey Pool

530-752-3893

Hickey Pool is a 7-lane, 33 and 1/3 yard pool with a moveable bulkhead previously used as the competitive pool on campus, housing six Intercollegiate Athletic teams, physical education classes, Intramural Sports and Club Sports, and University extension classes. With the addition of the new Ted and Rand Schall Aquatic Center, Hickey Pool's schedule now accommodates limited lap swimming hours that vary during the academic year. Entrance is free to currently registered students and at a minimal fee for staff and faculty.

The Games Area

Games Area
(located below the UCD Bookstore)
530-752-2580/1730

The Games Area features bowling lanes, billiards room, video arcade, lounge and storage lockers. The Games Area conducts bowling leagues, classes, clinics and tournaments for all ages from beginning through advanced skill levels. The facility is fully accessible to those with disabilities.

The Memorial Union (MU)

MU Campus Information Center
530-752-2222; infocenter@ucdavis.edu

The MU complex serves as the community center for the campus. The MU Campus Information Center's student staff can refer you to people, places, programs and services on and off campus, maintains an up-to-date database of 1,000 on and off

campus organizations, and takes reservations for the use of tables and display boards in and around the MU.

The complex houses the UC Davis Bookstore, Corral gift shop, Coffee House, MU II Conference Center, Campus Box Office (where you can purchase tickets for campus events and cash checks), Campus Events and Visitors Services (CEVS) and the MU Business Office.

King Lounge, on the second floor, provides a comfortable and relaxed atmosphere, popular for studying, leisure reading and listening to music. The adjacent Music and Periodicals Center (752-2885) contains current popular periodicals and a large library of music.

Freeborn Hall, a 1,250-seat assembly hall in the MU complex, is used for performing arts, dances, banquets, lectures and conferences.

The Memorial Union operates several facilities that can be rented for group gatherings. With its wood-paneled interior and ceiling-high windows, Rec Pool Lodge is an ideal location for meetings, lectures or dances. The covered patio surrounding the lodge offers a shaded environment for outside dining during the warm weather. Putah Creek Lodge, secluded in the Arboretum, provides a relaxing atmosphere for lectures, banquets, weddings or dances. The spacious lawn surrounding the lodge is suitable for volleyball and games, receptions and picnics. The lodge has kitchens and outdoor barbecues.

Silo Union

The Silo Union houses food services, meeting/conference facilities, lounges and the campus pub. In the South Silo are the ASUCD Experimental College (752-2568), Student Special Services (752-2007), Graduate Student Association (752-6108) and a branch of the Bookstore serving the School of Law (752-2961). To reserve space in the Silo, call Campus Events and Information at 752-2813.

The UC Davis Activities and Recreation Center (ARC)

530-752-6074

The Activities and Recreation Center (ARC) hosts many recreational activities for UC Davis students, faculty and staff. The building itself has 4 indoor basketball courts (convertible to volleyball and badminton), 8 four-wall courts, a multi-use activity center (MAC), an indoor track, large fitness/weight areas, and an indoor climbing wall. In addition, the complex includes group exercise, dance and martial arts studios, student lounges with computer terminals and wireless access points, a large ballroom and small conferencing center. Food service is provided in the lobby area along with a pro shop. The building is separated into three distinct areas: the controlled area, the conferencing/union area, and The Pavilion. All fitness related activities comprise the controlled area that is open to all students with a valid UC Davis identification card. Faculty and staff members can purchase membership to the ARC for an annual or monthly fee. The conferencing/union area is open-use and is accessible via the main entrance to ARC or through a smaller corridor on the Northeast side of the building that leads into the conferencing area. The UC Davis Pavilion (formally Recreation Hall) hosts athletic competitions, concerts, trade shows, conferences and miscellaneous spectator events each year. The Pavilion houses approximately 149,000 square feet of space and encompasses the home court of the UC Davis Aggies Volleyball team, Gymnastics team and Men's and Women's Basketball teams. The Pavilion hours and access vary depending upon the event being hosted. More information regarding ARC can be found by visiting the ARC Web site, calling the number listed or by stopping by the information desk located in the lobby area.

UC Davis Intramural Sports and Sport Clubs

UC Davis Activities and Recreation Center (ARC)
530-752-3500

The UC Davis Intramural Sports and Sport Club Program offers over 30 different Intramural Sports activities ranging from the traditional team sports like football, basketball, and soccer to individual or duel sports such as racquetball, table tennis, and golf. Additionally, we offer some non-traditional activities like innertube water polo, floor hockey, and Quickball (our version of Wiffleball). All UC Davis students are eligible to participate in intramural activities. The majority of our activities are free; however there are a few sports that require an entry fee for participation. Each club is formed, developed, directed, and controlled by its members within University guidelines. Stop by the office or check our Web site for a complete list of clubs.

Intercollegiate Athletics

264 Hickey Gymnasium
530-752-1111

Although Intercollegiate Athletics at Davis benefits the campus by fostering school spirit, its primary role is to provide personal development opportunities for as many student-athlete participants as facilities and resources permit. Currently, the program consists of varsity teams in 12 men's sports and 13 women's sports. UC Davis is currently a provisional status NCAA Division I member and competes in the Big West Conference. Approximately 750 students compete on varsity teams each year.

Arts and Entertainment

Whether you want to participate, be entertained or be inspired, an abundance of musical, theater, art, design and dance offerings take place on campus all year long.

UC Davis Presents

200 B Street, Suite A
530-757-3199; http://ucdpresents.ucdavis.edu

UC Davis Presents brings a wide variety of world-class performing artists to UC Davis to serve the campus and surrounding communities. During the academic year, UC Davis Presents offers concerts and recitals by classical, jazz and folk music artists; drama; classical, modern and ethnic dance; and lectures by eminent public figures. Tickets for UC Davis Presents events may be purchased at the Campus Box Office (Freeborn Hall, 530-752-1915) or any BASS outlet.

Music

Department of Music
530-752-0888; http://musdra.ucdavis.edu

The Department of Music sponsors the UCD Symphony Orchestra, Chorus, Chamber Singers, Early Music Ensemble, Gospel Choir, Concert Band, Jazz Band and small ensemble

groups. Music majors and other interested students can receive credit for participating in these groups, which perform at concerts and recitals open to the university community. The department sponsors artists-in-residence who give concerts, recitals and lectures. Free noon concerts featuring individual performers and ensembles—both professional musicians and music students—are a favorite weekly event during the school year. The Empyrean Ensemble is in residence on campus. The Department of Music sponsors nearly 100 public concerts each year.

Dramatic Art and Dance

Department of Theatre and Dance
530-752-0888; http://theatredance.ucdavis.edu

The Department of Theatre and Dance has one of the finest theater facilities in California, with an unusually good stock of scenery, props, costumes and state-of-the-art lighting and sound equipment. Facilities are complemented by an excellent faculty, the Granada Artists-in-Residence program (which brings a major director, choreographer or playwright to the department each quarter), and graduate students working on Master of Fine Arts degrees in acting, directing, choreography or design and Ph.D. degrees in 20th Century Performance and Culture, all of whom contribute to the fine quality of UC Davis drama and dance productions.

Each year's schedule includes undergraduate festivals in theatre, dance and film; opportunities to work with professional directors and choreographers in three main stage productions; and performance projects and established scripts developed by M.F.A. students. These productions take place on our proscenium (Main), thrust (Wyatt), arena (University Club) stages as well as in the Mondavi Center's Studio Theatre and Jackson Hall. These productions are part of the academic program of the department and serve an important purpose in the study of theatre and dance. Participation is open to all students.

Art Galleries

The Memorial Union Art Gallery (second floor of the MU; 530-752-2885) features a changing series of contemporary and historical art exhibits throughout the academic year. Works by professional artists as well as students are on display for periods of approximately six weeks. The gallery sponsors print sales, special programs and lectures, and offers internships for those interested in career work in an art gallery or museum.

The **Design Museum,** (first floor Walker Hall; 530-752-6150; http://designmuseum.ucdavis.edu) is known for its exhibitions of national and international design-related material. These world-class theme exhibitions are available to the campus community and surrounding region. Changing installations of architecture, interiors, graphic design, costumes, textiles, folk art and popular culture reflect the curriculum of the Design program and the multi-faceted nature of design. Through exhibitions and accompanying curator lectures, the Design Museum introduces visitors to the breadth of design found in technological societies and in third world cultures.

The **Richard L. Nelson Gallery** (first floor of the Art Building; 530-752-8500), named in honor of the first chair of the Department of Art, organizes regularly changing exhibitions of historical and contemporary works of art. The gallery's program reflects and complements the teaching program of the Department of Art and brings art to the university community and the Northern California area at large.

The **Fine Arts Collection** (Art Building, adjacent to the Nelson Gallery; 530-752-8500), representing various historical periods and cultures, is the Davis campus's major collection of art.

The **Basement Gallery** (Art Building basement) is a student-directed gallery that exhibits the artwork of advanced UC Davis art majors. There are approximately three shows per quarter.

The **Carl Gorman Museum** (first floor of Hart Hall; 530-752-6567, Native American Studies) was established in honor of Carl N. Gorman, an artist, advocate and former faculty member of Native American Studies. The museum features changing exhibitions of works by Native American and diverse artists.

STUDENT GOVERNMENT

Associated Students (ASUCD)

Student Government Administrative Office
348 Memorial Union
530-752-3632

ASUCD Student Services Office
347 Memorial Union
530-752-1990; http://asucd.ucdavis.edu

The Associated Students of the University of California, Davis (ASUCD), authorized by the regents and the chancellor, represents all undergraduate students. Graduate and law students also have access to all ASUCD commercial activities. Funds allocated to ASUCD provide activities and services that make life as a student a little easier, less expensive, or just more fun.

ASUCD operates more than 40 activities, including the Unitrans bus system, *The California Aggie* newspaper, the Bike Barn repair services, travel service, free legal advice for undergraduate students, The Aggie Student Store, Campus Copies, Classical Notes, Project Compost, Cal Aggie Camp, Book Exchange, U.S. Post Office and the Coffee House.

The ASUCD-sponsored Experimental College offers a variety of nontraditional classes each quarter for students interested in diversifying their educational experience. Radio KDVS stereo 90.3 FM, the student-run campus radio station, broadcasts at 5,000 watts. Other ASUCD activities include Housing Viewpoint, Homecoming, Entertainment Council and the Whole Earth Festival.

Picnic Day, a UC Davis tradition since 1909, is the largest student-run event in the nation. This annual spring open house features more than 100 exhibits and cultural displays, including a parade, a fashion show, sports, sheep dog trials, dachshund races, food, music and dancing.

You can find information about ASUCD programs in the *Student Directory,* which combines details about ASUCD services and organizations with the ASUCD student telephone directory, or by visiting the ASUCD Student Services Office.

Allocated funds are budgeted through the ASUCD Senate. Based on a modified federal form of government, the senate consists of 12 elected senate members and the ASUCD president and vice president. The senate is the policy-making body for ASUCD and supervises all aspects of the associa-

tion. The ASUCD president is the chief administrative officer and is assisted by the vice president. ASUCD is the liaison for the undergraduate student body and represents the students with other universities, the UC Office of the President and the regents.

Seven commissions advise the senate and assist the governing board with its decisions by researching legislation and making recommendations. Commission chairs are ex-officio members of the senate. Each commission also involves itself with various projects that relate to its specific area.

- Academic Affairs advocates students' rights in the area of academics, including dealing with the Academic Senate and with issues such as grading policies, tenure and teacher evaluations.
- Business and Finance makes recommendations to the Senate on all financial matters and conducts audits on ASUCD commercial units.
- Environmental Policy and Planning addresses all issues and concerns that pertain directly to the environment.
- Ethnic and Cultural Affairs makes recommendations on policies and programs concerning UC Davis' ethnic community, acts as a liaison between on-campus and off-campus bodies affecting ethnic students and their quality of life at the university.
- External Affairs deals with off-campus concerns (the regents, UC Office of the President, City Council, etc.).
- Internal Affairs recommends policies to improve ASUCD operations and the quality of nonacademic student life on campus.
- The Gender and Sexuality Committee actively promotes awareness of gender and sexuality issues, and prevention of sexual assault through outreach efforts and education programs.
- The Elections Committee ensures the fair administration of ASUCD online elections. The committee coordinates candidate and ballot measure forums and provides unbiased election information.

The judicial branch consists of the ASUCD Student Court. The court has the judicial authority and responsibility to carry out all rules designated to it in the ASUCD Constitution and its bylaws.

UC Davis Administrative Advisory Committees

Office of the Chancellor
http://chancellor.ucdavis.edu/aac/default.htm

The Office of the Chancellor encourages students to participate in issues affecting the campus community by applying for membership on an administrative advisory committee. Each committee focuses on a specific area, such as athletics, child care, disability issues, Regents' scholarships, or student services and fees. The committees respond to requests for advice, identify needs or concerns within the charge of the committee, and recommend action to the campus administration.

Applications are accepted each winter for service on committees the next academic year. Undergraduate students should contact ASUCD Student Advocacy. Graduate students should contact the Graduate Student Association.

Graduate Student Association (GSA)

Room 253, South Silo
530-752-6108; 530-752-5158 (fax); gsa@ucdavis.edu;
http://gsa.ucdavis.edu

The Graduate Student Association (GSA) is the officially recognized student government for UC Davis graduate students. GSA provides a forum for addressing the concerns of graduate students and promotes communication with campus administrators. GSA also serves as an advocate at all levels of the university on behalf of graduate students. Funded by graduate student fees, GSA provides services to all academic graduate students and to professional students in the Graduate School of Management. Services include new student orientation, legal service, fax service, travel awards, newsletters and assorted social events. Other professional students are eligible to join GSA by paying a fee.

GSA General Assembly representatives are designated by other students in their department or graduate group. General Assembly meetings are held once a month and are open to all graduate and professional students. Each year the General Assembly elects the members of the Executive Council, who serve in a variety of positions to carry out the policies and functions of the organization.

STUDENT ORGANIZATIONS

Student Programs and Activities Center

Memorial Union, 4th Floor
530-752-2027
http://spac.ucdavis.edu

More than 400 student organizations are registered at UC Davis. They consist of cultural, social, religious, political, ethnic, academic, international, recreational, performing and service groups, who provide students and the entire campus with important educational experiences. The Student Programs and Activities Center (SPAC) registers these diverse groups and provides educational programs, advising and support for activities, event planning, leadership development, conflict resolution, resources and campus policies.

In addition, SPAC administers a number of campus programs including the Activities Faire, Club Finance Council, Danzantes del Alma folklorico dance troupe, campus service awards and acts as liaison to fraternities and sororities. Anyone interested in participating in student organizations or becoming involved in unique activities is encouraged to visit the SPAC office.

Cultural Days is a series of annual programs celebrating the diverse ethnic cultures of the university community. Programs include Asian Pacific Culture Week, Black Family Week, La Raza Cultural Days and Native American Culture Days . Everyone is invited to share in these programs featuring speakers, workshops, films, entertainment and family events.

The Student Recruitment and Retention Center, located at 16 South Hall, is a student-run program serving traditionally underrepresented students. Programs include Southeast Asians Furthering Education (SAFE); American Indians for Recruitment and Retention (AIRR); African Americans and Africans Cultivating Education (ACE); Filipino Outreach and Retention; Yik'al Kuyum; and Graduate Academic Achievement and Advocacy Program. These programs provide outreach to

high schools and community colleges and provide tutoring and study halls to current students.

The Cal Aggie Marching Band entertains spectators at athletic, campus and community events. As one of the few student-run bands in the nation, the band has a style and personality indicative of UC Davis.

Cal Aggie Student Alumni Network (CASAN)

Walter A. Buehler Alumni and Visitors Center
530-752-0115 or 530-752-0286;
http://www.casan.ur.ucdavis.edu

All UC Davis students are encouraged and welcome to become CASAN members. CASAN involves students and alumni in a variety of academic, philanthropic and professional programs that build lasting ties to the university. Programs include Senior Daze, Leadership Conference, new student receptions, career panels, Take an Aggie to Lunch and Aggie Diner. You may join CASAN any time during the academic year; the annual $15 membership fee includes collegiate membership in the Cal Aggie Alumni Association.

ACADEMIC ADVISING AND STUDENT RESOURCES

UCDAVIS





2004–2005 · 2005–2006

ACADEMIC ADVISING

UC Davis offers many different types of academic advising to help you get the most from your education. College advisers can assist you in meeting degree requirements and taking maximum advantage of the resources available in the university. A conference at least once a quarter with your faculty or staff adviser is especially desirable during your first year and during your final quarters preceding graduation.

College Advising

College of Agricultural and Environmental Sciences

Office of the Dean
150 Mrak Hall
530-752-0108
http://www.caes.ucdavis.edu

In the dean's office you will find

- staff advisers who can help with university and college rules, regulations and policies and procedures that affect students.
- academic advising: in-depth advice regarding probation/dismissal status, admission to the college, readmission, and second bachelor's, limited and regular status.
- advice and action on petitions.
- other services including study plan clearance, college English requirement check, release of holds on registration packets and final evaluation for graduation.

Associate Dean of Undergraduate Academic Programs

Annie King, Associate Dean
150 Mrak Hall
530-752-0108

The college has an associate dean of undergraduate academic programs and advising staff who welcome the opportunity to become acquainted and to talk with individual students. They can also help you with academic problems if you are placed on probation or subject to dismissal.

Faculty Advisers/Staff Advisers. You will be assigned a faculty adviser to help you plan a program that corresponds to your individual educational interests. The master advisers coordinate advising within a major. Staff advisers in the department can advise you on courses, specific requirements of majors and career opportunities. You are strongly urged to consult with your faculty adviser or staff adviser each quarter before selecting your courses.

As educational objectives evolve, you may, in consultation with the master adviser for your major, choose a new faculty adviser whose area of expertise corresponds more directly to your specific objectives.

Exploratory Program (non-degree program)

150 Mrak Hall
530-752-0610

Are you unsure what major you really want to pursue? If so, you may want to register in the Exploratory Program. With the help of staff in the dean's office and the major advisers, you can explore specialized options, develop your decision-making abilities and select the major best suited to your needs. For registration purposes, indicate "Exploratory" on your admissions materials. You must declare a major before you complete 120 units; see Declaration of Major in the "Academic Information" chapter.

Division of Biological Sciences

Dean's Office
202 Life Sciences Addition
530-752-0410

The associate dean and staff in the dean's office offer complete academic advising services for the Biological Sciences major and general advising information about other divisional majors. The office also advises on college and university requirements, policies, and procedures, including PELP, withdrawal, change of major and late actions.

This office is also responsible for the academic progress of all students majoring in the division. If you have any problems (personal, medical, financial) that are affecting your academic performance, or if you are on academic probation, make an appointment to see one of the advisers in the dean's office.

Sections and Advising Centers. Students entering or intending to declare majors in biochemistry and molecular biology; cell biology; evolution and ecology; exercise biology; genetics; microbiology; neurobiology, physiology, and behavior; or plant biology should contact the specific section office for academic advising services, where both faculty and staff advisers are available. Students selecting the biological sciences major should contact the dean's office for academic advising services.

Peer Advisers. Peer advisers are available in each section. Biological Sciences houses its peer advisers in the dean's office.

College of Engineering

Undergraduate Office
1050 Kemper Hall
530-752-0553

Information and assistance on academic, career and personal matters is available in the Undergraduate Office, either through direct assistance from one of the staff advisers or through referral to other offices on campus. The Undergraduate Office handles student petitions, transfer evaluation, articulation and degree certifications.

Advising. As soon as you arrive on campus, you should consult with your departmental staff adviser, whose name and office hours you can obtain at the department office. The departmental staff adviser is aware of the requirements for your major and can assist you with planning your program.

Mandatory Advising. The College has implemented a mandatory advising system through the online registration system. You are required to meet with your adviser once a year, during a specific quarter, which is to be determined. You will be notified of your advising hold at the time of your registration for your advising registration. If you fail to clear your hold during your specified period, you may be blocked in any future registration. If you meet with your adviser during this quarter, there will be no difficulties with subsequent registration. Therefore, you have approximately four months to clear an advising hold. For more information on mandatory advising, call the Advising Office at 752-0557.

Peer Advisers. A well-developed peer advising system complements faculty and staff advising. Student advisers are in 1050 Kemper Hall. Peer advisers are also available during designated hours in the residence halls. Call the Engineering Dean's Office (752-0553) to speak with a peer adviser about the specific schedule.

College of Letters and Science

Office of the Deans/Undergraduate
Education and Advising Office
200 Social Sciences and Humanities Building
530-752-0392;
http://www.ls.ucdavis.edu/Students

The deans and staff in the Undergraduate Education and Advising Office can help you with issues relating to your academic goals and experiences. You can consult the Advising Office on matters such as program planning, selection of a major, exceptions to regulations and academic enrichment opportunities. The office also provides a number of additional services:

- Determines how your transfer credits from other institutions apply towards completion of breadth and unit requirements for the bachelor's degree. (Applicability of transfer credit toward the major is determined by your major faculty adviser.)
- Provides degree checks to identify remaining college requirements and certifies graduation.
- Acts on petitions requiring the dean's approval.
- Reviews the records of students who are subject to disqualification and determines whether such students may continue at UC Davis.

Faculty Advisers. New students are assigned to a faculty adviser during their first term of enrollment. If you indicated an interest in a particular program on your application, your adviser will be a faculty member associated with that major. If you change your major, you will be reassigned.

New students are encouraged to see their faculty adviser at least once every quarter during their first year on campus to discuss their educational goals, course program and progress.

Continuing students who have completed three quarters in residence in the college should consult with an adviser at certain important checkpoint stages in their academic careers. You are urged, however, to maintain regular contact with an adviser in your major to avoid program errors that may delay graduation. Seniors should maintain close contact with their advisers to ensure that they are meeting the major requirements.

Academic Options Program. If you did not indicate an initial commitment to a particular major program on your application, you will participate in the Academic Options Program, which provides academic advising to lower division students. You will be assisted by an advising team available at sites in each of the university residence hall complexes. Students living off campus may contact the Letters and Science Undergraduate Education and Advising Office for advising assistance prior to declaring a major.

Advising Checkpoints. You should consult with your faculty adviser at two, possibly three, critical stages in your academic career:

- Before you complete 90 units of degree credit, including transfer work, you must develop in consultation with your faculty adviser, a proposal for a quarter-by-quarter program of courses showing how you will meet your educational goals and graduation requirements. You must also have declared a major by this time. Filing this plan with your adviser does not preclude subsequent modifications of the plan or a change of major.
- When you complete 135 units of degree credit, including transfer work, you may pick up Degree Check materials from the Letters and Science Advising Office and consult your adviser concerning course selection and satisfaction of requirements in the major.
- Before you complete 195 units of degree credit, including transfer work, you must develop in consultation with your faculty adviser, a firm study plan in the form of a quarter-by-quarter program that will satisfy all remaining degree requirements as expeditiously as possible. This plan will be filed with your adviser. If the plan indicates that you will have to register beyond the 225-unit limit in order to meet degree requirements, you must contact the Undergraduate Education and Advising Office immediately. Exceptions to the 225-unit limit are granted by the dean only rarely. Typically, approval is granted only to allow completion of *minimum* degree requirements.

If you have not met with your faculty adviser before these established checkpoints, a hold may be placed on your registration as a reminder.

Peer Advisers. Student-to-student advising is an important part of the university advising services. The College of Letters and Science dean's office peer advisers are available in the Undergraduate Education and Advising Office, 200 Social Sciences and Humanities Building, and on a weekly basis in the campus residence halls to talk with students about their academic concerns.

Advising Services

1st floor, South Hall
530-752-3000;
http://advisingservices.ucdavis.edu

Academic Peer Advising (APA) places peer advisers in over 50 departments to help students find the answers to their questions about major requirements, courses and university regulations. The academic peer adviser complements faculty advising by providing a student perspective on the department. The Academic Peer Advising staff is trained to provide information and assistance about graduate schools, career opportunities and college requirements.

Orientation and Summer Advising coordinates the Summer Advising and Registration Program, fall quarter Orientation activities and other student assistance and orientation programs for new students. The staff will introduce you to the campus environment, procedures and opportunities, and offers programs relevant to your changing needs. Your contribution to orientation programs, through ideas and assistance, is always welcome.

The **Leading Roles** program coordinates several campus-wide student leadership development initiatives and provides information on academic, co-curricular and employment opportunities that promote the attainment of leadership skills and knowledge. Among the offerings are a summer leadership institute, an Academic Theme Program in the residence halls and various workshops and campus events that aid students in developing their leadership skills.

Pre-Graduate School Advising assists students interested in M.A., M.B.A., Ph.D. or teaching credential programs. Services include help in locating graduate school programs in specific fields, completing application forms and statements of purpose

and planning financial options. This unit also coordinates the Undergraduate Research Conference, an annual event open to all undergraduate UC Davis researchers.

Pre-Law Advising offers help with admission requirements and program planning to students interested in the legal profession. You can learn about preparing for law school and a legal career through the many seminars and workshops held each year.

Health Sciences Advising is an important resource if you are preparing for a profession in the health sciences. Staff and student advisers can provide information on requirements, application procedures, professional school curricula and related options.

The **Career and Graduate Study Resource Center,** 114 South Hall, is an extensive reference library managed by Advising Services and the Internship and Career Center. Resources include numerous graduate and professional school catalogs and program directories, admission test materials, fellowship directories, videotapes, and books and journals related to health education. Also available are job listings, general career information materials, and information about companies who recruit at UC Davis. Several personal computers are available to search the Internet for information on graduate and professional study and job opportunities.

Educational Opportunity Program (EOP)

228 North Hall
530-752-3472

The Educational Opportunity Program serves students by assisting them with their academic, social and personal adjustments to the university environment; coordinates EOP new student orientation programs; and serves as liaison to staff, faculty and administrators. The office's diverse peer staff is particularly sensitive to differing social, cultural and ethnic concerns. Students interested in pursuing the helping professions can receive training and experience through the Peer Adviser Counselor training program.

EOP Information Office services are also accessible at various locations on campus, such as the Colleges of Agricultural and Environmental Sciences, Letters and Science and Engineering; Learning Skills Center; The House; and all ethnic studies departments. You are invited to telephone or stop by the EOP Information Office on the second floor of North Hall or at any of the outreach locations to find out more about the peer support services.

The First Resort

1st floor lobby, South Hall
530-752-2807 or 530-752-3323

The First Resort is a place to go if you are feeling bogged down by university red tape, registration procedures, course selection, choosing a major or other general advising questions. The student advisers here can either answer your questions or put you in contact with others who can. The staff can give you advice and assistance from the point of view of someone who has "been there." Peer advisers from The First Resort are also part of an extensive network of academic support services available to first-year students living in the campus residence halls. The First Resort maintains a referral service, a listing of courses of 1 to 3 units and other valuable resources. If you have a problem, remember—start with The First Resort.

STUDENT CONDUCT AND GRIEVANCES

Student Judicial Affairs
3200 Dutton Hall
530-752-1128; http://sja.ucdavis.edu

The Office of Student Judicial Affairs (SJA) is charged with administering the student discipline system. SJA supports campus standards by resolving alleged violations of university policies or campus regulations. The office also coordinates the informal student grievance resolution process and provides information and assistance about how to file formal complaints of alleged unfair policies or practices, arbitrary treatment and prohibited discrimination or harassment (based on sex, race, religion, disability, etc.). The office can help with conflict resolution and provide interpretations of university policies and regulations.

Misconduct and Discipline

Students enrolling or seeking enrollment in the university have an obligation to act honestly, ethically and responsibly consistent with the university's function as an educational institution. As members of our academic community and of society at large, students have both rights and responsibilities, and are expected to comply with the general law, University policies, and campus regulations. Rules concerning student conduct, student organizations, use of university facilities and related matters are set forth in both university policies and campus regulations; they apply to on-campus and University-related conduct or activities, and also to certain off-campus behavior.

Standards for student conduct are included in the *UCD Code of Academic Conduct,* the *Student Activities Handbook,* the *Guide to Residence Hall Life* and the *University of California Policies Applying to Campus Activities, Organizations and Students.* The operation of the campus student disciplinary system is outlined in the publication, *The Administration of Student Discipline.* These policies and regulations are available from the Office of Student Judicial Affairs and on the Internet.

Misconduct for which students are subject to discipline includes, but is not limited to, plagiarism, cheating, or other dishonest or unfair academic misconduct; furnishing false information to the university; sexual or other physical assault; threats of violence or conduct that threatens health and safety; misuse of university property or resources, including electronic communications; possession of weapons; harassment, including stalking and sexual harassment; forgery; theft; vandalism; possession, use, distribution or sale of drugs or alcohol that is illegal or against University policy; hazing; obstruction or disruption of university activities or functions; and alteration or misuse of university documents, records, keys or identification.

Disciplinary sanctions that may be imposed range from censure to dismissal from the university, and may include restitution and/or assigned community service. Alleged violations of campus or university standards should be referred to the Office of Student Judicial Affairs. If complaints cannot be resolved informally by agreement between Student Judicial Affairs, the accused student and the referring party, the case may be referred to a hearing before a panel of students and faculty or staff, or a hearing officer. The president of the university,

through the chancellor, has ultimate authority for the administration of student discipline.

Student Responsibilities

You are responsible for complying with the announcements and regulations printed in this catalog, in the *Class Schedule and Registration Guide,* on the SJA Web site and with all policies, rules and regulations of the university and this campus. You will not be able to register or receive transcripts of record or diplomas until you have met all university obligations.

Discrimination/Harassment

If you believe that you have been discriminated against or harassed, you may contact the Office of Student Judicial Affairs or the ASUCD Grievance Center for information and assistance. It is important to seek assistance as soon as possible, as a 30-day time limit applies to some grievance processes. Advice is also available from the Sexual Harassment Information Line (752-2255). Graduate students may contact Graduate Studies (752-0650) and/or the Graduate Student Association (752-6108).

Resolving Academic Problems

Grade Changes

Grades may not be changed once they have been submitted to the Office of the University Registrar unless 1) a clerical error has been made (e.g., a homework score is missing) or 2) a procedural error has affected the student's grade (e.g., misapplication of grading procedures, arbitrary treatment or prohibited discrimination). If you believe you received an incorrect grade due to a clerical or procedural error, ask your instructor to file a grade change form with the Office of the University Registrar. If your instructor does not agree, you may request a change of grade by filing a grade change petition with the Office of the University Registrar. Requests must be made by the fifth week of the following quarter (see the *Class Schedule and Registration Guide*).

The Academic Senate Committee on Grade Changes reviews requests for grade changes and has no authority to reevaluate student work, but can change the grade if it finds a documented clerical or procedural error. If the alleged procedural error involves arbitrary treatment or prohibited discrimination, the Grade Change Committee may refer the case to the Student-Faculty Relationships Committee, or the student may file a formal grievance. See the Student Judicial Affairs Web site at http://sja.ucdavis.edu for more information.

Other Academic Problems

If you need a requirement waived or any other type of variance, contact your faculty adviser or the appropriate dean's office for information on your college's procedures. If you cannot get satisfaction through normal channels, contact the ASUCD Grievance Center or the Committee on Student-Faculty Relationships (see below).

ASUCD Student Advocacy Grievance Center

349 Memorial Union
530-754-4131; 530-752-6101/530-752-3339

The ASUCD Student Advocacy Grievance Center advocates students' academic and nonacademic concerns to the faculty and administration. Grievance counselors assist students one-on-one, directing them to appropriate channels through which to state their academic grievances (e.g., student-faculty relations, sexual harassment, grade change problems, pre-judicial treatment in the classroom and problems with academic procedure and policy) and nonacademic grievances (e.g., campus facilities, campus safety, ASUCD, and any other nonacademic concerns). All information discussed between counselors and students is completely confidential. Students can get counseling, referrals and support to aid in the resolution of these matters.

Committee on Student–Faculty Relationships

Academic Senate Office
356 Mrak Hall
530-752-3920

If students with a grievance feel they cannot get satisfaction through normal procedures, they may contact the Committee on Student-Faculty Relationships for assistance. The committee is advisory and can make recommendations to the office having authority to resolve the problem. The chair and/or other designate may also meet informally with the students involved with the grievance.

TUTORING AND LEARNING RESOURCES

EOP Tutoring

Learning Skills Center
2205 Dutton Hall
530-752-2013

EOP tutoring is a free service for EOP students. If you are having difficulty with your course work, the Learning Skills Center offers tutoring in many course areas. Tutoring is provided in groups and on a drop-in basis. For students in academic difficulty, a limited amount of one-to-one tutoring is also available. Although primary emphasis is on the assignments in classes, tutorial services may also be used to improve study habits and learning skills. The tutoring program is staffed by students carefully selected for both their knowledge of course content and their sensitivity to the needs of students being tutored.

The Learning Skills Center offers pre- and co-classes in mathematics and physics for EOP students. Pre-classes help prepare EOP students for the regular university class they usually take the following quarter. Co-classes provide supplementary instruction for EOP students enrolled in the regular class. The LSC offers pre-classes for Mathematics 16A, 21A and Physics 9A. The LSC also offers co-classes for the Mathematics 16 and 21 series, and the Physics 9 series. All pre-classes carry 3 workload units and co-classes carry 1 workload unit. These units count toward minimum progress and financial aid eligibility, but do not count toward graduation.

Learning Skills Center

2205 Dutton Hall
530-752-2013

At the Learning Skills Center you can receive help with such things as general study skills, math/science study skills, writing essays and term papers, reading efficiency, English as a second language, time-management skills, test-taking skills and test anxiety reduction.

Learning specialists can help you individually, or you may participate in workshops covering specific areas of study. The

Learning Laboratory has self-help tapes and films that let you work at your own pace. The LSC library contains a variety of programmed instructional materials, reference books, preparation materials for the GRE, MCAT and LSAT exams, and a file of course examinations given in past quarters. Most materials may be checked out.

Under certain circumstances, the center also provides individual tutoring sessions for students on academic probation or subject to dismissal. Group and drop-in tutoring is available to all students. Come in and ask about our services, which are free to all UC Davis students.

Special Transitional Enrichment Program

Learning Skills Center
2205 Dutton Hall
530-752-2013

Freshman EOP students are invited to participate in the Special Transitional Enrichment Program (STEP). The program begins in summer and continues through the first two academic years, offering preparatory course work, developing academic skills and providing advising. It helps students adjust academically and socially to the campus by strengthening their learning skills and study habits, and by providing an extensive orientation to campus life.

Learning Resource Centers

Student Housing
530-754-6258

Learning Resource Centers are located in the Segundo, Tercero and Cuarto residence hall areas. They offer the following services to all residence hall students: PC computers (Macintosh conversion software), printers, scanners and staff assistance. Other resources include a reference library, CD ROMs, language tapes, an exam file and a quiet place to study. The staff also provides free computer software tutoring and programs.

INTERNSHIPS AND CAREER SERVICES

Internship Programs

The Internship and Career Center
2nd and 3rd floors, South Hall; Buehler Alumni and Visitors Center
530-752-2855; http://icc.ucdavis.edu

You can take advantage of one of the hundreds of organized internships through the Internship and Career Center or initiate your own.

An internship may be full time or part time, credit or noncredit, voluntary or involving a stipend, depending on your needs and interests and the availability of openings. Internship experiences must emphasize learning rather than routine activities, include field supervision by a qualified professional and, where appropriate, the faculty member responsible for giving credit. Academic credit is awarded only for experiences planned and approved in advance by the sponsoring faculty member.

The Internship and Career Center

2nd and 3rd floors, South Hall; Buehler Alumni and Visitors Center
530-752-2855; http://icc.ucdavis.edu

If you are an undergraduate, graduate or alumnus, ICC can help you identify your abilities and interests and relate them to jobs; gain access to practical experience to increase your competitiveness in the job market; and find out how and where to look for the jobs you want. If you are considering dropping out of the university for a term or longer, an adviser can also give you information about internships and employment opportunities.

The Career and Graduate Study Resource Room (1st floor, South Hall) contains materials that can help you learn how your major field of study can be translated into job opportunities, and data concerning types of employment graduates have obtained. Useful to job-seekers—and available free of charge—is ICC's *Career Resource Manual,* which provides guidelines for preparing a resume, tips on being interviewed and information on employment in government, business and education.

The ICC's Career Recruiting Programs, located in the Buehler Alumni and Visitors Center, maintains job vacancy listings, arranges employment interviews and schedules on-campus recruiting by employers.

Graduate Student and Postdoctoral Career Services

The Internship and Career Center
3rd floor, South Hall
530-752-7841

Any student enrolled in the teaching credential program or pursuing a master's or doctoral degree in order to teach should register with the Educational Placement Office.

Services include teaching job vacancy listings, placement files (professional dossiers), special workshops on writing teaching resumes and curriculum vitae, on preparing for interviews, and individual advising.

Advisers maintain contact with school district personnel and work with undergraduate students to explore teaching through internships. The office sponsors the Graduate Career Options Program for advanced degree candidates originally planning a teaching career and now considering other career options.

Human Corps Program

The Internship and Career Center
2nd floor, South Hall
530-752-3813

Human Corps is the student community services program at UC Davis. Public service work can be a rewarding and satisfying experience that may also improve your qualifications for the job market. Community service may or may not be compensated through wages, academic credit or transcript notation and can vary from a one-day activity to a long-term commitment.The Human Corps is a referral center for students who want to perform community service and as a resource for agencies and campus units with service opportunities. The office has a database and directories with information about nonprofit agencies in California, community service opportunities throughout the world and employment in the non-profit or public sectors after graduation. This office also coordinates the AmeriCorps Bonner Leaders Program at UC Davis.

ACADEMIC RESOURCES

Education Abroad Center

151-155 Kerr Hall
530-752-3014; 530-754-8311 (fax);
http://www.mrak.ucdavis.edu/provunde/eap

The opportunity to study abroad is one of the richest educational experiences a student can have. When students return from a quarter at universities in places like Italy or Hong Kong, they routinely describe their time abroad as an experience that changed their lives. The reasons for studying abroad include the desire to see the world, to learn a language, to prepare for a job in the global economy and to have an experience that will add distinction to an application for graduate or professional school.

The Education Abroad Center (EAC) can help students decide which program is best for them, whether to study abroad for a quarter or a year and when to go abroad (freshman through senior year). The EAC advisers also have information about financial aid, fellowships and which programs have internship possibilities.

The EAC is home to the University of California Education Abroad Program and to hundreds of professional study abroad organizations.

Freshman Seminar Program

17 Wellman
530-752-3249; http://trc.ucdavis.edu/TRC

The UC Davis Freshman Seminar Program gives first-year students the opportunity to study with faculty members in small groups, meeting in settings more informal than the ordinary classroom. The seminars focus on a current intellectual interest of the faculty member. All freshman seminars emphasize student participation, providing intense intellectual exchange among students and between student and teacher.

STUDENT RESOURCE AND INFORMATION CENTERS

Campus Violence Prevention Program

Fire and Police Building, Kleiber Hall Drive
530-752-3299; jmbeeman@ucdavis.edu

The Campus Violence Prevention Program (CVPP) explores myths and exposes the realities of sexual violence, relationship violence and hate-related activities, focusing on prevention through education. The program offers discussions, workshops, self-defense classes, short-term crisis intervention, referrals and support groups for victims/survivors of all types of interpersonal violence, 24-hour crisis intervention and advocacy and training for peer counselors and professionals. A circulating library of books, videos and articles on related issues is available. Call for drop-in hours or to make an appointment.

Cross-Cultural Center

Winnie LaNier, Director
Corner of East Quad and Shields Road
530-752-4287; 530-752-5067 (fax); ccc@ucdavis.edu;
http://ccc.ucdavis.edu

The Cross-Cultural Center fosters a multi-ethnic and multicultural community through educational and cultural programs, and leadership development opportunities. Everyone is welcome and encouraged to participate in the many programs, special events and activities sponsored by the center.

Lesbian, Gay, Bisexual and Transgender Resource Center

Sheri Atkinson, Director
University House Annex
530-752-2452; http://lgbtcenter.ucdavis.edu

The LGBT Resource Center provides a comprehensive range of education, information and advocacy services and works to create and maintain an open, safe and inclusive environment for lesbian, gay, bisexual and transgender students, staff, faculty, their family and friends and the entire campus community. The LGBT Resource Center offers a library of over 1,100 books, most of which can be borrowed for 2 weeks for personal use. The Center can also serve as a meeting space for local organizations or support groups. Our focus is respect, pride and unity with regard to all individuals. The LGBT Resource Center is open Monday through Friday, 10 a.m.–5 p.m.

Services for International Students and Scholars (SISS)

Services for International
Students and Scholars
530-752-0864; siss@ucdavis.edu

Services for International Students and Scholars assists international students, faculty and researchers throughout their programs of study, teaching and research at UC Davis, offering orientation, personal and cultural advising, and information and assistance with U.S. immigration regulations. The office serves as a liaison with home governments and sponsors, and provides orientation to the U.S. university system.

All new and transfer international students must attend a special orientation program held just before each quarter begins. The orientation helps new students with registration, class enrollment, making housing arrangements, immigration regulations, and finding campus services and community resources. Orientation and check-in for new international faculty and researchers is held each week. Students and scholars should report to SISS as soon as possible after arriving in Davis.

Women's Resources and Research Center (WRRC)

North Hall, First Floor
530-752-3372; 752-0222 (fax); http://wrrc.ucdavis.edu

The Women's Resources and Research Center educates the campus community about women's issues and concerns, promotes an understanding of the role and impact of gender in our lives and in our society, helps women of diverse backgrounds achieve their intellectual, professional and personal goals, and advocates for women's full inclusion, equality and advancement.

The WRRC's staff can answer questions, locate resources and help you with personal, academic or work-related concerns. Services and resources include lectures, workshops and forums; a library staffed by a full-time librarian; resource listings of campus and community services such as health care, counseling, child care, women's organizations and legal resources; child emergency notification service for student parents; and specialized programs, discussion groups and individualized consultation for faculty and graduate students on research, academic, career and personal topics.

Student Special Services

South Silo
530-752-2007

Student Special Services coordinates a variety of programs and services to meet the special needs of students.

Student Disability Center

530-752-3184 (voice) or 752-6833 (TTY)
http://sdc.ucdavis.edu

The Student Disability Center (SDC) provides services to students with disabilities who are eligible for reasonable accommodation under Section 504 of the Rehabilitation Act, the Americans with Disabilities Act or state law. The staff of Disability Specialists assist students with disabilities in identifying accommodations that will ensure the student has equal access to educational opportunities at UC Davis. For information about SDC services, please call us or visit our Web site.

Reentry Student Services

530-752-2005

Reentry Student Services helps students who have returned to the university after several years of life and work experience. The office provides information, orientation and peer support, and provides referral assistance through the Reentry Resource Network. The office sponsors an annual Reentry Day for prospective reentry students on the last Saturday in February.

Transfer Student Services

530-752-2200

Transfer Student Services helps students who have transferred from other institutions of higher education, coordinating transfer student matters among existing student services units to aid in an easy and smooth transfer to the university. It also sponsors special receptions and workshops for new transfers and annually publishes an online *Transfer Guide* of available campus services.

Veterans Affairs

530-752-2020

Veterans Affairs assists veterans, dependents and reservists with a number of services, including certifying course attendance to the Department of Veterans Affairs, coordinating a tutorial assistance program, providing advice and support, and helping with educational fee waivers, work study and financial aid concerns. To initiate a benefit claim, write or drop by with your letter of admission.

ACADEMIC INFORMATION

UCDAVIS





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REGISTERING AT UC DAVIS

Registration

Office of the University Registrar
12 Mrak Hall
530-752-2973; http://registrar.ucdavis.edu

Registration is the way you become a student at the university. Every UC Davis student must register each quarter. Registration includes enrolling in classes, paying fees and other financial obligations, filing your current address with the Office of the University Registrar, and completing and filing other forms.

If you are a *new* or *reentering* student you must also

- submit a photo for a student ID.
- submit a Statement of Legal Residence (see Appendix).
- return the completed Medical History form, evidence of rubella and hepatitis B immunity, results of a tuberculin skin test and the Insurance Information Request form. These forms are mailed to each new student by the Student Health Center.

New graduate students who have been registered previously at UC Davis as undergraduates are considered to be new students.

Change of Name. Petitions to change your name on official university records can be obtained from the Office of the University Registrar. (Students planning to graduate should file this petition no later than the 5th week of the quarter in which they intend to graduate.)

Change of Address. Be sure to inform the Office of the University Registrar of any change of address. Failure to file your current addresses can result in a hold on your registration. You can update your address through SISWeb, the online registration system.

Late Registration

Late registration privileges extend through the 10th day of instruction, but you are assessed a late fee of $50.00 to defray the extra clerical costs. Registration after the deadline is allowed only if action or inaction on the part of the university delays registration. A recommendation from an appropriate administrative unit is required, and the registration fee must be paid with cash, cashier's check, credit union check, university check or fee credit.

Enrolling in Courses

SISWeb Web Registration. Students enroll in courses by using SISWeb on the World Wide Web.

The *Class Schedule and Registration Guide,* available one week before the start of registration for the quarter, explains registration procedures, gives class meeting times and locations, changes to the *General Catalog* and
provides updated information on fees and registration.

The "Schedule of Classes," an open-courses list and other information about registration is available on the Web site.

Undergraduate Registration Priority. Access to registration is by priority groups. The groups are established according to student class level, as determined by the number of units completed. Undergraduate classification is determined by the number of quarter units you have completed:

Class Level	Units
Freshman	0.0–44.9
Sophomore	45.0–89.9
Junior	90.0–134.9
Senior	135.0 or more

You are officially registered in all courses listed on your individual study list. You are responsible for completing each of the courses. View your study list (class schedule) online using SISWeb.

Adding and Dropping Courses

You can adjust your schedule by adding or dropping courses until the deadlines published in the *Class Schedule and Registration Guide.*

The last day to add courses is the 12th day of instruction. The last day to drop courses without dean's permission or fee is the 20th day of instruction, except for those courses designated by departments as 10-day-drop courses. You need to obtain the permission of your dean and pay a $3.00 fee to drop a designated 10-day-drop course after the 10th day of instruction or to drop any other courses after the 20th day of instruction.

The *Class Schedule and Registration Guide* for each quarter lists the add and drop deadlines and explains how to use SISWeb to adjust your schedule and what add/drop procedures and fees apply after the published deadlines. The academic calendar in the front of this catalog also lists the course add and drop deadlines.

Late Drop

To drop a course after the deadline (but before the day of the scheduled final examination), you need approval of the dean of your college or school. Graduate students must have their adviser's approval in order to drop courses. A $3.00 fee applies to late drops. Permission to drop courses after the deadline may be granted only in exceptional circumstances.

Late Add

To add a course after the deadline (but before the day of the scheduled final examination), you need approval of the department. A $3.00 fee applies to late adds.

Retroactive Drop

Occasionally, in exceptional circumstances, students are allowed to drop a course after the course is completed. Reasons for seeking a retroactive drop are very specific: medical problems, severe emotional difficulties, or recent death or severe illness in the immediate family. Petitions are available from the Office of the University Registrar and should include a detailed account of the problem, appropriate documentation and an adequate explanation of why an *I* grade or late drop was not taken during the quarter in which the problem occurred. The instructor's signature is required on the petition. A $3.00 fee is applicable on all retroactive drops.

Retroactive Add

In some rare circumstances, students are allowed to add a course after the course is completed. Petitions for retroactive adds are available from the Office of the University Registrar. Each petition must include the reason for the student's failure to add the course during the quarter in which it was offered. The petition must be supported by the instructor's signed approval, together with a statement from the instructor indicating knowledge of the student's participation and performance during the presentation of the course in question and the instructor's understanding as to the reason for the student's failure to add the course before the end of the quarter. A course grade must be assigned by the instructor. A $3.00 fee is applicable on all retroactive adds.

COURSE LOAD

Normal Progress. Students are expected to graduate in 12 quarters (four years). To do so, **students should plan to complete an average of 15 units per quarter** (15 units per quarter for 12 quarters totals 180 units). It is understood that for various reasons students will occasionally need to take fewer than 15 units per quarter. However, students must meet the minimum progress requirements of the campus.

Minimum Progress Requirements. Minimum progress is defined as a total of 39 units (including workload units) passed, calculated at the end of every quarter for the preceding three quarters of enrollment. Undergraduate students falling below this requirement will be subject to academic disqualification. Under minimum progress, a student will earn the 180-unit minimum degree requirement within 14 quarters of enrollment. Normal progress would achieve 180 units in 12 quarters (four years).

Minimum progress requirements do not apply to students who have been granted part-time status or to students who have their dean's approval to carry less than the minimum progress load because of medical disability, employment, a serious personal problem, a recent death in the immediate family, the primary responsibility for the care of a family member, or a serious accident involving the student.

Certification of Full-Time Status. Undergraduate students must carry a study load of at least 12 units (including workload units) each quarter in order to be certified as full-time students for insurance and financial aid purposes or to compete in intercollegiate athletics. Graduate students must carry a study load of at least 12 units each quarter in order to be certified as full-time students for insurance and financial aid purposes.

Course Load Limits in the College of Letters and Science. Freshman students in their first year and transfer students in their first quarter of residence may not take more than 17 units each quarter. For all other Letters and Science students, the study list may not exceed 21 units each quarter. These unit limitations include non-credit remedial courses and repeated courses, but not make-up work to remove incomplete grades.

Course Loads in the College of Engineering. Because of the large number of units in some of the double-major programs, students must take more than 15 units per quarter to finish in four years.

Part-Time Student Status

If, for reasons of occupation, family responsibility, health or, graduating-senior status (one term only), you are unable to attend the university on a full-time basis, you may qualify for enrollment in part-time status. You must file for part-time status each quarter. To be considered eligible, undergraduate students must be registered in 10 units (including workload units) or fewer by the tenth day of instruction that quarter, and graduate students must be registered in 6 units or fewer by the tenth day of instruction. Minimum progress requirements are waived for part-time students. Undergraduate petitions are available at the Office of the University Registrar and require approval by the University Registrar. Graduate petitions are available at Graduate Studies and approved by the Dean of Graduate Studies. Part-time students have use of the same facilities and are eligible for the same services, including Student Health Services, as full-time students.

THE MAJOR

You'll find a complete list of the majors offered at UC Davis in a chart at the front of this catalog.

Declaration of Major

College of Agricultural and Environmental Sciences. Students must declare a major by the time they have completed 120 units. Failure to declare a major at this point may result in a hold on further registration. In order to declare a major, you must meet with your faculty adviser and/or advising associate, fill out a Change of Major petition available at the Office of the University Registrar Web site or dean's office and file the petition with the dean's office. If you have completed 120 units, you must prepare a study plan with your adviser and/or advising associate at the same time. You are accepted into a major only after your major department and the dean's office have approved the Change of Major petition. With the approval of the College Executive Committee, additional requirements, such as completion of a particular set of required courses with a specified grade point average (usually well above a *C* average), may be introduced as conditions for acceptance into any major at any time.

College of Engineering. Students must declare a major when they apply to the College of Engineering. Their freedom to change majors thereafter may be limited.

College of Letters and Science. Students must declare a major by the time they have completed 90 units. If you have not declared a major by this point, a hold may be placed on your registration. Such a hold would be removed only when your Change of Major petition is filed in the deans' office. Petitions can be obtained from faculty advisers, department offices or the Office of the University Registrar Web site. As a part of the declaration procedure, you must, in consultation with a faculty adviser, prepare a projected plan of study. You are accepted into the major when your adviser and the dean have approved the petition.

To be accepted into a major, you must have a *C* average in all courses you have completed that are required for that major, as well as a *C* average in the upper division courses you have taken toward the major. With the approval of the College Executive Committee, additional requirements, such as completion of a particular set of required courses with a specified grade

point average (usually well above a *C* average), may be introduced as conditions for acceptance into any major at any time.

If your performance is unsatisfactory after you have declared a major program, you may be required by the dean to withdraw from that major, upon written recommendation from the chair of the department or the curriculum committee that administers the major.

Change of Major Within a College

To change from one major to another within a college, you need the consent of the department or committee in charge of your proposed new major. Admission into a major program may be denied by the program or by the dean if your grade point average (GPA) in courses required for the selected major is less than 2.0.

Procedures for change of major within a college are the same as for declaration of major and the same conditions apply. If you wish to change to a major that has admission restrictions, you must comply with the special procedures and requirements for that major.

Except under unusual circumstances, no change of major will be permitted after you attain senior standing (135 units). It is not possible to change or declare a major in the quarter in which you file to graduate.

College of Engineering. The above provisions may not apply to students in the College of Engineering, whose freedom to change majors is limited. Please contact the Engineering dean's office for specific change-of-major requirements.

Change of Major Accompanied by Change of College

A change petition, available at the dean's office and Office of the University Registrar, must be endorsed by a faculty adviser of the new major you are selecting and signed by the dean of the college from which you wish to transfer. In addition, admission to the new college will require that dean's approval. To obtain that approval, you must be in good academic standing and meet all minimum GPA criteria, including those for the major, established by the new college.

College of Engineering. Requirements for changing to an engineering major vary by major. Please consult the department responsible for the major or the Engineering dean's office for the current requirements.

Multiple Majors

College of Agricultural and Environmental Sciences. A student choosing to major in multiple majors must petition the departments/programs/divisions responsible for the major(s), and the dean of the college. The dean's approval of declaration for multiple majors is subject to the following:

1. Eighty percent of the upper division units offered in satisfaction of course and unit requirements of each major must be unique; that is, they may not be offered in satisfaction toward the upper division unit requirements of any of the other selected majors. Courses with substantial overlap in content will not count as part of the 80 percent. Departmental advisers may approve only one course for substitution when considering the 80 percent in upper division courses and units required for each major.
2. When unit requirements of the majors included in a request differ, the major with the smaller number of upper division units required should be used to compute the minimal unit difference that must be met.
3. A student in good academic standing and with a minimum of a C average in the upper division courses taken toward the major may elect to declare simultaneously more than one major within the college or a combination of majors offered by the college and other undergraduate colleges on campus.
4. Combinations of majors offered by a single department/program/division are not allowed. Multiple majors will not be approved for the following majors: biochemistry and molecular biology; biological sciences; cell biology; evolution and ecology; genetics; microbiology; neurobiology, physiology, and behavior; plant biology.

College of Engineering. Engineering has several established combined majors. Enrollment in combinations of engineering majors other than the established combined majors or in an engineering major and a non-engineering major may be possible. A change of major petition is required; this should be filed in the Undergraduate Office and is subject to approval. Double-major students must satisfy the requirements for both majors. Degree requirements for such double majors ordinarily cannot be completed within four academic years.

The Department of Computer Science does **not** allow double majors of Computer Science and Engineering and Computer Engineering, **or** Computer Science and Engineering and Electrical Engineering, **or** Computer Science and Engineering and Computer Science.

If you want to double major in any over-subscribed engineering major, you will be subject to the additional restrictions for transferring into those majors and must satisfy the requirements of both majors.

College of Letters and Science. Students choosing to major in multiple subjects must notify the dean's office of their decision by submitting for approval a petition endorsed by faculty advisers in the majors. The dean's approval of the declaration of more than one major is subject to the following conditions:

1. At least 80 percent of the upper division units used to satisfy course and unit requirements in each major selected must be unique and may not be counted toward the upper division unit requirements of any other major undertaken. Courses with substantial overlap in content will not count as part of the 80 percent.

   If the major programs differ in the number of upper division units required, the major program requiring the smaller number of units will be used to compute the minimum number of units that must be unique.
2. At the time of request, a substantial part of the preparatory subject matter and at least two upper division courses in each major must have been successfully completed.

All degree requirements must be completed within the 225-unit limit.

Combination proposals that *cannot be approved* are two or more majors offered by the same discipline, *except* art history and art studio.

A student who completes all requirements for approved multiple majors in which one major normally leads to an A.B. degree and another normally leads to a B.S. degree, will receive a B.A.S. degree. A single degree is granted to students who graduate with multiple majors.

Cross-College Majors

College of Agricultural and Environmental Sciences. The College does encourage multiple majors between colleges whenever your academic interests and abilities indicate this to be the best route. After endorsement of the Change of Major petition by the appropriate faculty in the colleges involved, each dean may approve the petition if there are sufficient differences between the requirements for the major programs you wish to study. At least 80 percent of the upper division units used to satisfy course and unit requirements in each major selected must be unique and not duplicate those of the other major. In planning for multiple majors, you should determine the total requirements needed for each major as well as for graduation from each college involved.

All degree requirements must be completed within the 225-unit limit.

The same conditions apply for cross-college majors as for multiple majors. Cross-college programs will not be approved if the majors involved are available within a single college as well. For example, cross-college programs between the colleges of Letters and Science and Agricultural and Environmental Sciences will not be approved if one of the majors is biochemistry and molecular biology; biological sciences; cell biology; evolution and ecology; genetics; microbiology; neurobiology, physiology, and behavior; or plant biology.

College of Engineering. Enrollment in a combination of an engineering major and a non-engineering major may be possible. A change of major petition must be filed in the Undergraduate Office and is subject to approval. Such double-major students must satisfy the requirements for both majors. Degree requirements for such double majors ordinarily cannot be completed within four academic years.

College of Letters and Science. The same conditions apply for cross-college majors as for multiple majors. Cross-college programs will not be approved if the majors involved are available within a single college as well. For example, cross-college programs between the colleges of Letters and Science and Agricultural and Environmental Sciences will not be approved if one of the majors is biochemistry and molecular biology; biological sciences; cell biology; evolution and ecology; genetics; microbiology; neurobiology, physiology, and behavior; or plant biology.

Individual Major

Students with academic interests not covered by an established major have the opportunity to develop an individual major. Such a major requires the selection of interrelated courses totalling a minimum of 45 upper division units from two or more areas of study. If you choose this option you will work closely with faculty advisers to develop a coherent and rigorous academic program. This program is then submitted to a faculty committee for review and approval. Submit the proposed program to the committee **prior to reaching 120 units, or by the fourth full week of the fifth quarter before graduation, whichever is earlier.** If you wish to undertake an individual major, request the appropriate forms from your dean's office. Program requirements are outlined under Individual Major in the Programs and Courses section of this catalog. *The College of Engineering does not offer an individual major.*

THE MINOR

If you are interested in two or more areas of study, you should consider completing one or more minor programs. Minor program requirements are listed in the "Programs and Courses" chapter of this catalog under the department that offers them. You will find a complete list of the minors offered at UC Davis in a chart at the front of this catalog.

A minor consists of 18 to 24 units in upper division courses specified by the department or program offering the minor. Courses used to satisfy the requirements of a minor, including those completed elsewhere, must be approved by an adviser in the sponsoring department or program. **For minors offered by the College of Agricultural and Environmental Sciences, at least half of these units and courses must be completed in residence on the Davis campus.** You are also expected to complete all courses that are prerequisite to the upper division courses required for the minor. Minors offered by the College of Letters and Science do not require that a portion of the units be completed at UC Davis.

To request certification of a minor, **you must have a grade point average of 2.0 in all courses required for the minor.** At most, one course used in satisfaction of your major may be applied to your minor. If you elect more than one minor, these minors may not have any courses in common.

If you want to have completion of a minor certified on your transcript, you must obtain a minor petition from your dean's office and file it no later than the deadline for filing for graduation. You can elect only one minor in a subject area. Requirements for the minor must be met by the time of graduation.

For information on a minor in Engineering, please consult the Undergraduate Office in the College of Engineering. Students in Engineering may, with the approval of the Engineering dean's office and the adviser in the minor department, elect a minor in either the College of Letters and Science or in the College of Agricultural and Environmental Sciences. You must pick up a minor petition in the office of the college that offers your minor and have the completed petition approved by the minor adviser and then certified by the Undergraduate Office of the College of Engineering. The Undergraduate Office in the College of Engineering has the primary responsibility for certifying minors for engineering students and should be consulted before you begin the minor sequence.

ACADEMIC CREDIT

Units of Credit

Academic work at the university is measured by "units of credit." In conjunction with the letter grade you receive from the course instructor, units of credit give a fairly accurate evaluation of the amount of time you have devoted to a given subject. Units of credit also make it possible to anticipate the amount of work involved in a particular course and enable you to transfer from one campus or university to another without undue difficulty. (To convert quarter units to semester units, multiply by 0.66; from semester to quarter units, multiply by 1.5.)

Units of credit are assigned to courses based on 1 unit of credit for three hours of work by the student per week. Usually this means one hour of lecture or discussion led by the instructor and two hours of outside preparation by the student. In laboratory courses, two or three hours of work in the laboratory are normally assigned 1 unit of credit.

In most courses at UC Davis, the standard procedure prevails, so that a 3-unit course meets for three hours a week, a 4-unit course for four hours, and so on. Courses that are an exception to this pattern may require additional class time or give more demanding assignments. If you have questions about the number of units assigned to a course, you should check the expanded course descriptions (available at your college, department, or on the Web) or ask the instructor what is required in terms of outside reading, term papers, problem sets or field trips. These are not always spelled out completely in the *General Catalog*. By knowing the amount of work that will be required, you can plan your course load more systematically and realistically.

Credit by Examination

Under certain prescribed conditions, currently registered students in good standing may receive course credit by taking an examination without formally enrolling in a course. You may obtain a petition and a copy of the prescribed conditions from the Office of the University Registrar. The petition is subject to the approval of the instructor giving the examination and the department involved.

The completed petition, accompanied by a fee of $5.00, must be presented for final approval to the dean of your college or school, or if you are a graduate student, to the dean of Graduate Studies.

The credit received for the examination may not duplicate any credit you have already earned toward your degree. You may not use credit by examination to repeat any course you have taken previously, regardless of the grade you received in that course. The final results will be reported to the Office of the University Registrar, which will assign the appropriate grade and grade points to you. Since failure to pass the examination will be recorded as an *F,* you are encouraged to prepare fully for such an examination before attempting it.

You may also receive credit for learning in nonacademic settings through credit by examination.

To earn credit through the credit by examination process, the examination must be given by a UC Davis instructor and be for a course listed in the current *General Catalog*. Students are not eligible to take a credit by examination in a quarter in which they are not currently enrolled.

Concurrent Credit from Another Institution

A student may not obtain transfer credit for courses taken at a non-University of California campus in a term during which the student is registered as a full-time student at UC Davis. A variance can be obtained only by petitioning the dean of your college well in advance of the desired registration. When a variance is granted, units earned are counted toward minimum progress for the term in which the dual registration occurs. Summer Session courses are exempt from this regulation.

Students may gain credit for courses taken during the summer at other institutions, provided the courses parallel those given in the University of California. Assurance that such credit will be accepted, however, can be given only after the courses have been completed. You should arrange to have the transcripts of your Summer Session grades sent to Undergraduate Admissions and Outreach Services for evaluation.

Intercampus Visitor Program

Qualified undergraduates may take advantage of educational opportunities on other University of California campuses as an Intercampus Visitor (ICV). This program enables students who have completed at least one year in residence on their home campus and have maintained a grade point average of at least 2.0 to take courses not available on their home campus, to participate in special programs, or to study with distinguished faculty members on other campuses of the university. Students who meet the above requirements should complete an application available in the Office of the University Registrar.

Summer Sessions

One Shields Avenue
Davis, CA 95616-8715
530-757-3305 or 1-888-VIP-7580
summer-sessions@ucdavis.edu
Summer Abroad programs: 1-800-SUMMER6
http://summer-sessions.ucdavis.edu

Every summer, many students earn units, complete their undergraduate degrees, expand their knowledge, do research, take special study courses, meet prerequisites or take courses that are often over-enrolled during the academic year by participating in Summer Sessions at UC Davis.

Summer Sessions offers more than 500 lower and upper division courses in a wide range of subject areas that provide full university credit transferable to most campuses. Since admission is open to virtually all adults, Summer Sessions traditionally attracts students from universities and colleges, high school graduates and many other qualified applicants. Admission to a summer session, however, does not guarantee or imply admission to the university's regular academic quarters.

Summer session dates are listed in the academic calendar in the front of this catalog, online at http://summer-sessions.ucdavis.edu and in the *Class Schedule and Registration Guide*. Summer abroad and special programs offered include Community Resources Development in San Francisco; the study of volcanoes in Hawaii; and other special topic programs of different lengths. Students often have the opportunity to study in England, France, Germany, Norway, Denmark, Sweden, Spain, Mexico, Italy, Japan, Peru, Ireland, Scotland, Greece, Panama, New Zealand, Namibia, South Africa and Australia.

UC/CSU/Community College Cross Enrollment

If you are interested in taking a particular class at a nearby California State University or community college campus, you may now do so through the Intersegmental Cross Enrollment program. Enrollment is limited to one course per term and participating students need the approval of both the home and the host campus. (Please note that the Los Rios Community College district is NOT participating in the program.)

Senate Bill 361 requires that UC, CSU and the California Community Colleges permit students to enroll in one course per term at a campus of either of the other two systems on a space available basis at the discretion of the two campuses. This pro-

gram aims to encourage community college students to enroll concurrently in courses offered at local universities, potentially increasing the number of community college transfers, including students from underrepresented groups.

Students must meet certain qualifications and be certified by their home campus as to eligibility, residence, fee, financial aid and health status. Generally, students will be allowed to add a class, if space is available, after the add/drop period on the host campus. To add a course, students must obtain the faculty member's approval and signature on a Cross-Enrollment form, available at their home campus Registrar's Office. The student takes the signed form to the Registrar's Office at the host campus for processing. If you are interested in participating, come to the service counter at the Office of the University Registrar, 12 Mrak Hall, for information.

UC Davis Extension

Credit for a limited number of units may be granted for specified UC Davis Extension courses, subject to the regulations of the individual colleges (see Bachelor's Degree Requirements section).

EXAMINATIONS

Midterms

In undergraduate courses for which a midterm examination is required, each student has the right to take the midterm (or submit the take-home examination as opted by the instructor) during one of the regularly scheduled meetings of the class as published in the *Class Schedule and Registration Guide*. The scheduling of a midterm examination at a time other than a regularly scheduled class meeting requires mutual written consent of the instructor and each student registered in the course. A student who does not consent in writing to the different time must be permitted to take the examination (or submit the take-home examination) at the officially scheduled time. A student who consents in writing to the change of examination time waives the right to take the midterm at the officially scheduled time.

Final Examinations

Scheduling. The *Class Schedule and Registration Guide* lists the times that final examinations are to be held. These are set up according to the day-and-hour periods in which the classes are given during the quarter. This information is available in the *Class Schedule and Registration Guide* each term so that you can avoid final examination conflicts. A student who has multiple exams on the same day may discuss the situation with the instructors of the courses. **Students are responsible for ensuring they do not have conflicting exams. There is no regulation mandating a change.**

Requirements. Except under certain specified circumstances, Academic Senate Regulations require that final examinations be given in all undergraduate courses. Final examinations may be given in graduate courses. Exceptions to the regulation would be independent study courses, courses that consist of laboratory work only, and courses in which the examination has been waived.

At the instructor's option, the final examination may be completely or in part a take-home examination. The writing time (in undergraduate courses) of a take-home and an in-class final examination together should not exceed three hours. In each course in which a final examination is required, the students have the right to take the final examination (and/or submit the take-home examination) at the time published in the *Class Schedule and Registration Guide*.

An instructor may release each student's original examination, or a copy, at any time. Otherwise, the instructor will keep the exams, or copies thereof, until the end of the next quarter and students may pick up their exams during this period.

Changing a Final Examination Date. An in-class final examination may not be rescheduled for a date earlier than the first day of finals week. The due date for a take-home final examination may not be rescheduled for a date earlier than the first day of finals week. The scheduling of an examination at a time other than the specified time requires the written mutual consent of the instructor and each student involved in the change. Any student who does not consent in writing to a different time will be permitted to take an examination (or submit the instructor-opted take-home examination) at the officially scheduled time. A student who consents in writing to a change in the final examination time waives the right to take the examination as originally scheduled. Departures from the published examination schedule should be carried out so as not to disadvantage students who are unable to accept the changed schedule.

A student who is improperly denied the right to take a required final examination on the published date (or submit the take-home examination as opted by the instructor) may file a petition with the Executive Council of the Davis Division of the Academic Senate by the end of the next regular term for appropriate action.

Disabilities. Students with documented disabilities may be entitled to in-class accommodations. The student shall provide the instructor with a letter from the Student Disability Center (SDC) recommending those academic accommodations that the instructor is responsible for providing. Students must request accommodation as soon as possible, to allow the university reasonable time to evaluate the request and offer necessary adjustments. No accommodations shall alter the nature of the academic demands made of the student nor decrease the standards and types of academic performance, nor require facilities or personnel that cannot reasonably be provided. SDC coordinates with the Office of the University Registrar to reserve a classroom for examinations for students with documented disabilities during finals week. The instructor should consult with the student and SDC on any questions or concerns.

Religious observances. UC Davis seeks to accommodate any student who, in observance of a religious creed, encounters an unavoidable conflict with a test or examination schedule. The student is responsible for providing, in writing no later than the beginning of the quarter, notification of a potential conflict to the individual responsible for administering the examination and requesting accommodation. Instructors will consider such requests on a case-by-case basis and determine whether such conflicts can be resolved without imposing on the instructor or the other students in the class an undue hardship, which can-

not be reasonably avoided. If so, the instructor will determine, in consultation with the student, a time during which the student can take the test or examination without incurring a penalty or violation to the student's religious creed.

GRADES

Every instructor is required to assign a grade for each student enrolled in a course. The following grades are used to report the quality of a student's work at UC Davis:

A	excellent
B	good
C	fair
D	barely passing
F	not passing (work so poor that it must be repeated to receive recognition)
P	passed (grade *C*– or better)
NP	not passed
S	satisfactory
U	unsatisfactory
I	incomplete (work is satisfactory but incomplete for a good cause)
IP	in progress

The grades *A, B, C* and *D* may be modified by a plus (+) or minus (–).

Grade Points

Grade points are assigned each letter grade as follows:

A+ = 4.0	*B*– = 2.7	*D* = 1.0
A = 4.0	*C*+ = 2.3	*D*– = 0.7
A– = 3.7	*C* = 2.0	*F* = 0.0
B+ = 3.3	*C*– = 1.7	*P/NP* = n/a
B = 3.0	*D*+ = 1.3	*S/U* = n/a

Grade Point Average (GPA)

The grade point average is computed on courses taken at the University of California. The value of grade points over units attempted determines your grade point average. The grade point balance represents the number of grade points above or below a *C* average. The grades *IP, P, S, NP* and *U* carry no grade points and are not included in grade point computations. Incomplete (*I*) grades are not included in the GPA at the end of the quarter, but are counted as *F* in determining if a bachelor's degree candidate has earned the minimum 2.0 GPA required for graduation.

A student at UC Davis is expected to maintain a *C* (2.0 GPA) or better in all work undertaken in the university. If you fall below a *C* average, you are considered "scholastically deficient" (see Probation and Dismissal).

Passed/Not Passed *(P/NP)* Grading

Subject to regulation by the faculties of the colleges and schools, an undergraduate student **in good standing** may request to take specific courses on a Passed/Not Passed basis. Such requests must be submitted and confirmed before the 25th day of instruction.

The grade *P* is assigned for a grade of *C*– or better. Units thus earned are counted in satisfaction of degree requirements but are not counted in determining your grade point average. The intent of this option is to encourage exploration in areas in which you have little or no previous experience by alleviating grading pressures. **The maximum number of units graded *P* that will be accepted for degree credit is one third of the units completed in residence on the Davis campus.** Consequently, at least two thirds of the units completed in residence at Davis and presented in satisfaction of degree requirements must be in courses taken for a letter grade.

In specific approved courses, instructors will assign only Passed or Not Passed grades. Such courses count toward the maximum number of units graded *P* allowable toward the degree. If you are planning to take courses on a *P/NP* basis, you should also familiarize yourself with the requirements of your particular school or college, which may have placed conditions or restrictions in addition to the university requirements. If you plan to attend graduate or professional school, you should consult with Advising Services regarding Passed/Not Passed grading.

If you elect the *P/NP* grading option for courses graded upon completion of a two- or three-quarter sequence (in-progress grading), a petition must be submitted before half of the time covered by the *IP* grading has elapsed. The *P/NP* grading will then be in effect for the entire course sequence.

If you receive a *D* or an *F* in a course, you may not repeat it using the *P/NP* option. If you receive an Incomplete in a course you took for a letter grade, you may not complete the course on a Passed/Not Passed basis.

College of Agricultural and Environmental Sciences: The Passed/Not Passed option should be used only for elective courses, not for courses taken to fulfill major requirements. An *NP* grade in a course required by the major could prevent graduation. When in doubt, check with your faculty adviser before electing to take a course on a Passed/Not Passed grading basis.

College of Engineering: Students enrolled in any undergraduate major offered by the College of Engineering may **not** exercise the Passed/Not Passed grading option for any course work presented in satisfaction of course or unit requirements for any undergraduate major or degree offered by the College of Engineering. Additionally, undergraduate students may not exercise the *P/NP* option for any course offered through the College of Engineering. **Courses offered only on a *P/NP* basis are acceptable for specific program area degree requirements.**

College of Letters and Science: Students enrolled in the College of Letters and Science are subject to an additional limitation on the number of units that may be completed employing the Passed/Not Passed grading option (see Bachelor's Degree Requirements for the college in the "Undergraduate Education" chapter). Graduating seniors, and other students planning to undertake graduate or professional studies, should consult an adviser before electing for Passed/Not Passed grading in courses required for the major program.

Satisfactory/Unsatisfactory *(S/U)*

The grade of *S* is awarded to graduate students for work in graduate courses that otherwise would receive a grade of *B*– or better and for work in undergraduate courses that otherwise would receive a grade of *C*– or better.

Graduate students, under certain circumstances, may be assigned grades of *S* or *U,* but units earned in this way will not be counted in calculating the grade point average. Petitions to

elect *S/U* grading are available from the Graduate Studies Office and must be signed by your graduate adviser. Graduate students may petition to take no more than one course per quarter on an *S/U* grading basis. A graduate course in which a *C, D* or *F* grade is received may not be repeated with the *S/U* option.

In specific approved courses, instructors will assign only Satisfactory or Unsatisfactory grades. Such courses count toward the maximum number of units graded *S* allowable toward the degree, as specified by each degree program.

In-Progress (IP) Grading

For a course extending over more than one quarter (designated "deferred grading only, pending completion of sequence" in course descriptions), evaluation of student performance is deferred until the end of the final quarter. Provisional grades of *IP* are assigned in the intervening quarters and are replaced with the final grade at the completion of the sequence. In order to gain credit toward graduation, a student must successfully complete the entire sequence. (See above for electing *P/NP* grading for a course graded in-progress.)

Incomplete Grades

The grade of *I* may be assigned when a student's work is of passing quality and represents a significant portion of the requirements for a final grade, but is incomplete for a good cause as determined by the instructor. (Good cause may include current illness, serious personal problems, an accident, a recent death in the immediate family, a large and necessary increase in working hours or other situations of equal gravity.)

You may replace an *I* grade with a passing grade and receive unit credit (and grade points if the instructor assigns a letter grade) provided you satisfactorily complete the course work as specified by the instructor. In order to change your records, you must obtain a petition from the Office of the University Registrar and present it to your instructor for completion and mailing.

An *I* grade must be replaced with a letter grade (or *P* or *S* grade) before the end of the third succeeding quarter (excluding summer sessions) of the student's academic residence, or the grade will revert to an *F* (or *NP* or *U*). If a student's degree is conferred before the expiration of the time limit for an *I*-grade conversion, the graduated student shall have until the end of the third quarter succeeding the quarter in which the *I* grade was assigned to replace the *I* grade. If the grade is not replaced by then, the *I* grade will remain on the student's record.

You may not re-enroll for credit in a course for which an *I* grade has been assigned. An undergraduate student whose record shows more than 16 units of *I* grades will be subject to disqualification. A graduate student who accumulates more than eight units of *I* grades will be subject to probation.

Incomplete grades will not be included in your grade point average at the end of a quarter. However, at the time of graduation, any remaining *I* grades are included when your grade point average is computed in order to determine whether you have achieved the 2.0 average required for the bachelor's degree. An Incomplete grade, in these computations, has the same effect as a grade *F, NP* or *U,* depending on which option you have exercised. Therefore, it is recommended that students not delay the clearance of incomplete grades so as not to jeopardize graduation.

Retroactive Grade Changes

All grades except *I* and *IP* are final when filed by an instructor at the end of the quarter. No final grade except *I* may be revised by examination or the submission of additional work after the close of the quarter.

If a clerical or procedural error in the reporting of a grade by the instructor can be documented, you may request a change of grade with a petition available from department offices. The request must be made by the fifth week of the following quarter.

Grade changes for "clerical" errors (such as incorrect addition of points), upon documentation, are automatically granted. Requests to interchange *P, NP, S,* or *U* grades with normal letter grades based upon student need (such as to allow graduation or to meet entrance requirements for professional school) do not involve clerical or procedural errors and are automatically denied. Thus, students should exercise the Passed/Not Passed or Satisfactory/Unsatisfactory grading options with caution.

Students are reminded of their reponsibility to be aware of the procedures and regulations contained in this catalog and the *Class Schedule and Registration Guide*, to verify their class schedules, and to familiarize themselves with the expectations of their instructors. No changes, except completion of an *I* grade as noted above, can be made to the student's record once he or she has graduated.

Repeating Courses

Undergraduate students may only repeat courses in which they received a *D, F* or *NP.* Courses in which students received a grade of *D* or *F* may not be repeated on a *P/NP* grading basis. (Courses in which a grade of *NP* was received may be repeated on a *P/NP* grading basis.)

Degree credit for a repeated course will be given only once, but the grades assigned for both the first and second time a course is taken will appear on the student's transcript. In computing the GPA of undergraduates who have received a grade of *D, F* or *NP,* only the grade and corresponding grade points earned the second time a course is taken will be used, up to a maximum of 16 units for all repeated courses. After the 16-unit maximum is reached, the GPA shall be based on all grades assigned and total units attempted.

Repeating a course more than once requires approval by the appropriate college dean. Departments may restrict the repetition of a course if it is a prerequisite to a course the student has already completed with a grade of *C–* or better.

Graduate students, with the consent of the appropriate graduate adviser and the dean of Graduate Studies, may repeat any course in which they received a *C, D, F* or *U,* up to a maximum of 9 units for all courses repeated. Courses in which a grade of *C, D* or *F* has been earned may not be repeated on a *S/U* basis. (Courses in which a grade of *U* was received may be repeated on a *S/U* basis.)

Degree credit for a repeated course will be given only once, but the grades assigned for both the first and second time a course is taken will appear on the student's transcript. In computing the GPA of graduate students who have received a grade of *C,*

D or *F,* only the most recently earned grade for each course and corresponding grade points will be used, up to a maximum of 9 units for all courses repeated. After the 9-unit maximum is reached, the GPA shall be based on all grades assigned and total units attempted.

Mid-Term Grade Standing

Students wishing to know their grade at the mid-quarter should ask the instructor. Those who have deficient grades (*D, F* or *NP*) are urged to confer with their advisers.

Final Grades

Grades are generally available about three weeks after a quarter has ended. You can check your grades online through SISWeb.

Transcripts

A record of each student's academic work at UC Davis is retained permanently by the Office of the University Registrar. Copies of your official transcript may be obtained from that office for $4.00 a copy. Application for a transcript of record should be made at least two weeks in advance of the time needed.

Transcripts of all work done through UC Davis Extension or Concurrent Enrollment must be requested directly from the UC Davis Extension Office, 1333 Research Park Drive, Davis, CA 95616. Transcripts of work completed at another campus of the university or at another institution must be requested directly from the campus or institution concerned.

PROBATION AND DISMISSAL

The following provisions apply to all undergraduates. Graduate and professional students with scholarship deficiencies are subject to action at the discretion of their respective deans.

Scholastic Deficiencies

A student will be placed on probation or subject to disqualification for failure to meet qualitative or quantitative standards of scholarship.

The **qualitative standards** of scholarship require that a student maintain a *C* average (2.0) or better for all work undertaken in the university and for the work undertaken in any one quarter.

A student will be placed on **probation for qualitative reasons** if, at the end of any quarter, the student's grade point average (GPA):

- is less than 2.0, but not less than 1.5, for the quarter,

or

- is less than 2.0 for all courses taken within the University of California.

A student will be subject to **disqualification for qualitative reasons** if, at the end of any quarter,

- the student's grade point average is less than 1.5 for the quarter,

or

- the student's grade point average is less than 1.5 for all courses taken within the University of California.

or

- the student has attempted more than 16 units graded *I* (Incomplete),

or

- the student has spent two consecutive quarters on academic probation.

In the case of probation or disqualification, the official transcript will state "not in good standing." Once a student has met qualitative standards for scholarship, the notation will be removed from the transcript.

The **quantitative standards,** referred to as minimum progress requirements, define scholarship in terms of the number of units that you must satisfactorily complete. It is assumed that a student will earn the 180-unit minimum degree requirement within 12 quarters (four years). This means students must plan to complete, on average, 15 units per quarter. Because occasions arise which prevent students from achieving normal progress towards the degree, the campus has established minimum progress requirements, to which students must adhere. Minimum progress is defined as a total of 39 units passed, calculated at the end of every quarter for the preceding three quarters of enrollment.

A student will be subject to **disqualification for quantitative reasons** if the total number of units passed at UC Davis is **less than 39,** calculated at the end of every quarter for the preceding three quarters of enrollment.

Quantitative standards are not reflected on the official transcript.

The following courses may be counted toward unit minimum progress:

- Required non-credit courses, e.g., Mathematics B, will be evaluated according to the "Carnegie unit" rule and counted as units passed
- Repeated courses passed to improve *D* or *F* grades
- Courses passed in Summer Sessions at UC Davis or at another accredited school and transferred to UC Davis will be counted as units passed (applied to the quarter of registration just preceding the summer session)
- Courses passed by examination in accordance with policies established by the Divisional Committee on Courses (applied to quarter in which exam is taken)
- Courses that are *IP* (in progress) will be counted as units passed
- Courses graded *I* will be counted as units passed when replaced by a passing grade (applied to the quarter in which the *I* grade is received)

The dean of the student's college may grant a student a minimum progress variance of one or more quarters for an acceptable reason.

Minimum progress requirements do not apply to students who have part-time status or to students who have their dean's approval to carry less than the minimum progress load because of medical disability, employment, a serious personal problem, a recent death in the immediate family, or a serious accident involving the student.

Dismissal

Dismissal for either qualitative or quantitative reasons (defined above) is based on the decision of the dean of the college in which you are enrolled. Such dismissal is from the University of California system and not simply the college or the Davis campus. Should a former Davis student later wish to be readmitted on the Davis campus, the authority to do so rests with the dean of the college from which the student was dismissed. If you are dismissed from your college, you will automatically receive a full refund of registration fees paid.

See your faculty adviser or go to the dean's office of your college if you need academic advising about probation and dismissal.

HONORS AND PRIZES

Scholarships

Dutton Hall
530-752-2804; http://financialaid.ucdavis.edu/schol.htm

By mail:
Scholarship Office
University of California
One Shields Avenue
Davis, CA 95616-8696

Students with outstanding academic records who show promise of continued scholarly achievement are encouraged to apply for scholarship recognition and awards. Awards include a financial honorarium or stipend.

Deans' Honors Lists

According to Davis campus regulations, the quarterly Dean's Honors List includes names of students who have completed, for a letter grade, a minimum of 12 units in a specific quarter with a grade point average equal to or higher than the minimum grade point average attained by the upper 16 percent of those registered in the same class level and college during that quarter. Honors lists will be posted quarterly outside deans' offices or on the dean's office Web sites, and a notation of these honors will be placed on each student's permanent record by the Office of the University Registrar.

Graduation Honors

Honors at graduation are awarded to students who have a grade point average in the top percent of their college as shown in the table below. (The College of Letters and Science requires that additional criteria be met for high and highest honors—see explanation below.)

Total Quarter Units Completed at UC	Highest Honors	High Honors	Honors	Total
45-89	2%	next 2%	next 4%	8%
90-134	3%	next 3%	next 6%	12%
135+	4%	next 4%	next 8%	16%

Grade point averages from the winter quarter prior to graduation are used to determine the averages that will earn an honors designation. Following are the averages for winter quarter 2004. These averages will be used through winter 2005.

Grade Point Average by College

Percent Determining Cut-Off Point	Agricultural and Environmental Sciences	Engineering	Letters and Science
2%	3.892	3.912	3.882
3%	3.857	3.881	3.833
4%	3.820	3.835	3.793
6%	3.763	3.775	3.730
8%	3.703	3.691	3.679
12%	3.591	3.580	3.588
16%	3.505	3.476	3.503

An honors notation is made on students' diplomas and on their permanent records in the Office of the University Registrar.

College of Letters and Science. Graduation with "honors" requires that a student meet the appropriate grade point requirement described in the above table for all UC courses completed. Students who meet the grade point requirement for graduation with honors, and who complete the Honors Program of the College of Letters and Science, may be recommended by their departments for graduation with high honors or highest honors on the basis of an evaluation of their academic achievements in the major and in the honors project in particular. A notation shall appear on the student's official transcript indicating that the 194H Honors Thesis was completed. Graduating students will not be awarded honors with the bachelor's degree if more than eight units of grade *I* (Incomplete) appear on their transcripts. The College Committee on Honors may consider exceptions to this condition. Petitions for this purpose should be submitted to the dean's office.

The Honors Program of the College of Letters and Science

The Honors Program in the College of Letters and Science permits students to pursue a program of study in their major at a level significantly beyond that defined by the normal curriculum. It represents an opportunity for the qualified student to experience aspects of the major that are representative of advanced study in the field. Successful completion of the College Honors Program is a necessary prerequisite to consideration for the awarding of high or highest honors at graduation.

Entrance into the honors program requires that a student have completed at least 135 units with a minimum grade point average of 3.5 in courses counted toward the major. Other prerequisites for entrance into the program are defined by the major. The program consists of a project whose specific nature is determined by consultation with the student's major adviser. It may involve completion of a research project, a scholarly paper, a senior thesis, or some comparable assignment depending on the major. The project will have a minimum duration of two quarters and will be noted on the student's record by a variable unit course number or special honors course designation. Successful completion of the honors program requires that a minimum of six units of credit be earned in course work for the project.

Davis Honors Challenge

530-752-9797; http://www-honors.ucdavis.edu

The Davis Honors Challenge is a campuswide program for highly motivated students who are interested in enhancing their education through special courses, closer contact with faculty and dynamic interaction with academic peers.

DHC courses are limited in size so that participants receive substantial individual attention from faculty. In return, students are expected to participate actively in analyzing real world problems. Honors courses and small honors sections of regular courses also encourage individual student participation and self-challenge. Students satisfactorily completing the program will receive transcript notation for each academic year of participation.

First and second year students take two honors courses and one problem-oriented interdisciplinary seminar per academic year. Second year students have the option to substitute an honors contract for an honors course. Third year students are required to complete two honors contracts and one upper division honors seminar, a team-based project in conjunction with an outside interested party. Fourth year students participate in a year long project to identify real world problems, apply research, critical thinking, problem solving and communication skills to develop viable solutions for their outside party.

Other components of the DHC include honors living learning communities, a mentorship program and a service learning program. Each of these programs is designed to enhance students' college experience.

Entering first year students who file a "Statement of Intent to Register" at UC Davis will be mailed detailed information about the DHC application process. Continuing students may obtain information and an application from the DHC Office after the start of spring quarter.

Integrated Studies Honors Program

530-752-9760

The Integrated Studies Honors Program is a campuswide, invitational, first-year residential honors program, now in its fourth decade. The Integrated Studies Honors Program offers specially designed, interdisciplinary honors courses that satisfy General Education requirements. Approximately 110 students live in an Academic Residential Community on campus and take three limited-enrollment honors courses (open only to Integrated Studies Honors Program students) and two seminars.

Holders of Regents Scholarships, the university's most prestigious scholarship awards, are guaranteed places in the Integrated Studies Honors Program. Other highly qualified students are also invited to participate and are selected to create a balanced community of students from all three undergraduate colleges and the Division of Biological Sciences.

Prizes and Awards

The University Medal is the highest campus honor awarded to a graduating senior in recognition of superior scholarship and achievement. A College or School Medal is also given to the outstanding graduating student in each of the colleges and professional schools.

Departmental citations, special awards and prizes are also awarded to students for superior achievement and scholarship.

College of Agricultural and Environmental Sciences. Each year, the outstanding graduating senior in the College is awarded a silver medal, known as the "Agricultural and Environmental Sciences Medal." Scholastic excellence (in a minimum of six quarters at UC Davis) is the primary basis for choosing the recipient. The Mary Regan Meyer Prize is awarded to an outstanding graduate who has demonstrated expertise and an interest in serving humanity. The Charles E. Hess Award is awarded to the graduate with the most noteworthy record of public/community service while at UC Davis. The Kinsella Memorial Prize, in honor of John E. Kinsella, is awarded annually to an outstanding individual who submits his or her Ph.D. dissertation during the spring, fall or winter quarter immediately preceding the due date for nomination.

College of Engineering. Each year, outstanding senior students in engineering are selected by their grade point averages as nominees for the M.S. Ghausi Medal. Academic excellence is the primary basis for selecting the recipient of the award.

College of Letters and Science. Graduating seniors with a distinguished academic record may be recommended by the faculty as nominees for the College's Herbert A. Young Medal. Each June, one medalist is selected from among the graduates of the current academic year. The Leon H. Mayhew Award is conferred upon the outstanding graduate majoring in the arts or humanities, preferably music, art, or literature. Academic excellence is the primary basis for selecting the recipients of these awards. The Lawrence J. Andrews prize is awarded to a student entering the senior year who not only has achieved academic excellence but who also has demonstrated interests outside of pure scholarship.

Chancellor's Award

This award recognizes students who have distinguished themselves through their excellence in and contribution to undergraduate research and encourages others to become involved in these types of efforts. Recipients of the award receive a certificate of commendation and inscribed plaque from the president of the university.

In conjuction with the Chancellor's Award, Professor Dean Simonton of UC Davis' Department of Psychology established an endowment for funding a cash prize of $500 for each year's student recipient.

Honorary Societies

Election to an honorary society is one of the most prestigious awards a student can receive. At UC Davis, the following honorary societies are represented:

Alpha Kappa Delta (Sociology)
Alpha Omega Alpha (Medicine)
Alpha Zeta (College of Agricultural and Environmental Sciences)
Delta Phi Alpha (German)
Gamma Sigma Delta (College of Agricultural and Environmental Sciences; Biological Sciences)
Golden Key (All colleges and schools)
Kappa Omicron Nu (Family and Consumer Sciences)
The National Society of Collegiate Scholars (All colleges and schools)
Omicron Delta Epsilon (Economics)

Order of Omega (Fraternities–Sororities)
Order of the Coif (Law)
Phi Alpha Theta (History)
Phi Beta Kappa (College of Letters and Science)
Phi Kappa Phi (All colleges and schools)
Phi Sigma (Biological Sciences)
Phi Zeta (Veterinary Medicine)
Pi Delta Phi (French)
Pi Mu Epsilon (Mathematics)
Pi Sigma Alpha (Political Science)
Prytanean Honor Society
(All colleges—undergraduate women only)
Psi Chi (Psychology)
Sigma Pi Sigma (Physics)
Sigma Xi (All colleges and schools—research)
Tau Beta Pi (Engineering)

LEAVING UC DAVIS

Graduation

Each candidate for an undergraduate degree must file an **Application for Graduation** online with the Office of the University Registrar for the quarter in which the candidate plans to receive the degree. The dates for campus filing are published in the Academic Calendar at the front of this catalog and the quarterly *Class Schedule and Registration Guide*.

Students in the College of Agricultural and Environmental Sciences must have their Major Certification form evaluated by the dean's office before their candidacy for a degree can be finalized (see Bachelor's Degree Requirements for the college in the Undergraduate Education chapter).

Students in the College of Engineering must register online at the College of Engineering Web site in addition to filing with the Office of the University Registrar. Consult the College of Engineering Web site or the Undergraduate Office for Engineering filing deadlines.

Leave of Absence: Planned Educational Leave Program (PELP)

The Planned Educational Leave Program allows students to suspend academic work at UC Davis, leave the campus and later resume studies at UC Davis with a minimum of procedural difficulties.

Any registered student on the Davis campus, undergraduate or graduate, is eligible to enroll in the Planned Educational Leave Program, although restrictions may be imposed on the number of times a student can participate in the program. Undergraduates apply for PELP at the Office of the University Registrar. Graduate students apply through their departments and professional students apply through their dean's office. Applications for PELP must be filed no later than the tenth day of instruction but must be filed by the first day of instruction for a full refund. After filing your PELP form, you must file an exit form with Student Accounting.

An application fee of $40 is charged to your account when you enroll in the PELP program. This fee is identical to that paid by a student who withdraws and is required to pay a readmission fee upon return.

The minimum Planned Educational Leave is one full quarter; the maximum leave is one full academic year. Applications for PELP should be filed no later than the first day of instruction. While approved applications can be accepted as late as the tenth day of instruction, filing after the first day of instruction will entitle you to only a partial refund of fees paid, in accordance with the Schedule of Refunds. The Schedule of Refunds refers to **calendar** days beginning with the first day of instruction. The effective date for determining a refund of fees is the date the completed and approved PELP form is returned to the Office of the University Registrar. (See the "Fees, Expenses and Financial Aid" chapter.)

While students may receive academic credit at other institutions and transfer this credit to UC Davis (subject to rules concerning transfer credit), participants are reminded that the intent of the program is to "suspend academic work." Therefore, students should carefully evaluate the desirability of taking academic work while away from the campus during PELP. Students enrolled in PELP are not eligible to enroll in Open Campus (concurrent) courses at the Davis campus, or to otherwise earn academic credit at Davis during the PELP leave.

Readmission is guaranteed assuming you resume regular academic work at the agreed-upon date and satisfy any holds that may have been placed on your registration. Students who do not return at the agreed-upon date and who do not officially extend their leave will be automatically withdrawn from the university.

You will not be eligible to receive normal university services during the planned leave. Certain limited services, however, such as placement and student employment services, counseling and faculty advising are available. Students on Planned Educational Leave may purchase a health care card from the Student Health Service and may retain library privileges by purchasing a library card. International students should consult Services for International Students and Scholars to find out how the Planned Educational Leave will affect their status. Grants and other financial aids will be discontinued for the period of the leave, but every effort will be made, where legally possible, to allow you to renegotiate loan payment schedules and to ensure the availability of financial aid upon your return.

Withdrawal

Withdrawals may be granted by the university for emergency reasons or for good cause. Petitions for withdrawal (Notice of Cancellation/Withdrawal) are available at the Office of the University Registrar. A percentage of fees paid may be refunded, in accordance with the Schedule of Refunds (see the "Fees, Expenses and Financial Aid" chapter). The effective date for determining a refund of fees is the date the completed withdrawal form is filed with the Office of the University Registrar. After filing your withdrawal form, you must then file an exit form with Student Accounting to complete your withdrawal.

If you are receiving financial aid, you must report your change of status immediately, in person or by mail, to the Financial Aid and Student Accounting Offices. If you are receiving veterans benefits, you must also report your withdrawal to the Veterans Affairs Office.

Retroactive Withdrawals. Petitions for retroactive withdrawals may be obtained from the Office of the University Registrar. Reasons for seeking such are medical problems, severe emotional difficulties, or death or severe illness in the immediate family. Petitions should include a detailed account of the problem, appropriate documentation and an adequate explanation of why withdrawal was not taken during the quarter in which the problem occurred.

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UNDERGRADUATE EDUCATION

UCDAVIS





2004–2005 · 2005–2006

UNDERGRADUATE EDUCATION

Students may choose from over 150 major programs and more than 60 minor programs in a wide variety of disciplines offered by the three undergraduate colleges.

College of Agricultural and Environmental Sciences

Office of the Dean
150 Mrak Hall
530-752-0108; http://www.caes.ucdavis.edu

Major programs in the College of Agricultural and Environmental Sciences highlight the multiple connections among agricultural sciences, environmental sciences and human sciences within the larger context of the quality of life in the global economy. The majors fall into three broad areas of study described below. Majors in a fourth area of study, the biological sciences, are offered through both the College of Agricultural and Environmental Sciences and the College of Letters and Science and are administered by the Division of Biological Sciences. Refer to the following section, "Division of Biological Sciences," for more information. The College of Agricultural and Environmental Sciences also offers two collegewide degree programs and two collegewide non-degree programs.

The Undergraduate Programs

Agricultural Sciences

These majors prepare students in animal biology and the management of environmental resources as needed to develop sustainable animal production technologies. Also considered is the impact of production and management processes on animal health and welfare, human diet and health, and the natural environment.

The majors that focus on plant science provide a strong background in the context of agricultural and environmental systems and societal needs; ecological understanding of food and fiber production systems; biological and economic principles that underlie management decisions in agribusiness; and a basic background in all areas of plant biology, including plant development, plant protection, biotechnology and postharvest physiology.

Majors:
Agricultural Management and Rangeland Resources, B.S.
Animal Biology, B.S.
Animal Science, B.S.
Animal Science and Management, B.S.
Avian Sciences, B.S.
Biotechnology, B.S.
Crop Science and Management, B.S.
Entomology, B.S.
Plant Biology, B.S.
Viticulture and Enology, B.S.

Minors:

Agricultural Entomology and Bee Biology (Entomology)
Applied Computing and Information Systems (Agronomy)
Animal Biology (Animal Science)
Animal Genetics (Animal Science)
Apiculture Entomology (Entomology)
Aquaculture (Animal Science)
Avian Sciences
Dairy/Livestock (Animal Science)
Entomology
Environmental Horticulture
Fungal Biology and Ecology (Plant Pathology)
Insect Biology (Entomology)
Insect Ecology and Evolution (Entomology)
Medical-Veterinary Entomology)
Nematology
Precision Agriculture (Biological and Agricultural Engineering)

Environmental Sciences

These majors focus on the broad facets of the human and natural environments and their interactions. They draw on the social, physical and biological sciences as needed to prepare students for leadership and advanced studies in the areas of natural resource management, environmental quality and stewardship, community planning and design, and public policy decision making.

Majors:
Atmospheric Science, B.S.
Environmental and Resource Sciences, B.S.
Environmental Biology and Management, B.S.
Environmental Horticulture and Urban Forestry, B.S.
Environmental Policy Analysis and Planning, B.S.
Environmental Toxicology, B.S.
Hydrology, B.S.
Landscape Architecture, B.S.
Soil and Water Science, B.S.
Wildlife, Fish and Conservation Biology, B.S.

Minors:
Applied Biological Systems Technology (Biological and Agricultural Engineering)
Atmospheric Science (Land, Air and Water Resources)
Environmental Policy Analysis (Environmental Science and Policy)
Environmental Toxicology
Geographic Information Systems (Biological and Agricultural Engineering)
Geographic Studies (Environmental Design)
Hydrology (Land, Air and Water Resources)
Landscape Restoration (Environmental Horticulture)
Soil Science (Land, Air and Water Resources)

Human Sciences

These majors foster a deeper understanding of the multiple connections between scientific and cultural issues in the context of human health and the quality of life. Basic physical and biological science, social science, design, and economic priniciples are taught in this context, linking food and fiber production to consumption, emerging knowledge to societal applications and policy, and human development to active, informed citizenship. Emphasis is on linking resources for humans with humans as resources. Physiological, social, and aesthetic dimensions of the human experience are explored.

Majors:
Clinical Nutrition, B.S.
Community and Regional Development, B.S.
Design, B.S.
Fiber and Polymer Science, B.S.
Food Science, B.S.
Human Development, B.S.

Managerial Economics, B.S.
Nutrition Science, B.S.
Textiles and Clothing, B.S.

Minors:
Aging and Adult Development
(Human and Community Development)
Community Development
(Human and Community Development)
Community Nutrition (Nutrition)
Fiber and Polymer Science (Textiles and Clothing)
Food Service Management (Nutrition)
Human Development
(Human and Community Development)
Managerial Economics
(Agricultural and Resource Economics)
Nutrition and Food (Nutrition)
Nutrition Science (Nutrition)
Textiles and Clothing

Collegewide Programs

The collegewide programs cut across all of the above areas, providing students in a variety of majors with a background in such areas as public policy, economic principles in a global context, and the intersections among environmental, agricultural and socio-economic issues. Collegewide programs also include non-degree, lower division curricula aimed at providing students with a foundational knowledge base and the potential for developing individualized programs.

Majors:
Individual Major, B.S.
International Agricultural Development, B.S.

Minors:
International Agricultural Development
Science and Society

Non-degree programs:
Exploratory
Science and Society

Division of Biological Sciences

(College of Agricultural and Environmental Sciences and College of Letters and Science)

Dean's Office
202 Life Sciences Addition
530-752-0410;
http://www.dbs.ucdavis.edu/undergrad

The Division of Biological Sciences is an intercollege unit that coordinates campuswide programs in basic biology and administers undergraduate programs in the core disciplines of biology on behalf of the College of Agricultural and Environmental Sciences and the College of Letters and Science.

The division is organized into five sections that represent major themes of modern biology: Evolution and Ecology; Microbiology; Molecular and Cellular Biology; Neurobiology, Physiology, and Behavior; and Plant Biology. The individual sections offer seven specialized majors, each focusing on one of the core disciplines of basic biology. The majors in Biological Sciences and Exercise Biology, and the Bodega Marine Laboratory Program are offered by the entire division.

The Undergraduate Programs

Biological Sciences

The biological sciences major is broad in concept, designed to span the numerous core disciplines of biology. The major covers most dimensions of the study of life, ranging from molecules and cells to populations of organisms. While emphasizing breadth, the Bachelor of Science degree also requires the student to select an area of emphasis that provides concentrated study in one facet of biology at the upper division level. Each area of emphasis coincides with one of the divisional sections.

Major:
Biological Sciences, A.B., B.S.

Minor:
Biological Sciences

Evolution and Ecology

The major in evolution and ecology offers the student a broad background in the theoretical and empirical basis of our understanding of the evolution and ecology of living organisms. The program of study begins with a core of introductory courses in mathematics, physical sciences, and biology. These are followed by survey courses in evolution and ecology and more specialized courses that allow the student to focus his or her studies.

Major:
Evolution and Ecology, A.B., B.S.

Exercise Science

The major in exercise biology is an integrative program of study, encompassing the physiological, biomechanical and behavioral aspects of exercise and physical activity. Our focus is on both the acute and adaptive effects of physical activity (and inactivity). Exercise biology deals with the mechanisms and consequences of activity from the molecular to the organismal (human ecological) level. We examine these mechanisms and consequences during growth, development, aging, disease and in altered environmental conditions. The exercise biology major encompasses the critical aspects of an integrative program in applied human biology.

Major:
Exercise Biology, A.B., B.S.

Minor:
Exercise Biology

Microbiology

Microbiology deals with bacteria, yeasts and other fungi, algae, protozoa, and viruses. These microorganisms are ubiquitous in nature and play a crucial role in areas such as agriculture, biotechnology, ecology, medicine, and veterinary science. The field of microbiology contributes to areas of fundamental inquiry such as biochemistry, cell biology, evolution, genetics, molecular biology, pathogenesis, and physiology.

Major:
Microbiology, A.B., B.S.

Molecular and Cellular Biology

The Section of Molecular and Cellular Biology offers three majors. The biochemistry and molecular biology major introduces students to the chemistry of living organisms and the experimental techniques that are used to probe the structures

and functions of biologically important molecules. Students who enjoy both chemistry and biology and who are comfortable with quantitative approaches to problem solving will find this major a rewarding field of study.

The cell biology major provides a comprehensive understanding of the cell, the basic structural and functional unit of all living organisms. The major emphasizes the principles that govern how biomolecules interact with one another to organize themselves into higher order structures that comprise cells and how cellular organization and function contribute to the development, maintenance, and reproduction of adult organisms.

The genetics major provides a broad background in the biological, mathematical, and physical sciences basic to the study of heredity and evolution. The major is sufficiently flexible to accommodate students interested in the subject either as a basic discipline in the biological sciences or in terms of its applied aspects such as biotechnology, medicine and agriculture.

Majors:
Biochemistry and Molecular Biology, B.S.
Cell Biology, B.S.
Genetics, B.S.

Neurobiology, Physiology, and Behavior

The neurobiology, physiology, and behavior major emphasizes the understanding of vital functions common to all animals. All animals perform certain basic functions—they grow, reproduce, move, respond to stimuli, and maintain homeostasis. The physiological mechanisms upon which these functions depend are precisely regulated and highly integrated. Actions of the nervous and endocrine systems determine behavior and the interaction between organisms and their physical and social environments. Students in this major will study functional mechanisms; the control, regulation, and integration of these mechanisms; and the behavior which relates to those mechanisms at the level of the cell, the organ system and the organism.

Major:
Neurobiology, Physiology, and Behavior, B.S.

Plant Biology

Plant biology is the study of plants as organisms. It includes the newer disciplines of cellular and molecular plant biology and the traditional areas of botany, such as anatomy, morphology, systematics, physiology, mycology, phycology, ecology and evolution. The major provides breadth in diverse areas of plant biology and depth in one of several areas of specialization.

Major:
Plant Biology, A.B., B.S.

Minor:
Plant Biology

Divisionwide Program

Bodega Marine Laboratory Program

A full quarter of undergraduate course work in marine biology is available each spring quarter at the Bodega Marine Laboratory (BML) located in Bodega Bay, CA. Course offerings include lecture and laboratory instruction in the developmental biology and physiological adaptation of marine organisms, population biology and ecology, a weekly colloquium, and an intensive individual research experience under the direction of laboratory faculty (Biological Sciences courses 120, 120P, 122, 122P, 123; Neurobiology, Physiology, and Behavior 141, 141P). The program is residential, with students housed on the laboratory grounds. Participants are assessed a room and board fee in addition to standard campus registration fees. This is a 15-unit program. Course offerings and instructors may vary from year to year. Additional information is available from the Bodega Marine Laboratory at (707) 875-2211, P.O. Box 247, Bodega Bay, CA 94923.

College of Engineering

Undergraduate Advising Office
1050 Kemper Hall
530-752-0553; http://www.engr.ucdavis.edu

Engineering is the profession in which the physical and biological sciences are applied in a practical way for the benefit of society. As an engineering student, you will learn to observe and describe technological problems and to seek useful solutions to them. Your skills upon graduation will be useful to you not only as an engineer, but also as a professional in management, sales, operations, manufacturing, and other fields.

Seventeen undergraduate engineering curricula, including four formal combined major programs, are offered. Each of these is a four-year program leading to the degree of Bachelor of Science. Eleven programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), the nationally recognized accrediting body for engineering curricula: Aeronautical Science and Engineering, Biological Systems Engineering, Chemical Engineering, Chemical Engineering/Biochemical Engineering, Civil Engineering, Computer Engineering, Computer Science and Engineering, Electrical Engineering, Electrical Engineering/Materials Science and Engineering, Materials Science and Engineering, and Mechanical Engineering.

The four-year undergraduate program is divided into two parts: the Lower Division Program and the Upper Division Program.

Lower Division Programs. If you enter the College of Engineering with fewer than 90 quarter units of credit, follow the lower division program specified for your major. If you enter the College with 90 or more quarter units of credit, you must fulfill the requirements for transfer students outlined in this chapter under "College of Engineering, Unit Requirements."

Upper Division Programs. If you have completed the requirements for the lower division program or have entered the College of Engineering with more than 90 quarter units of credit, you should follow the upper division requirements for the major you have selected from the programs that follow.

Minor Programs. The College of Engineering currently offers one minor program in Computational Applied Science.

The Undergraduate Programs

Applied Science

The Department of Applied Science offers two majors, one in Optical Science and Engineering and one in Computational Applied Science. The objective of the Optical Science and Engineering program is to provide a basic education in the fundamental principles of optics combined with key courses in physics, mathematics, and the engineering applications of optics. There is a rapidly growing national demand for engi-

neers educated in optical science and engineering. Much of the high-technology infrastructure is based upon optics and its applications, the most prominent being optical digital information transmission. In addition, engineers trained in optical science and engineering are in strong demand in health care and life science, optical sensing for environmental and weather applications, energy-use reduction, commercial camera and space-program optical applications, and national defense applications. Computational Applied Science deals with the interplay between the mathematics of models that arise from physical science and engineering and the numerical techniques for their computational implementation and subsequent solution. The major provides a comprehensive background in mathematics and physical science. The specific objective of the major is to enable students to construct practical numerical solutions to problems in science and engineering. Strong components of the program are the development, analysis, and integration of numerical algorithms and an appreciation for the interaction among numerical simulations, theoretical models and experiments.

Majors:
Computational Applied Science, B.S.
Optical Science and Engineering, B.S.

Biological and Agricultural Engineering

Biological Systems Engineering majors learn to combine the science and art of engineering with the science of biology to design systems that influence, control, or use biological materials and organisms for improving the quality of life. Specific objectives include designing systems to process biological materials into consumer products; designing machines to interact with biological systems in disciplines ranging from agriculture to medicine; managing, recycling and using wastes; developing systems to protect and preserve our natural resources and environment; developing and improving processing systems for food; designing equipment and systems that improve nutrition and diets; and minimizing waste discharge to the environment.

Majors:
Biological Systems Engineering, B.S.

Biomedical Engineering

The Department of Biomedical Engineering advances fundamental medical concepts; creates knowledge from the molecular to the organ systems levels; and develops innovative biologics, materials, processes, implants, devices and informatics approaches. These approaches are applied to the prevention, diagnosis and treatment of disease. The objective is to prepare students for employment in companies that manufacture medical assist devices, human tissue products and therapeutics. The program also prepares students to enter a graduate program in biomedical engineering or pursue professional degrees in medicine and related health fields.

Majors:
Biomedical Engineering, B.S.

Chemical Engineering and Materials Science

The Department of Chemical Engineering and Materials Science offers four majors, including one combined major.

Chemical Engineering majors learn to apply chemical and engineering principles to create useful products ranging from antibiotics to zirconium, from petroleum to plutonium, from agricultural chemicals to plastics. Specific objectives include the design of industrial processes as diverse as integrated circuit materials production, integrated waste management, and petroleum refining.

Biochemical Engineering majors combine chemical engineering studies with studies in the life sciences and bioprocess engineering. Bioprocess engineering is the application of engineering principles to develop, optimize, and commercialize manufacturing processes. Specific objectives include pharmaceuticals production, environmental repair, industrial chemical production, and food production.

Materials Science and Engineering majors learn to understand the relationships among microscopic structure, properties, and behavior of materials in order to produce new and improved materials with capabilities far superior to common metals, alloys, and ceramics. Specific objectives include the development of materials for high-speed transportation systems, surgical and dental implants, new generations of power plants, and solid-state electronic devices in computer and optical communications technology.

Majors:
Biochemical Engineering, B.S.
Chemical Engineering, B.S.
Chemical Engineering/Materials Science and Engineering,B.S.
Materials Science and Engineering, B.S.

Civil and Environmental Engineering

Civil Engineering majors learn to apply the principles of the physical and biological sciences and engineering to plan and design systems to improve the quality of life. Specific objectives include providing potable water and freedom from disease-carrying wastes; protecting the natural environment; mitigating the effects of earthquakes and other natural disasters; designing land-, water-, and air-transportation systems; and building roads and structures.

Majors:
Civil Engineering, B.S.
Civil Engineering/Materials Science and Engineering, B.S.

Computer Science and Engineering

The field of computer science and engineering encompasses the organization, design, analysis, theory, programming, and application of digital computers and computing systems. The curriculum develops versatile engineers with backgrounds spanning a broad computer/software spectrum. The Computer Science and Engineering major provides a solid background in mathematics, physics, chemistry, and electronic circuits and systems—all supporting the computer hardware and software courses that form the focus of the curriculum. A key theme is the hardware/software interaction in computer system design; this theme is reflected in the balance between hardware and software course requirements and in the orientation of the courses themselves. The major requires more humanities and social science electives than other college majors, in order to produce the verbal skills and intellectual breadth demanded by today's employers.

Major:
Computer Science and Engineering, B.S.

Electrical and Computer Engineering

Electrical Engineering majors learn to apply the principles of the physical sciences and engineering to the design, analysis, development, production, and evaluation of electronic sys-

tems. Specific objectives include the provision of systems for communications, control, signal processing, integrated circuit fabrication, optoelectronics, consumer electronics, and digital systems.

Computer Engineering majors study the design, development, analysis, organization, theory, programming, and application of digital computers. Specific objectives include developing the student's ability to design both software and hardware. In comparison to the Computer Science and Engineering major, the Computer Engineering major provides greater emphasis on hardware in the key hardware/software interaction in computer system design.

Majors:
Computer Engineering, B.S.
Electrical Engineering, B.S.
Electrical Engineering/Materials Science and Engineering, B.S.

Mechanical and Aeronautical Science Engineering

Aeronautical Science and Engineering majors learn to apply the principles of the physical sciences and engineering to vehicles whose motion is determined by aerodynamic forces. Specific objectives include the design, development, and manufacture of aircraft and other transportation systems integrating the disciplines associated with aerodynamics, propulsion, structures, and guidance/control.

Mechanical Engineering majors learn to apply physical and mechanical principles to the design and manufacture of machines and products, energy conversion systems, and equipment for guidance and control. Specific objectives include the provision of products and processes for intelligent manufacturing systems, biomechanical and sports equipment, power generation systems, propulsion for transportation, integration of vehicles and automated highways, and applications of computer and automation technologies.

Majors:
Aeronautical Science and Engineering, B.S.
Mechanical Engineering, B.S.
Mechanical Engineering/Materials Science and Engineering, B.S.

College of Letters and Science

Office of Undergraduate Education
and Advising
Room 200, Social Sciences
and Humanities Building
530-752-0392; http://www.ls.ucdavis.edu

Major programs in the College of Letters and Science provide students systematic exposure to the key principles, methods, findings and representations of a selected area of study. In pursuing a major, students gain intellectual depth and competency in that subject matter, explore important linkages with collateral fields of inquiry, and are encouraged to engage in independent study.

Most of the academic programs offered through the college are grouped in three divisions: Humanities, Arts, and Cultural Studies; Mathematical and Physical Sciences; and Social Sciences. One collegewide degree program, the individual major, also is available. A set of majors in the basic biological sciences is offered through both the College of Letters and Science and the College of Agricultural and Environmental Sciences and is administered by the Division of Biological Sciences. Refer to the earlier section, "Division of Biological Sciences," for more information.

The Undergraduate Programs

Division of Humanities, Arts, and Cultural Studies

These majors focus centrally on the artifacts, expressions and concerns of humankind in various cultures and times. They provide students the opportunity to explore the creation, performance and analysis of works of art, the language and customs of non-English speaking societies, the theory and criticism of literature, and the peoples and cultures of this nation and its hemisphere. Students interested in studying these types of issues may select from more than 20 different majors.

Majors:
African American and African Studies, A.B.
American Studies, A.B.
Art History, A.B.
Art Studio, A.B.
Asian American Studies, A.B.
Chicana/Chicano Studies, A.B.
Chinese, A.B.
Classical Civilization, A.B.
Comparative Literature, A.B.
Dramatic Art, A.B.
English, A.B.
French, A.B.
German, A.B.
Italian, A.B.
Japanese, A.B.
Medieval Studies, A.B.
Music, A.B.
Native American Studies, A.B.
Nature and Culture, A.B.
Religious Studies, A.B.
Russian, A.B.
Spanish, A.B.
Women's Studies, A.B.

Minors:
African American and African Studies
American Studies
Art History
Art Studio
Asian American Studies
Chicana/Chicano Studies
Chinese
Classical Civilization
Comparative Literature
Dramatic Art
English
Film Studies
French
German
Global and International Studies
Greek
Italian
Japanese
Latin
Medieval Studies
Music
Native American Studies
Nature and Culture
Religious Studies
Russian
Social and Ethnic Relations
Spanish
Women's Studies

Division of Mathematical and Physical Sciences

These majors focus primarily on the description and interpretation of the structure, processes and events of the physical universe. They provide students the opportunity to explore in depth the structure, properties and reactions of substances; fundamental mathematical techniques and models and their application to the interpretation and explanation of phenomena; studies of matter and energy and their interconversions; the nature and development of computer languages; and earth and environmental processes. Students interested in studying these types of subjects may select from eight different majors. The division strongly encourages undergraduates to enroll in undergraduate research projects with one-on-one instruction by faculty scholar/researchers.

Majors:
Applied Physics, B.S.
Chemistry, A.B., B.S.
Computer Science, B.S.
Geology, A.B., B.S.
Mathematics, A.B., B.S.
Natural Sciences, B.S.
Physics, A.B., B.S.
Statistics, A.B., B.S.

Minors:
Computer Science
Environmental Geology
Geology
Geophysics
Mathematics
Physics
Statistics

Division of Social Sciences

These majors focus largely on issues and problems that characterize social, cultural, political and economic life across human societies. They provide students the opportunity to explore the relationships between people and the groups and organizations of which they are a part, the antecedents of individual behavior, the development of political and economic systems, the social forces that have shaped the contemporary world, and the foundations of language, thought, knowledge and perception. Students interested in studying these types of issues may select from more than a dozen different majors.

Majors:
Anthropology, A.B., B.S.
Communication, A.B.
East Asian Studies, A.B.
Economics, A.B.
History, A.B.
International Relations, A.B.
Linguistics, A.B.
Philosophy, A.B.
Political Science, A.B.
Political Science–Public Service, A.B.
Psychology, A.B., B.S.
Sociology, A.B.
Sociology–Organizational Studies, A.B.

Minors:
Anthropology
Communication
East Asian Studies
Economics
Education
History
History and Philosophy of Science
Jewish Studies
Linguistics
Philosophy
Political Science
Psychology
Sociology
War-Peace Studies

Collegewide Program

Students whose academic interests cannot be satisfactorily met through the completion of an established major have the opportunity to develop an individual major. Individual majors may reflect the most recent trends in scholarship and research and are typically interdisciplinary in nature. The major proposal is developed in close and active consultation with two faculty advisers from the academic disciplines most closely related to the subject matter of the individual major. Careful faculty guidance and review assure that individual majors are comparable in academic rigor and intellectual coherence to those regularly available through the departments and programs of the college.

Major:
Individual Major, A.B., B.S.

BACHELOR'S DEGREE REQUIREMENTS

You must satisfy four groups of requirements before you can become eligible for candidacy for the bachelor's degree (see box). The four groups are:

- University requirements, which apply to all colleges;
- General Education requirement, which applies to all colleges;
- College requirements; and
- Major requirements.

Detailed information on university requirements, the General Education requirement and college requirements can be found in this chapter.

Every student is responsible for seeing that all of his or her degree requirements are fulfilled.

UNIVERSITY REQUIREMENTS

All students must fulfill the following University of California requirements.

Subject A: English Requirement

The university requires every undergraduate student to demonstrate college-level proficiency in English composition. Satisfaction of the Subject A requirement is a prerequisite to all other undergraduate courses in English.

The requirement, as determined by Undergraduate Admissions, may be met in one of the following ways:

- By achieving a score of 680 or higher on the SAT II-Writing Test.

- By achieving a grade of 5, 4 or 3 on the College Board Advanced Placement Examination in English.
- By achieving a score of 5 or above on the International Baccalaureate's Higher Level English A Examination.
- By entering the university with credentials showing the completion of an acceptable 3 semester-unit or 4 quater-unit college-level course in English composition with a grade of *C* or better.
- By writing a passing essay on the Subject A Examination. This examination may be taken **only once** prior to enrollment. It is offered in the spring at local sites throughout California; a student admitted for fall quarter who has not already satisfied the Subject A requirement must take this examination. An out-of-state student or any California freshman admitted after mid-April will take another form of the Subject A Examination, which will be offered on the UC Davis campus during the orientation period each quarter. For the time and location, consult the *Class Schedule and Registration Guide,* published before the beginning of each quarter.

If you have not satisfied the requirement in one of the ways described above, *you must enroll in English 57 during your first quarter of residence at the university, or as soon thereafter as space is available in the course.* English 57, offered by Sacramento City College on the Davis campus, counts as 4.5 units on your study list and toward minimum progress but is not transferable as units toward graduation. To satisfy the requirement, students must pass the Subject A Examination offered as the final examination for English 57. Students failing the examination must repeat English 57. If the requirement has not been satisfied by the end of your third quarter, and you were not required to take courses for non-native speakers of English in the Linguistics program, you may be disenrolled from the University.

Students whose native and school language is not English, and some students whose schooling combines work in the United States and in another country, must demonstrate proficiency in English. The level of proficiency must meet the standards of both the non-native speakers of English program and the Subject A program. The results of the Subject A Examination and a special examination in English administered during the orientation period each quarter determine whether a student has met the Subject A requirement or must take specific course work in the Linguistics program. Students held for Linguistics course work have three quarters to meet the Subject A requirement **plus** the number of quarters required in Linguistics.

American History and Institutions

The American History and Institutions requirement ensures that every graduating student will have at least a minimum knowledge of the background of this country's development

Bachelor's Degree Requirements

University Requirements

All students must fulfill the following University of California requirements:

Subject A

American History and Institutions

Unit Requirement

Residence Requirement

Scholarship Requirement

General Education Requirement

Students must complete three courses in the two areas of *topical breadth* outside the assigned area of their major. Students also must complete three *writing experience* courses and one *social-cultural diversity* course.

College Requirements

College of Agricultural and Environmental Sciences	College of Engineering	College of Letters and Science
Unit	Unit	Unit
Residence	Residence	Residence
Scholarship	Scholarship	Scholarship
English Composition	English Composition	English Composition
	Design	Area (Breadth)
		Foreign Language (A.B. and B.A.S. degrees)

Major Requirements

Course requirements for each major are listed in the Programs and Courses section of this catalog.

and an understanding of the political, economic and social interrelationships of its way of life.

You may meet this requirement in any of these ways:

- By offering one high school unit in American history, or 1/2 high school unit in American history and 1/2 high school unit in civics or American government, with a grade of *C* or better in each course.
- By completing any one of the following courses:

African American and African Studies 10, 100,120, 121
Asian American Studies 1, 2
Economics 111A, 111B
History 17A, 17B, 17C, 72A, 72B, 170A, 170B, 170C, 171A, 171B, 174A, 174B, 174C, 175A, 175B, 175C, 176A, 176B, 177A, 177B, 179, 180A, 180B, 183A, 183B (upper division courses may be taken only with the consent of the instructor)
Native American Studies 1, 10, 55, 116, 130A,130B, 130C
Political Science 1, 5, 100, 101, 102, 103, 104, 105, 106, 108, 109, 113, 130, 131, 160, 163

(Students electing to offer one of the above courses are subject to the rules for prerequisites and majors.)

- By presenting evidence that the requirement has been accepted as satisfied at another campus of the university.
- By presenting evidence that the requirement has been satisfied through courses in the area of American History and Institutions at another collegiate institution whose credits are acceptable for transfer to UC Davis.
- By successful completion of the Advanced Placement Examination in American History or American Government and Politics.

International students, regardless of the type of visa they hold, must meet the university's American History and Institutions requirement for graduation.

Unit Requirement

A minimum of 180 quarter units is required for graduation. These must be distributed according to the minimum requirements set forth by the faculty of your college.

A maximum of 12 units of Internship Courses (92, 192, or a combination) may be counted toward the 180-unit bachelor's degree requirement.

The acceptability of transfer courses for unit credit is determined by Undergraduate Admissions and Outreach Services. The acceptability of such courses toward specific requirements is determined by the individual college or school.

Students should refer to the Advanced Placement Examination chart and their transcripts to eliminate the possibility of duplication of credit.

Residence Requirements

The minimum residence requirement for a bachelor's degree at the University of California is one academic year (three quarters). Thirty-five of the final 45 quarter units completed by each candidate must be earned while in residence on the Davis campus. Each summer session in which a student completes a course of at least 2 quarter units may be counted as half a quarter's residence. Not more than 18 of these 35 quarter units may be completed in summer session courses at UC Davis.

Regularly approved courses (laboratory, field, or other individual work) done outside of a regular session but under the direction of a department of instruction may be accepted upon the recommendation of the department in partial fulfillment of the residence requirement for the bachelor's degree. Registration is with the consent of the instructor only.

UC Davis Extension courses are not accepted as part of the university residence requirement.

There are additional residence requirements for students enrolled in the Colleges of Letters and Science and Engineering. If you are planning to study abroad during your senior year, you should consult your college dean's office.

With the approval of the dean of a student's college or school, a candidate for the bachelor's degree who was in active service in the armed forces of the United States in the year preceding the awarding of the degree may be recommended for the degree after only one quarter of university residence in which the candidate completes at least 16 units or passes a comprehensive examination in the major or field of concentration.

Scholarship Requirement

To receive a bachelor's degree, you must obtain twice as many grade points as units (a 2.0 GPA) for all courses you have attempted in the university. An exception to this rule is made for those students undertaking certain honors courses. For specific college requirements consult the college sections following.

GENERAL EDUCATION REQUIREMENT

The General Education (GE) requirement promotes the intellectual growth of all undergraduates by ensuring that they acquire a breadth of knowledge that will enlarge their perspectives beyond the focus of a major and serve them well as participants in a knowledge-based society. It seeks to stimulate continued intellectual growth by providing students with knowledge not only of the content but also of the methodologies of different academic disciplines. It involves students in the learning process by its expectation of considerable writing and class participation. It encourages students to consider the relationships between disciplines.

The GE requirement has three components: **Topical Breadth, Social-Cultural Diversity** and **Writing Experience.**

Topical Breadth

A GE course in *topical breadth* addresses broad subject areas that are important to the student's general knowledge. It takes a critical, analytical perspective on knowledge, considering how knowledge has been acquired and the assumptions, theories, or paradigms that guide its use.

Topical breadth courses are grouped into three broad subject areas of knowledge:

1. **Arts and Humanities.** Courses in this area provide students with knowledge of significant intellectual traditions, cultural achievements and historical processes.
2. **Science and Engineering.** Courses in this area provide students with knowledge of major scientific ideas and appli

cations. They seek to communicate the scope, power, limitations and appeal of science.

3. **Social Sciences.** Courses in this area provide students with knowledge of the individual, social, political and economic activities of people.

Social-Cultural Diversity

Courses in social-cultural diversity teach students the significance of the many patterned differences that characterize human populations—particulary differences of gender, race, ethnicity, sexuality, religion or social class.

Writing Experience

Courses in writing experience improve student writing through instruction and practice. Instruction is provided through workshops or evaluation of content, logical coherence and use of language and grammar, and require student revision during the quarter. Courses require one extended assignment (5 pages or more) or multiple short assignments.

Fulfilling the General Education Requirement

Topical Breadth Component: 6 courses

To fulfill the topical breadth component of the General Education requirement you must successfully complete three approved courses in each of the two subject areas of topical breadth other than the one that includes your major. To identify the area of topical breadth to which your major belongs, refer to the chart at the back of this catalog. Each academic major has been assigned to one of the three subject areas of GE topical breadth. If you have any questions concerning the subject area to which your major is assigned, consult your college dean's office.

- **Double majors** will satisfy the topical breadth subject areas to which they are assigned. You will still be responsible for completing any topical breadth subject area in which you do not have a major. If, for example, two majors are assigned to the same subject area, you will need to complete the topical breadth component in each of the other two other subject areas. If, on the other hand, you complete two majors that have been assigned to two different areas of topical breadth then you will be responsible for completing the topical breadth component in only the remaining subject area.
- **Individual majors** are assigned to an area of *topical breadth* at the time they are approved by your college.
- **Each minor** has also been assigned to one of the three subject areas of *topical breadth.* A minor assigned to a subject area other than the area of your major will satisfy the GE course requirement for *topical breadth* in that subject area.
- **Courses in your major** may count toward the *topical breadth* component when those courses are also assigned to subject areas other than the area of your major.
- **A course approved in more than one *topical breadth* subject area** may only be offered in satisfaction of **one** of those subject areas.

Social-Cultural Diversity Component: 1 course

To fulfill the *social-cultural diversity* component of the GE requirement, you must successfully complete one course from the approved list at the back of this catalog.

Writing Experience Component: 3 courses

To fulfill the *writing experience* component of the GE requirement, you must successfully complete three courses from the approved list at the back of this catalog.

- **Subject A.** You must satisfy the university Subject A requirement **before** you take any *writing experience* course for GE credit. If you take an approved *writing experience* course but have not yet satisfied the Subject A requirement, you will **not** receive GE *writing experience* credit for that course.

Fulfilling the General Education Requirement

Freshman student, or Transfer student* who has not completed TCC or IGETC†

6 GE courses in topical breadth—3 courses in each of the two subject areas other than your major's assigned area
1 GE course in social-cultural diversity
3 GE courses in writing experience

Bear in mind that some courses may count toward two or three components of GE. For example, a single course might provide GE credit for *topical breadth, writing experience* and *social-cultural diversity.* Depending on the GE courses you choose, you can satisfy the GE requirement with 6 courses.

* Transfer work comparable to approved UC Davis GE courses may be used to satisfy the GE requirement, as determined by the college dean's office.

Transfer student who has successfully completed TCC or IGETC†

GE requirement satisfied; no further GE courses required

† Transfer Core Curriculum (TCC) or Intersegmental General Education Transfer Curriculum (IGETC); completion must be certified by the community college. College of Engineering students still have General Education requirements to complete.

Additional Conditions

1. **Letter grading.** All courses taken to fulfill the GE requirement must be taken for a letter grade. No GE credit will be awarded for a course that you take on a Passed/Not Passed basis.
2. **College and university composition requirements.** The following GE courses may not be used to satisfy university or college requirements in composition and GE writing experience simultaneously: Communication 1, Comparative Literature 1, 2, 3, 4, English 1, 3, 18, 19, 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, Native American Studies 5.

   Remember: You must satisfy the university Subject A requirement **before** you take any *writing experience* course for GE credit.
3. **Courses approved for multiple GE components.** Courses approved for more than one component of the GE requirement (*topical breadth, writing experience* and *social-cultural diversity*) will be accepted toward satisfaction of all components for which the course has been approved.
4. **Approved GE courses.** You cannot claim GE credit for any course you completed before it was an approved GE course.

GE Exemption

IGETC, TCC, and UC Reciprocity. You are exempt from the UC Davis GE requirement if you come from a California community college and are certified as having successfully

completed the "Intersegmental General Education Transfer Curriculum" (IGETC) or "Transfer Core Curriculum" (TCC), or if you come from another UC campus and are certified as having successfully completed the lower division breadth or General Education requirements of that UC campus (UC reciprocity).

If you are in the College of Engineering and have satisfied IGETC or TCC, you are still required to complete two upper-division General Education courses at UC Davis to satisfy College of Engineering requirements.

Approved General Education Courses

A list of the courses that provide General Education credit for 2004–05 appears in the back of this catalog. Please note that you cannot claim GE credit for a course you completed **before** it was an approved GE course. This list is subject to change. You should check the *Class Schedule and Registration Guide* each quarter for the most current information.

General Education Theme Options

General Education theme options are sets of GE courses sharing a common intellectual theme. Faculty from the College of Agricultural and Environmental Sciences have worked collaboratively to develop sets of complementary courses in several areas of interest. These GE theme options are not a separate element of the GE requirement, but a way of selecting your GE courses so that you may benefit from a coherent focus of study while completing the GE requirement.

Completion of a theme satisfies the GE requirement for students with majors assigned to the GE topical breadth area of Arts and Humanities. Students with majors assigned to the topical breadth area of either Science and Engineering or Social Science will need to complete additional GE courses in Arts and Humanities to satisfy the campus GE requirement.

Beginning a theme option does not prevent you from later choosing to take other approved GE courses to fulfill the GE requirement. If you choose to mix courses from a theme option and the broader GE course lists, you will need to make sure that the combination of courses you select will complete the campus GE requirement.

GE Scholars

GE Scholars is a certificate program related to the GE theme options. In addition to completing three approved courses in a GE theme option, students choose a capstone experience (either a seminar course or curriculum related internship) that integrates concepts introduced in the theme courses. Students are awarded a certificate upon completion of their capstone experience. The GE Scholars program allows you to participate in the application of knowledge gained in GE courses, focus your academic experience beyond your major and develop a secondary body of knowledge while working towards completing your GE requirement.

Contact the GE Scholars Project Manager at 754-9431; gamartinez@ucdavis.edu or go to http://gescholars.ucdavis.edu for more information.

COLLEGE REQUIREMENTS FOR THE BACHELOR'S DEGREE

College of Agricultural and Environmental Sciences

Unit Requirements

Of the required 180 units counted toward a degree, 54 units must be upper division work.

Unit Credit Limitations

In addition, the following unit limitations apply to all majors:

- Not more than 6 units can be Physical Education 1 and 6.
- Not more than 20 units can be courses numbered 90X, 92, 97T, 97TC, 99, 190C, 190X, 192, 197T, 197TC, or 199.
- Not more than 12 units can be courses numbered 92 and/or 192 (credit will not be given for 192s or 199s taken before the completion of 84 units).
- Not more than 5 units per quarter of Special Study courses (99, 194H, 199).
- Not more than 9 units of professional courses (numbers 300–499) may be used toward the 54 upper division units.

Limitation on Credit for Units Graded P. The Academic Senate limits the total number of courses graded *P, including units earned in courses graded "P/NP only,"* to *one third* of the units completed on the Davis campus. The *P/NP* option is to be used only for elective courses and should not be used for major requirements.

Credit in UC Davis Extension Courses. Students in residence may apply a maximum of 9 units of credit earned in some Open Campus courses taken through University Extension toward the 180-unit requirement provided written approval has been obtained from the dean before registering. Units of credit allowed by the dean may be less than the number of units listed for a course. Beginning in Fall 2003 grade points will be assigned to approved Open Campus (concurrent) courses enrolled through UC Davis Extension.

Registration Beyond the 225-Unit Limit. Students may not exceed 225 units; registration for enrollment when the limit has been reached may only be approved by the Dean. A petition to complete excess units may be picked up in the Dean's office or in your major department.

Residence Requirement

Thirty-five of the final 45 quarter units completed by each candidate must be earned while in residence on the Davis campus. Not more than 18 of these 35 quarter units may be completed in summer session courses at UC Davis.

Scholarship Requirement

Students in the College are required to attain a minimum grade point average of 2.0 for all courses specified as depth subject matter in their major. Only grades earned in courses taken at UC Davis are included in the grade point calculation. Each candidate must complete a program of study either as prescribed in *(a)* a major approved by the Undergraduate Majors and Courses Subcommittee and printed in this catalog, or *(b)*

an individual major approved by the Individual Major Subcommittee.

English Composition Requirement

The English Composition requirement can be met in one of two ways:

1. Either two courses emphasizing written expression or one course emphasizing written expression and one course emphasizing oral expression, with a grade of *C-* (or *P*) or better. The following UC Davis courses satisfy this requirement:

   (*a*) one course must be selected from English 1, 3, 18, 19, 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, or 104F (courses with primary emphasis in writing skills);

   (*b*) one course selected from the courses not selected above, or from Communication 1, Comparative Literature 1, 2, 3, 4, or Native American Studies 5 (courses emphasizing either writing or speaking skills);

OR

2. by passing the English Composition Examination administered by the College of Letters and Science upon completion of 70 units of degree credit (the examination does not yield credit).

English Composition Examination. The no-fee examination is typically offered on Saturday mornings in mid-October, late January and late April. See the *Class Schedule and Registration Guide* for specific dates.

There are no examinations given during the summer. Sign-up rosters will be posted on the bulletin board near the main English Department office (114 Voorhies), Monday until Friday at noon (or until they are filled) just preceding each Saturday examination date. You must sign up, in person, by noon Friday. The English Composition Examination form, available at the UC Davis Bookstore, is required.

General Education

You should consult your Dean's Office or department adviser in advance to determine exactly how your General Education courses will apply toward your major.

You can choose one of four General Education theme options to help plan your GE courses. The themes, Global Population and Environmental Issues; Biodiversity and Cultural Diversity; Food and Fiber; and Changing Agriculture are described in more detail in the section "General Education Theme Options" in the General Education section at the back of this catalog.

Study Plan Approval

A Study Plan provides for attainment of specific long-term goals and should allow for the acquisition of prerequisite knowledge for courses to be taken in subsequent quarters; the fulfillment of College and major requirements; a proper balance between the demands of the courses and your ability to master the subject matter; and meeting the minimum progress requirements (see the "Academic Information" chapter).

In conjunction with a faculty adviser and/or staff adviser, you must plan and prepare a program that specifies your goals and shows how the graduation requirements will be met. It is a regulation that a written "study plan" be filed with your faculty adviser or staff adviser by the end of the second quarter of the junior year (having completed not more than 120 units either in residence and/or by transfer).

You may be denied registration for future quarters if you do not comply with this regulation. However, filing this study plan does not preclude a change of major or program modifications.

Major Degree Certification

A Major Certification is completed during the quarter you plan to graduate. At that time, you and your faculty adviser and/or staff adviser check to see that all *major* requirements have been completed. The Dean's Office completes the degree certification by verifying that all *college* and *university* requirements have been satisfied and will notify you with a copy of the Major Certification form.

Degree Requirement Changes

On occasion, the faculty make changes in the requirements that students must satisfy to obtain the baccalaureate degree. So that you will not be penalized by changes that may work to your disadvantage and so that you will benefit by changes that assist you in completing your degree requirements, it is college policy that you may choose to fulfill the university, college and major requirements in effect at the time you were registered at UC Davis. If you have transferred to UC Davis from a community college, state college, or another university, you may follow the requirements as stated in any UC Davis catalog in effect *either* during the three years immediately preceding your transfer to Davis or at the time you first registered at that institution, *whichever is most recent*. Once you have chosen the year of the *General Catalog* under which you wish to be governed, you must satisfy all of the university, college and major requirements specified in that catalog.

College of Engineering

Unit Requirements

Each candidate for the degree of Bachelor of Science in Engineering must satisfactorily complete an approved curriculum in engineering. Each curriculum consists of a specified Lower Division Program (or an approved equivalent program for students who transfer into the College with 90 or more quarter units) and a specified Upper Division Program. **No unit of coursework you complete may be used to satisfy two different degree requirements (except where the catalog specifically indicates otherwise).** Detailed requirements for the approved curricula are given in the "Programs and Courses" section of this catalog; to see the courses required in your major, consult this section. The minimum number of required units in the combined Lower and Upper Division Programs varies, with the curriculum, from 180 to 195. **You are responsible for planning your program and satisfactorily completing all degree requirements.**

You may, for good cause, request a modification of particular degree requirements by submitting a student petition. These petitions, which are available in the Undergraduate Office, can be a valuable aid in resolving individual program conflicts or other special problems. Such petitions are subject to approval by the Student Relations Committee, a body of seven professors and seven (non-voting) students. A negative decision by

the committee may be appealed to the Executive Committee of the College for action at a regular meeting.

Transfer students. To be eligible for transfer, you must have at least 90 transferable quarter units, which must include two acceptable courses in university level composition. You will be classified as having upper division status, but you will be required to complete the lower division requirements for your major before your lower division is considered complete. You may, however, start your upper division program while completing your lower division requirements provided you meet all prerequisites for the upper-division courses.

All engineering majors are impacted. For your application for transfer to be considered, you need to have completed a substantial proportion of your lower-division requirements.

For more specific advice on your requirements, see the transfer counselor at your institution, consult Project Assist (available at community college transfer centers) or consult with the advisers in the Engineering dean's office (530-752-0553).

Credit in UC Davis Extension Courses. Appropriate courses taken through UC Davis Extension may be used for degree credit; however, you may use a maximum of 16 units of courses taken through UC Davis Extension for degree credit. Simultaneous registration in resident courses and Extension courses requires *prior approval* by the College's Associate Dean for Undergraduate Studies. Such approval will be given only for a limited number of credits.

Residence Requirement

In addition to fulfilling the university residence requirement, you must complete at least 35 of the final 45 units characteristic of your curriculum in engineering while registered in the College.

Scholarship Requirement

In addition to meeting the university scholarship requirement, you are required to maintain a 2.0 grade point average for all course work within Engineering.

English Composition Requirement (Upper Division)

After completing 70 quarter units, you may elect to satisfy the upper division English Composition requirement by passing the English Composition Examination administered by the College of Letters and Science. (You should take it early in your junior year and must take it before your last quarter. Units of credit are not given for passing this examination.)

The English Composition Examination is typically offered on Saturday mornings in mid-October, late January and late April. See the *Class Schedule and Registration Guide* for specific dates. Sign-up rosters will be posted on the bulletin board near the main English Department office (114 Voorhies), Monday until Friday at noon (or until they are filled) just preceding each Saturday examination date. You must sign up, in person, by noon on Friday. You must obtain the English Composition Examination form, available at the UC Davis Bookstore, to take the exam.

Or, upon completion of 90 quarter units, you may satisfy this requirement by completing English 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, or 104E with a grade of *C–* or higher. Students in Computer Science Engineering must complete the upper division composition requirement by taking English 101 or by passing the English composition requirement. Students in Optical Science and Engineering must complete the upper division composition requirement by taking English 101, 102, 104A, 104B, 104C or 104E.

This requirement is in addition to the expository writing course requirement (English 1 or 3; Comparative Literature 1, 2, 3 or 4; or Native American Studies 5) specified in the Lower Division Programs.

Engineering Design Requirement

Engineering design is the process of devising a system, component, or process to meet certain needs. Design involves a decision-making process (often iterative), in which the basic sciences, mathematics and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation. You must take an appropriate amount of such design course work through a combination of required and restricted elective courses. Specific comments about design are included in individual curricula descriptions. You should also review the design content of your individual program with your adviser in the course of completing the upper division advising worksheet.

Electives

In general, there are three kinds of elective courses in the engineering curricula: *General Education, technical, and unrestricted.* Some transfer students have an additional set of electives: *Physical and Biological Sciences electives.*

General Education Electives. Because, as an engineer, you will be a signficant participant in the human setting, you will need to have a breadth of education that will allow you to deal with contemporary social issues and to understand the impact of engineering solutions on the global and societal context. To these ends, you will need to take a minimum of 24 units (33 units for Computer Science and Engineering majors) of General Education electives. In addition, to ensure that your GE program has a degree of depth and coherence, at least two of the courses that you take for your GE topical breadth requirement must be upper division courses (courses numbered 100 or above).

Since all engineering majors are in the Science and Engineering GE topical breadth area, you will fulfill the campus GE requirement by taking courses in the Arts and Humanities and the Social Sciences areas.

In satisfying the GE requirement, note that *(a)* you must take GE courses for a letter grade, and *(b)* you must satisfy the Subject A requirement before you can receive GE writing experience credit for any course. In consultation with your academic adviser, you should attempt to design a coherent approach to contemporary issues by using your GE electives.

The list of Arts and Humanities and Social Sciences electives appears at the end of this catalog. Note that you may not take the following courses for GE credit if you are a College of Engineering student:

Agricultural Education 100, 160, 172
Animal Science 141, 148

Applied Science 137
Civil and Environmental Engineering 165
Engineering 160
Entomology 158
Environmental and Resource Sciences 10
Fiber and Polymer Science 110
Food Science and Technology 10
Geology 115N
Physics 137, 160
Plant Biology 141
Political Science 192A, 192B
Statistics 10
Viticulture and Enology 3

Technical electives permit you to tailor a program to your own academic and career objectives. For some, the technical electives offer the opportunity to prepare for a specific occupation. For others, they offer an opportunity to broaden a background in the sciences and engineering.

You may receive technical elective credit to a maximum of 6 units for any combination of engineering courses numbered 190C, 192, 197, 198 and 199, unless further restrictions are imposed on your major. Academic credit for 199 courses is limited to a maximum of 5 units per quarter for each substantially different project. Academic credit for engineering internship courses (192s) is also limited to a maximum of 5 units per quarter.

With the exception of the following courses, all upper division courses in engineering, physics, chemistry, mathematics and statistics may be taken as technical electives. The courses which may *not* be used are

Applied Science Engineering 137
(restricted to one unit of technical elective)
Physics 137 and 160 (restricted to one unit of technical elective), 194HA, 194HB, 195, 197T, 198, 199
Chemistry 194HA, 194HB, 194HC, 197, 198, 199
Engineering 160 (restricted to one unit of technical elective)
Mathematics 190, 192, 194, 197TC, 198, 199
Statistics 102

In addition to upper division engineering, physics, chemistry, mathematics and statistics courses, the following courses may be taken as technical electives:

Agricultural and Resource Economics 100A, 100B, 106, 112, 113, 118, 130, 132, 135, 136, 138, 139, 155, 156, 157, 171A, 171B, 175, 176
Agricultural Management and Rangeland Resources, any upper division course except 101 and 190 through 199
Anatomy, Physiology, and Cell Biology 100
Animal Biology 102, 103
Animal Genetics 101, 105, 107, 108, 109, 111
Animal Science 104, 105
Applied Biological Systems Technology 110L, 161, 163, 165, 170, 175, 180, 181, 182
Atmospheric Science 110, 111, 115, 116, 120, 121A, 121B, 124, 128, 133, 149, 150, 158, 160
Biological Sciences 1A, 1B, 1C, 101, 102, 103, 104, 120, 120P, 122, 122P
Chemistry 2B, 2BH, 2C, 2CH, 8A, 8B
(if not used for your major requirement)
Economics 140
Environmental and Resource Sciences 100, 100L, 105, 131, 136, 144, 173, 185, 186, 187
Environmental Horticulture 100, 102, 105, 120, 125, 130, 133, 144, 145, 149, 150, 160
Environmental Science and Policy 100, 110, 121, 123, 124, 126, 150A, 150B, 150C, 151, 151L, 155, 155L, 163, 167, 168A, 168B, 173, 179
Environmental Toxicology 101, 112A, 112B, 114A, 114B, 128, 131, 135, 146
Evolution and Ecology 100, 101, 102, 103, 104, 105, 108, 112, 112L, 117, 119, 134, 134L, 138, 140, 141, 147, 149
Fiber and Polymer Science 100, 150, 161, 161L
Food Science and Technology 100A, 100B, 101A, 101B, 102A, 102B, 103, 104, 104L, 107A, 107B, 108, 109, 110B, 117, 119, 120, 120L, 121, 123, 123L, 127, 128, 131, 159, 160
Geology 50, 50L, 100, 100L, 101, 101L, 103, 105N, 106N, 107, 107L, 108N, 109, 109L, 134, 135, 138, 139, 142, 143, 145N, 146N, 147, 148, 150A, 150B, 150C, 161, 162N, 163
Hydrologic Science 103, 110, 115, 117, 122, 122L, 124, 134, 141, 142, 143, 144, 146, 151A, 151B, 182
Management 11A, 11B
Microbiology 102, 102L, 105, 110, 120, 120L, 140, 150, 155L, 160, 162
Molecular and Cellular Biology 120L, 121, 122, 123, 126, 140L, 141, 142, 150, 150L, 160L, 161, 162, 163, 164
Neurobiology, Physiology, and Behavior 100–169
Plant Biology 102, 105, 108, 111, 111D, 111L, 112, 112D, 113, 113D, 116, 117, 118, 119, 123, 125, 126, 141, 142, 143, 144, 146, 148, 151, 152, 153, 154, 157, 158, 160, 161A, 161B, 171, 172, 172L, 173, 174, 175, 176, 177, 178
Plant Pathology 120, 123, 130, 148, 150
Soil Science 100, 102, 105, 107, 109, 111, 112, 118, 120
Wildlife, Fish, and Conservation Biology 100, 102, 102L, 110, 110L, 111, 111L, 120, 120L, 121, 122, 123, 130, 131, 136, 140, 141, 151, 152, 153, 154, 156, 157

You are urged to discuss the selection of technical elective courses with your academic adviser.

Unrestricted electives. If your curriculum allows for unrestricted electives, you may count any course for which university credit is allowed as an unrestricted elective in the engineering curricula.

Physical and Biological Science electives. Engineering students are required to have 29 units in sciences, typically 10 units of chemistry and 19 units of physics. If you transfer into the College of Engineering with advanced standing, you are required to complete 26 units of physical and biological science by graduation, but you need to have completed only 5-10 units of chemistry (depending on major) and 15 units of physics by the time you transfer. You may make up the remaining 4 units by taking 4 additional units of chemistry, 4 additional units of physics, or 4 units in courses selected from any of the curricula listed below, with the restrictions that follow.

Atmospheric Science
Biological Science
Chemistry
Evolution and Ecology
Geology
Microbiology
Molecular and Cellular Biology

Neurobiology, Physiology, and Behavior
Physics
Plant Biology

All courses in these departments numbered 10 and 190–199 are excluded for credit, as are the following courses:

Evolution and Ecology 138
Geology 1, 3-3G-3L, 4, 116-116G, 135
Physics 137, 160
Plant Biology 1, 11, 12

Degree Check

Use the Degree Requirement Check sheets for each of the curricula for monitoring your progress toward a degree. The Undergraduate Office will prepare only one *unofficial* preliminary degree check for you (preferably at the end of your junior year). You should also file for a follow-up degree check the quarter before you plan to graduate. You will be offered the opportunity to have an exit interview degree check during your last quarter before graduation upon your filing for candidacy. The office will contact you to schedule an appointment. You can get further information concerning these services and the forms for requesting a degree check, a follow-up degree check or an exit interview in the Undergraduate Advising Office.

Degree Requirement Changes

Since engineering is a rapidly developing profession, curricular changes are made by the faculty from year to year. To ensure that you benefit from these changes, the College of Engineering has established a policy that you must fulfill the degree requirements stated in the College of Engineering *Bulletin* for the year in which you complete degree work or in the *Bulletin* for the year immediately preceding.

College of Letters and Science

Unit Requirements

A minimum of 180 units is required for the bachelor's degree. Of these units, 64 must be earned in upper division courses.

Registration Beyond the 225-unit Limit. You are normally expected to fulfill all degree requirements within the 180- to 225-unit range. Once 225 units have been completed (excluding units awarded for College Board Advanced Placement Examinations), you may register only with the permission of the dean. Such permission is rarely granted, and then typically only to allow completion of *minimum* degree requirements. You will be expected to adhere to a program of courses agreed upon and to meet other conditions that may have been set. Approval must be obtained before you will be permitted to register for courses for the quarter following completion of 225 or more units.

If you are in good standing, you will be able to complete 12 quarters or the equivalent (e.g., four years) of college work even if you have earned more than 225 units before you finish your fourth year. You must petition for continuation, however, and file the quarter-by-quarter course program you have planned.

Unit Credit Limitations

For certain courses, limits have been established on the number of units that can be counted towards the 180-unit minimum required for the degree. To avoid discovering just before graduation that you are short units, keep track of the number of units you have taken in each of the following categories.

Limitation on Credit for Graduate and Professional Courses. Undergraduates may enroll in graduate and professional courses in the 200, 300 and 400 series subject to the restrictions described in the Academic Information section in this catalog. Graduate and professional courses that have been completed will be listed on the student's transcript in the usual manner. *However, the units earned may be counted toward degree requirements only under the conditions listed below.*

Within the limitations A, B and C given below, undergraduate students in the College may count an unlimited number of units in graduate 200 series courses and up to a combined total of 9 units in 300 and 400 series professional courses toward degree requirements. These units, however, are not counted as upper division units unless this is granted by petition to the dean.

A. The recommendations of the instructor in the course and the department chairperson—in addition to approval from the dean—must be obtained by petition in order to receive credit toward the degree for the following kinds of courses:
   - all graduate courses 200–298, whether offered by a department or program outside of or within the College of Letters and Science
   - all professional courses 300–398 for teachers offered outside of the College of Letters and Science
   - all postgraduate professional courses 400–498 offered outside of the College of Letters and Science
   - all variable unit courses 300–398 and 400–498 offered within the College of Letters and Science

B. The minimum eligibility conditions for an undergraduate student in the College to petition for degree credit for a 200, 300, or 400 series course are a UC grade point average of 3.3 and completion of 18 upper division units basic to the subject matter of the course. These eligibility conditions may be waived, however, upon the recommendation of the course instructor and concurrence of the department chairperson if the student's preparation warrants exception.

C. Undergraduates in the College cannot receive degree credit for special study courses 299, 399, or 499.

Limitation on Credit for Units Graded P. *Excluding* courses that are graded on a Passed/Not Passed (*P/NP*) basis *only, the number of units graded P that may be accepted towards a degree in the College of Letters and Science is limited to not more than one fourth* of the units completed in residence on the Davis campus.

The Academic Senate limits the *total* number of courses graded *P, including units earned in courses graded "P/NP only,"* to *one third* of the units completed on the Davis campus. This limitation applies to *all* Davis undergraduates, including Letters and Science students.

Limitation on Credit for University Extension Courses. Students may apply credit earned through UC Davis Extension courses towards the 180-unit requirement only with written approval from the dean prior to registration. The degree credit allowed by the dean for UC Davis Extension courses with des-

ignators other than "XD" or "XDC" is usually less than the unit value listed in the course description. Additional limitations on UC Davis Extension courses include: a maximum of 9 units may be offered for elective credit only and may not be applied toward fulfillment of the Area, Foreign Language, Upper Division, or Residence requirements of the College. Beginning in Fall 2003, grade points earned when enrolled in Open Campus (concurrent) courses through UC Davis Extension will count toward the calculation of a student's UC GPA upon his/her admission or readmission to regular student status at UC Davis.

Other Unit Credit Limitations. The following are additional courses that have limits on the number of units that can be counted toward your degree.

Internship courses (numbers 92, 192): 12 units maximum including internship units taken at other institutions. (See under Nonstandard courses below.)

Nonstandard courses (92, 97T, 97TC, 99, 192, 194H, 197T, 197TC, 199 and similar courses): 30 units maximum or one-sixth of the units taken at UC Davis, whichever is the smaller. (Note the separate unit limits on internship, special study and tutoring courses; and major limitations.)

Physical Education 1 and 6 (combined): 6 units maximum.

Special Study courses (99, 194H, 199): 5 units maximum in any one quarter. (See under Nonstandard courses above.)

Tutoring courses (97T, 97TC, 197T, 197TC): 10 units maximum. (See under Nonstandard courses above.)

Residence Requirement

While registered in the College of Letters and Science, a minimum of 27 upper division units, including 18 upper division units in the major, must be completed on the Davis campus. (Work completed while registered in the UC Education Abroad Program or the UC Davis Extension Open Campus Program does not satisfy campus or College Residence requirements.)

Scholarship Requirement

The minimum grade point average to satisfy the scholarship requirement is 2.0 for all courses counted toward the major and for all upper division courses used to satisfy major requirements. Only grades earned in courses taken at UC Davis will be included in the grade point computations. To obtain these minimum averages in the major, you may repeat courses that are graded *D* or *F*. If you have to repeat a course more than once, you need the dean's approval.

English Composition Requirement

The English Composition requirement can be met in one of two ways:

1. by passing the English Composition Examination upon completion of 70 units of degree credit (the examination does not yield credit);

OR

2. by completing with a grade of *C–* (or *P*) or better

   (a) one course from English 1, 3, 18, 19, Comparative Literature 1, 2, 3, 4, or Native American Studies 5; and

   (b) English 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, or 104F (which must be taken after 84 units have been completed).

Transfer Courses in English Composition. Transfer courses considered by the dean to be equivalent or comparable to English 1, 3, 18, 19, 101, 104A, 104B, 104C, 104D, 104E, 104F, Comparative Literature 1, 2, 3, 4, or Native American Studies 5 will be accepted toward satisfaction of the English Composition requirement. Note that English 101 and 104A, 104B, 104C, 104D, 104E, and 104F or the equivalent must be taken after you have completed 84 units of transferable degree credit.

If your transfer work does not include an acceptable English composition course taken after you had completed or accumulated 84 units, you may fulfill the requirement by examination (see below) or take English 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, or 104F at UC Davis.

English Composition Examination. The no-fee examination is typically offered on Saturday mornings in mid-October, late January and late April. See the *Class Schedule and Registration Guide* for specific dates.

There are no examinations given during the summer. Sign-up rosters will be posted on the bulletin board near the main English Department office (114 Voorhies), Monday until Friday at noon (or until they are filled) just preceding each Saturday examination date. You must sign up, in person, by noon Friday. The English Composition Examination form, available at the UC Davis Bookstore, is required. It is recommended that students with disabilities contact the Student Disability Center (752-3184) and the Subject A Office (752-0450) at least two weeks prior to the exam date to arrange accommodations.

Area (Breadth) Requirement

The College Breadth Requirement promotes the intellectual growth of students by asking them to acquire a broader background of knowledge than is provided by the usual major. The Breadth requirement also guides students in exploring the interdependence of knowledge and, in the case of the A.B. degree, provides students the opportunity to become acquainted with performance in the fine arts.

A.B. degree—satisfaction of the campus General Education requirement plus completion of one of the following options:

a. a "Mini Minor" consisting of a minimum of three approved upper division courses in a single Letters and Science department or program other than the major (and which are not offered in satisfaction of major requirements);

OR

b. a minimum of three approved lower or upper division courses in Art, Music, or Dramatic Art from outside the student's major;

OR

c. a certified minor from any UC Davis college orprogram.

The Letters and Science faculty believes that the completion of a certified minor is often the best way for a student to obtain structure and coherence in pursuit of intellectual breadth.

For the purposes of options *a* and *b* above, all courses are considered as approved except: courses bearing less than 3 units

of credit, internship courses, non-standard courses, directed group study courses, and courses used to satisfy the College English Composition Requirement.

B.S. degree—a total of 90 units in natural sciences/ mathematics; and satisfaction of the General Education requirement.

Courses numbered 92, 97T, 97TC, 98, 192, 197T, 197TC, 198, and from 200 through 499 cannot be counted toward satisfaction of the natural sciences/
mathematics Area requirement. A maximum of 10 units in special study courses (99, 194H, 199) may be counted toward that portion of the Area requirement. Courses used to satisfy the English Composition and Foreign Language requirements may not be counted toward the Area requirement. Subject to the restrictions just listed, courses acceptable for fulfilling the 90-unit natural sciences/mathematics Area requirement are:

Natural Sciences and Mathematics

Anatomy, Physiology and Cell Biology 100
Anthropology 1, 5, 15, 15V, 151, 152, 153, 154A, 154B, 155, 156, 157, 158
Astronomy
Avian Sciences 13
Biological Sciences
Cell Biology and Human Anatomy 101, 101L
Chemistry
Engineering 5, 6, 10, 35, 102
Engineering: Computer Science 10, 30, 40, 50, 110, 120, 122A, 122B, 140A, 140B, 142, 150, 151A, 151B, 152A, 152B, 153, 154A, 154B, 158, 160, 163, 165A, 165B, 168, 170, 175, 177, 178
Engineering: Electrical and Computer 70, 170
Entomology 10, 100, 153
Environmental and Resource Sciences 131
Environmental Science and Policy 30, 100, 121, 126
Environmental Toxicology 101
Evolution and Ecology
Exercise Biology 101, 103, 110, 111, 112, 113, 115, 116, 117, 126, 133, 135
Fiber and Polymer Science 110
Food Science and Technology 100A, 100B, 101A, 101B
Geography 1
Geology
Integrated Studies 8A
Mathematics
Microbiology
Molecular and Cellular Biology
Neurobiology, Physiology, and Behavior
Nutrition 10, 101, 111
Pathology, Microbiology and Immunology 126
Physics
Plant Biology
Psychology 41, 100, 101, 103A, 103B, 104, 113, 121, 122, 123, 124, 126, 127, 128, 129, 130, 131, 135, 146, 180B
Statistics
Wildlife, Fish, and Conservation Biology 10

Foreign Language Requirement (A.B. and B.A.S. degrees)

The Foreign Language requirement may be satisfied in any language offered at UC Davis, or for which transfer credit is allowed from another academic institution (including American Sign Language).

You may also satisfy this requirement by examination in a language not offered on the Davis campus. In this case, the Dean's Office will assist you in making arrangements to take an examination on another University of California campus, with a faculty member who teaches the language in question.

Satisfaction of the Requirement. Plan to complete the Foreign Language Requirement by the end of your first or second year, as program priorities permit. This is particularly important if you plan to apply for the university's Education Abroad Program. The Foreign Language requirement may be satisfied by examination or completion of language courses as follows:

1. *Foreign Language Placement Test.* This test does not yield unit credit—it only determines whether the Foreign Language requirement has been met, or at which point in the language sequence you should enroll.

   You may validate your knowledge of a language learned in high school by taking this test. A test may not be taken, however, in a language for which you have already received degree credit. If you are a transfer student, consult your *Graduation Requirement Degree Check*, which is issued by the Dean's Office within a quarter after enrollment.

2. *College Board SAT II: Subject Test.* Earning a qualifying score of at least 550 on a College Board Foreign Language Subject Test satisfies the requirement. This test may be taken at any time during your high school career. Once your score is on file at Undergraduate Admissions and Outreach Services, notify the Letters and Science Dean's Office so that satisfaction of the College requirement can be noted on your record.

3. *College Board Advanced Placement Examination.* A score of 5, 4, or 3 on any foreign language College Board Advanced Placement Examination, with the exception of Latin, taken in high school will satisfy the Foreign Language requirement.

4. *Course Completion in College (or the equivalent).* A.B. and B.A.S. degrees—equivalent of 15-unit level of proficiency in one language at UC Davis (e.g., Spanish 3 or Japanese 3). B.S degree—none, but as is required in the major program.

   If you have successfully completed the second or third year of a language in the tenth or higher grade in high school you may receive unit credit for course 1 of that language when taken at UC Davis, but the grading mode will be *P/NP* only. Although a Passed or Not Passed grade will be charged to your *P/NP* option, no petition is required. [See "Passed/ Not Passed (*P/NP*) Grading" in the "Academic Information" chapter.]

5. *Proficiency Examination.* If you have not completed the required level language course, but assume you have attained equivalent knowledge, you may satisfy the language requirement by passing a proficiency examination. For more information, consult the appropriate foreign language department.

Major Program Requirements

Requirements for major programs are described in the Programs and Courses section of this catalog. These requirements are fulfilled by completing a major program offered by a teaching department or program committee in the College of Letters and Science (see the list of majors) or an individual major program approved by the College's Committee on Individual Majors.

No more than 6 units in internship courses (numbered 92, 192, or similar internship courses) may be accepted in satisfaction of the requirements of major programs. Courses numbered 97T, 97TC, 197T and 197TC do not satisfy unit or course requirements in the major.

Degree Check

Before the beginning of your senior year, take some time to consider your goals and to plan the academic program for your final year as an undergraduate. To plan properly and to ensure that you get the most out of your remaining education and complete all graduation requirements as well, you should know what requirements remain unsatisfied. To help you in these efforts, the Undergraduate Education and Advising Office provides on its Web site (http://www.ls.ucdavis.edu/students) informational materials and instructions on how to evaluate your progress on college and university requirements. Many departments provide similar information regarding your major requirements.

Once you have completed 135 units of degree credit, you should contact your faculty adviser for a check of your major requirements. At approximately this point, the Undergraduate Education and Advising Office will provide each student with one official degree check summarizing your progress in fulfilling college and university requirements.

Degree Requirement Changes

On occasion, the faculty makes changes in the requirements that students must satisfy to obtain the baccalaureate degree. So that you will not be penalized by changes that may work to your disadvantage and so that you will benefit by changes that assist you in completing your degree requirements, it is College policy that you may choose to fulfill the university and College requirements (see General Education requirement for an exception) as stated in any UC Davis *General Catalog* in effect at any time you were registered in a postsecondary institution of higher education (i.e., community college, college, or university). Once you have chosen the year of the *General Catalog* under which you wish to be governed, you must satisfy all of the university and college requirements specified in that catalog.

With respect to the completion of your major requirements, most of the majors in the College of Letters and Science require completion of the major degree requirements in effect at the time you officially declared your major. However, because departments differ in how they handle these matters, check with the department or major program office if you have any questions about which requirements apply to you.

GRADUATE STUDIES

UC DAVIS





2004–2005 · 2005–2006

GRADUATE STUDIES

250 Mrak Hall
530-752-0650;
http://gradstudies.ucdavis.edu

UC Davis offers advanced degrees in more than 80 graduate programs. Students' graduate study is guided by either departments or graduate groups. Graduate groups are composed of individual faculty members with similar disciplinary or research interests. The group structure, used extensively at Davis, permits faculty to be affiliated with graduate programs in more than one discipline and offers students flexibility and breadth by crossing the administrative boundaries of the various departments, colleges, schools and sometimes campuses. In keeping with UC Davis' progressive spirit, the group structure also allows for expansion of established degree programs and facilitates the development of new ones. More than half of the graduate programs at Davis are organized as graduate groups. You will find a list of the graduate degrees available at UC Davis in the front of this catalog.

Graduate study is administered by the Graduate Council, a standing committee of the Davis Division of the Academic Senate and by the dean of Graduate Studies. A universitywide Coordinating Committee on Graduate Affairs determines general policies and establishes common procedures.

Preparing for an Advanced Degree

Admission to a graduate program at the University of California requires a bachelor's degree that is comparable to a degree from the University of California both in distribution of academic subject matter and in scholarly achievement.

The primary requirement for admission to any program is evidence of intellectual achievement and promise. Your application will be evaluated primarily on the basis of your transcript to assure that your qualifications meet minimum standards as set by universitywide and UC Davis Graduate Councils. Generally, you must have a minimum *B* average in undergraduate course work from an institution of acceptable standing to be considered for admission. Graduate programs frequently require submission of additional materials such as a separate application form, Graduate Record Examination (GRE) scores, letters of recommendation, portfolios or examples of written work to assist in selecting from among qualified applicants. Admission to graduate study is limited by the number of spaces available in major programs. Not all eligible applicants can be admitted.

UC Davis is committed to maintaining excellence, preserving fairness and promoting diversity in its student population. In addition to an applicant's past scholastic achievement, admissions criteria include an applicant's potential for service in the field, keeping in mind the needs of our society and of underrepresented and disadvantaged communities. Criteria also attempt to take into account any prior disadvantages applicants have experienced that may bear on future achievements and services.

Applying for Admission

World Wide Web (applications for admission):
http://gradstudies.ucdavis.edu/b4apply.htm

January 15 Deadline for all students applying for fellowships. The application for admission must be received at the same time as the fellowship application.

March 1 Deadline for international students to file applications for admission to graduate standing, with complete credentials, with the program or department, or as required by program.

April 1 Deadline for United States residents to file applications for admission to graduate standing, with complete credentials, with the program or department, or as required by program.

Applications are accepted for fall quarter only. You may apply for admission to graduate study online at http://gradstudies.ucdavis.edu/b4apply.htm. If you apply electronically, the $60 nonrefundable application fee and official transcripts from each college and university you have attended must be mailed directly to the program to which you are applying. It is now possible to pay the application fee online using a major credit card.

You should begin the application process as early as possible in the academic year since many programs have early deadlines. In addition, your chances for appointment as a teaching assistant or graduate student researcher, or of receiving financial support, are greatly enhanced by applying early. The application deadlines are as noted above, unless otherwise indicated by the program, or until your proposed graduate program is full, whichever occurs first. Many programs have earlier deadlines.

You are strongly encouraged to apply electronically. If this is not possible, you may request the application for admission and fellowship from the Office of Graduate Studies, University of California, One Shields Avenue, Davis, CA 95616. The completed application form and official transcripts must be sent directly to the program to which you are applying as well as the application fee if you do not pay online. Supplemental application materials required by the graduate program must be sent directly to the graduate adviser for that program.

The Graduate Admissions Advisory Committee for the program will submit its recommendation and evaluation to Graduate Studies; final admission decisions rest with the dean of Graduate Studies. This approval procedure applies to all applicants, including those seeking a transfer to UC Davis from another UC campus.

Applications for the degrees of Juris Doctor, Doctor of Medicine, Doctor of Veterinary Medicine, Master of Business Administration and Master of Preventive Veterinary Medicine must be filed directly with the appropriate professional school.

Readmission

April 1 Deadline to file applications for readmission to graduate status with Graduate Studies

If you were formerly registered at UC Davis as a graduate student and wish to return to pursue the same degree objective in the same major, you must apply for readmission and pay the

readmission application fee of $60. The readmission application must be filed with Graduate Studies by April 1 (or earlier if the program specifies an earlier date). Readmission to quarters other than fall is granted on an exception basis by special petition to the dean of Graduate Studies. If you are seeking to return to a new degree program and/or new major, you must apply for admission along with other new applicants. Apply online at http://gradstudies.ucdavis.edu/b4apply.htm, or obtain an application from the Graduate Studies office. Transcripts of all work undertaken since you were last registered in graduate status at Davis must be presented with the application. (There is no assurance of reentry, as applicants for readmission will be considered in competition with other applicants for the program.)

International Students

Assessment of a foreign degree is based on the characteristics of the national system of education, the type of institution attended and the level of study completed.

If you are an international student with credentials from universities outside the U.S., you should begin the application process as early as a year in advance. Official copies or certified copies of all transcripts in English and in the original language are required before your application can be processed. Do not attempt to convert your grade point average or ranking to a U.S. equivalent. Graduate Studies will determine your eligibility using U.S. guidelines for credential evaluation. Completed applications from international students along with the nonrefundable $60 application fee must be received by the program to which you are applying by March 1, unless your proposed program has an earlier deadline.

International students are also encouraged to apply online at http://gradstudies.ucdavis.edu/b4apply.htm.

English Requirement. Applicants whose native language or language of instruction is not English must take the TOEFL or IELTS. The minimum score required for admission to UC Davis is 550 on the paper test, 213 on the computer-based test for TOEFL and at least 7 on a 9-point scale for IELTS; scores from tests taken before 1999 will not be accepted. Some programs require a higher score. There is no conditional admission. The score report is required before application processing begins. You may send a photocopy, however, an official copy is required before registration if you are admitted.

The Test of English as a Foreign Language (TOEFL) is given by Educational Testing Service (ETS), P.O. Box 6154, Princeton, NJ 08541-6154; (609) 771-7100; toefl@ets.org; http://www.toefl.org. The Academic Modules of the International English Language Testing System (IELTS) are designed by the University of Cambridge Local Examinations Syndicate and administered by the British Council worldwide. You are responsible for providing an official Test Report Form of your IELTS. To register, contact the IELTS Subject Officer, University of Cambridge, Local Examinations Syndicate, 1 Hills Road, Cambridge, CB1 2EU, United Kingdom; http://www.ielts.org.

Visas. If you need a certificate of eligibility for a student visa issued by UC Davis, you will be required to complete a certification of finances form showing the availability of sufficient funding for your graduate program (see International Student Services in the "Academic Advising" chapter for complete details).

Program of Study

New students are assigned an adviser within the appropriate department or graduate group who assists them in planning a program of study. The program will depend to some degree on the student's undergraduate training and may include undergraduate courses to remove deficiencies. Each student must satisfy the degree requirements as published in the *Graduate Program Directory,* or as documented by the program. Additional requirements for study may be established by the department or group and approved by the Graduate Council. These requirements often include a core of required courses, but considerable flexibility is permitted to suit individual needs. Undergraduates at Davis who plan to pursue graduate study should consult with their major adviser early in their senior year to guarantee adequate preparation.

GRADUATE STUDENT DEADLINES*

	Fall 2004	Winter 2005	Spring 2005	Summer 2005	Fall 2005	Winter 2006	Spring 2006
Deadline for students who expect to complete work for master's degrees to file applications for candidacy with the dean of Graduate Studies	Aug. 2	Oct. 29	Feb. 4	May 27	Aug. 5	Oct. 21	Feb. 3
Deadline for candidates for master's degrees to file theses with the dean of Graduate Studies	Dec. 3	Mar. 1	June 3	Sept. 1	Dec. 2	Mar. 3	June 2
Deadline for candidates for master's degrees to file final report on comprehensive examination with the dean of Graduate Studies	Dec. 17	Mar. 23	June 15	May 27	Dec. 16	Mar. 22	June 14
Deadline for students who expect to complete work for the degrees of Doctor of Philosophy and Doctor of Engineering to file applications for candidacy with the dean of Graduate Studies	Aug. 2	Oct. 29	Feb. 4	Sept. 16	Aug. 5	Oct. 21	Feb. 3
Deadline for candidates for the degrees of Doctor of Philosophy, Doctor of Education, and Doctor of Engineering to file dissertation with the dean of Graduate Studies	Dec. 3	Mar. 1	June 3	Sept. 1	Dec. 2	Mar. 3	June 2

* Deadlines are subject to change without notice.

A graduate degree is awarded to recognize a student's command of a wide range of knowledge in an academic field. It is not awarded merely for fulfillment of technical requirements, such as residence, or the completion of specific courses.

Master's Degree

Students working toward a master's degree must be registered in residence for at least three quarters. Two regular six-week Summer Sessions may count as the equivalent of one quarter. Usually, all work for the master's degree is done in residence on the Davis campus. With the consent of the graduate adviser and the dean of Graduate Studies, however, some work taken elsewhere may be credited toward your degree. The normal limit for such transfer credit is 6 units from another institution, or 12 concurrent units, or up to one half of the unit requirement if the courses were taken at another UC campus—providing the units were not used to satisfy requirements for another degree.

A master's degree may be awarded upon completion of one of two basic plans in which either a thesis or a comprehensive examination is required.

Ph.D. Degree

The Doctor of Philosophy degree, as granted at the University of California, means that the recipient possesses knowledge of a broad field of learning and has given evidence of distinguished attainment in that field; it is a warrant of critical ability and powers of imagination and synthesis. It means, too, that the candidate has presented a dissertation containing an original contribution to the knowledge of the chosen field of study.

Students working toward a doctorate must be registered and in university residence for a minimum of six regular quarters. Experience indicates that it takes considerably longer than this to complete a degree program. Two consecutive regular Summer Sessions may count as the equivalent of one regular quarter.

There is no university unit requirement for the doctoral degree. However, individual programs have course requirements that must be completed before admission to the qualifying examination.

The Qualifying Examination is administered by a committee appointed by the dean of Graduate Studies. The examination is intended to demonstrate critical thinking ability, powers of imagination and synthesis and broad knowledge of the field of study. Upon recommendation of the Qualifying Examination Committee, and with the approval of the Graduate Council, the examination may be repeated one time.

After successful completion of the Qualifying Examination, the student must file for Advancement to Candidacy for the degree. At this time, a committee is appointed to direct the research problem and guide in the preparation of the dissertation.

Graduate students in certain Ph.D. programs may participate in a Designated Emphasis, a specialization that might include a new method of inquiry or an important field of application which is related to two or more existing Ph.D. programs. The Designated Emphasis is awarded in conjunction with the Ph.D. degree and is signified by a transcript designation; for example, "Ph.D. in History with a Designated Emphasis in Critical Theory." Programs approved as Designated Emphases include Biotechnology; Classics and the Classical Tradition; Computational Science; Critical Theory; Economy, Justice and Society; Feminist Theory and Research; International Nutrition; Native American Studies; Reproductive Biology; Second Language Acquisition; and Social Theory and Comparative History.

Intercampus Exchange Program

A graduate student registered on any campus of the university may become an intercampus exchange student with the approval of the graduate adviser, the chairperson of the department or group on the host campus and the dean of Graduate Studies on both the home and the host campuses.

An intercampus exchange student has library, health service and other student privileges on the host campus, but is considered a graduate student in residence on the home campus. The grades obtained in courses on the host campus are transferred to the home campus and entered on the student's official graduate transcript.

Application forms may be obtained in Graduate Studies and must be submitted five weeks before the beginning of the quarter in which you wish to participate in the program. Petitions received after the first day of the quarter will not be processed.

Fellowships, Assistantships and Loans

http://gradstudies.ucdavis.edu/support/studsup.htm

Financial support for graduate study at UC Davis is available in several forms: teaching and research assistantships, financial aid and fellowships/scholarships.

Financial aid is awarded on the basis of demonstrated financial need and is administered by the Financial Aid Office. Federal financial aid includes student loans, grants and work-study funding. You may apply for financial aid before you have been admitted. To be considered for financial aid, or for any awards based on financial need, you must file a "Free Application for Federal Student Aid" (FAFSA) at http://www.fafsa.ed.gov no later than March 2, prior to the fall quarter enrollment. This form, submitted directly to the Federal Student Aid Program Office, Iowa City, IA, is used to determine financial need only. Contact the Graduate Financial Aid Office for information regarding loans, grants and work-study.

Fellowships and graduate scholarships are awarded primarily on the basis of scholarship and promise of outstanding academic and professional achievement. Fellowship awards can include a stipend, fees and/or nonresident tuition. Considered in evaluations are the Graduate Record Examination (GRE) scores, undergraduate and graduate grade point averages, academic transcripts, statement of purpose, letters of recommendation and other documentation such as publications or awards. The minimum cumulative undergraduate or graduate grade point average required for a stipend, nonresident tuition fellowships or in-state fee award is 3.0 (*A*=4.0). U.S. citizens and permanent residents are eligible for nonresident tuition fellowships for their first three quarters only at UC Davis. New international students may be awarded nonresident tuition fellowships, in addition to some stipend fellowships, in their first three quarters.

Applications for fellowships and graduate scholarships are due by January 15 for awards beginning fall quarter. Information

for both new and continuing students and application materials for fellowships and graduate scholarships are available at http://gradstudies.ucdavis.edu/support/studsup.htm. You may print the application forms, complete them and submit them by mail. The fellowship applications may not be submitted electronically. All students submit the "Internal Fellowship Application for New and Continuing Students" to their graduate programs.

Graduate Certificate Program for Engineers

For engineers who already have a degree, the College of Engineering offers a Graduate Certificate Program. This program consists of course work in selected engineering subjects and requires fewer units than the degree programs. The purpose of the Graduate Certificate Program is to provide practicing engineers with an opportunity to develop additional expertise in specific areas and to explore new fields of technical interest.

General requirements for the program are

- 15 or 16 units of specified graduate course work, or a combination of specified graduate and undergraduate course work.
- admission to Graduate Studies.

Further information on the Graduate Certificate Program may be found in the *College of Engineering Bulletin*.

Seminar in College Teaching

Teaching Resources Center
17 Wellman Hall
530-752-6050; http://trc.ucdavis.edu/trc/ta/courses.html

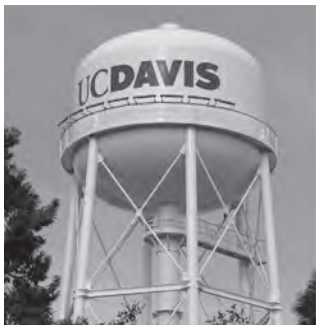
The Seminar in College Teaching introduces graduate students to the principles and methods of designing and delivering college-level instruction. The seminar deals with a broad range of skills and issues involved in helping college students learn, including classroom presentations, planning discussions, facilitating active learning, writing tests, evaluating student work and employing effective class management strategies.

Seminar participants meet weekly for a two-hour session. Participants also select and complete several assignments, such as developing a syllabus, preparing a lesson plan, practicing classroom presentations or writing a teaching philosophy statement. Readings from various sources complete the seminar experience.

Participants who attend every session and fulfill the required brief assignments in a satisfactory and timely manner receive a certificate of completion that is appropriate to note in a curriculum vitae.

SCHOOL OF EDUCATION

UCDAVIS



2004–2005 · 2005–2006

SCHOOL OF EDUCATION

School of Education
Academic Surge Building
530-752-0757
http://education.ucdavis.edu

The School of Education offers a wide range of academic and professional development programs that prepare teaching and administrative leaders for the world of public education (K-16), as well as researchers and university faculty. Hallmarks of our work include research that is integrated with practice and policy; deep, sustained engagement with schools and communities; and authentic, collaborative partnerships with those who share our goals.

Through our Ph.D., Ed.D. and M.A. programs, we prepare students to take leadership roles in strengthening schools, advancing research and scholarship and improving education policy. In our credential programs (Teaching Credential/M.A. and UCD/CSU Sacramento Joint Elementary Teaching Credential Program), we prepare students to become teacher leaders and educational advocates for all children.

Programs of Study

The Minor in Education is considered a foundation for undergraduates who wish to obtain a teaching credential, obtain a master's degree in education or a related field, pursue a doctoral degree in education, enter a profession that focuses on work with people, or develop a better understanding of issues confronting education today.

The Teaching Credential/M.A. Program offers an opportunity for qualified students to obtain both a Master of Arts in Education degree and a Multiple Subject or Single Subject Credential (optional BCLAD emphasis) in a combined five-quarter program. UC Davis offers Teaching Credential programs in elementary education as well as secondary English, mathematics, social studies, science (biology, chemistry, geo-science, physics) and agricultural education.

As part of the graduate offerings at UC Davis, the Teacher Credential Program is designed to prepare credential candidates for the teaching profession by immersing them in the total environment of a public school classroom. The program provides coursework that is grounded in public school student teaching experience and incorporates a theoretical-practical approach to the teaching-learning process. The Program's culture is one that encourages close interactions between each teacher candidate and teacher education faculty as well as among the teacher candidates of each year's class. Additional course work leading to a Master's Degree introduces the integration of classroom inquiry into teaching practice, making teachers more informed and pro-active practitioners.

The UCD/CSU Sacramento Joint Elementary Teaching Credential Program offers accelerated course work for the Multiple Subject credential during two consecutive summers; the supervised field experience is completed during part of the academic year. This program is designed to meet the needs of emergency credential holders and professionals who plan to change careers.

The Master of Arts in Education provides a course of study for examining research and theory about learners, teachers, schools and related social institutions. The program prepares professionals to begin conducting research about the education of children, youth and adults in a multicultural society. Graduates may assume leadership positions in school districts, state education agencies and private organizations concerned with instructional research, policy and practice. The program offers three areas of emphasis: Instructional Studies; Educational Psychology; Socio-cultural Studies.

The Joint Doctoral Program in Educational Leadership (JDPEL) leads to the Doctor of Education (Ed.D.) degree. This joint doctoral program between UC Davis and California State University Fresno develops educational leaders in the Central Valley. The program is designed to be completed in four to five years. Previous professional experience in an area of education is essential. The JDPEL program offers fours areas of specialization: Organizational Studies; Supervision, Curriculum, and Instruction; Assessment and Evaluation; Socio-cultural Contexts.

The Ph.D. in Education is a multidisciplinary program offered by the Graduate Group in Education, with faculty drawn from education, mathematics, science, social science and humanities units throughout the UC Davis campus. The program provides a challenging course of study for examining research and theory about learners, teachers, schools and related social institutions. Through course work, apprenticeships and mentoring, Ph.D. students are prepared to conduct research and teach about the education of children, youth and adults in a multicultural and multilingual society. Graduates of the program have assumed faculty positions in universities, as well as other leadership positions in universities, school districts, state education agencies and in private organizations that support teaching and learning in schools and communities. The program offers five areas of emphasis: Mathematics Education; Science Education; Educational Psychology; Language, Literacy and Culture; School Organization and Educational Policy.

Preparing for the Study of Education

Teaching Credential/ M.A. Degree and UCD/CSU Sacramento Joint Elementary Teaching Credential Program. Academic preparation for the Teacher Credential Programs includes a completed Bachelor's Degree and a GPA of at least 3.0. For multiple subject candidates many undergraduate majors are appropriate preparation for the program. For single-subject candidates we recommend undergraduate majors in the intended area of secondary teaching. In addition to these general requirements the following are essential for entering a Teacher Credential Program.

- Classroom experience in the appropriate grade levels
- U.S. Constitution course
- Specific preparatory course work (see adviser for details)
- California Basic Educational Skills Test (CBEST)
- For the elementary credential program, the California Subject Examination for Teachers (CSET)
- For secondary credential programs, approved subject matter course work or the California Subject Examination for Teachers (CSET) for the appropriate subject*

The CBEST examination needs to be attempted by the time of admission and passed prior to being recommended to the Commission on Teacher Credentialing for a credential. The

CSET or approved subject matter course work needs to be completed prior to beginning fulltime student teaching (see advising staff for details). Applicants are encouraged to have both of these requirements completed at the time of application. Credential requirements are revised by the State of California. To obtain the most current information, students considering a career in teaching are encouraged to consult with the School of Education advisers throughout their undergraduate career.

M.A. Degree. Applicants to the Master's in Education Degree program must have completed an undergraduate degree with a major in a field that supports their intended area of emphasis. A minimum undergraduate GPA of 3.0 is necessary for graduate admission at the University of California, Davis.

Ed.D. Degree. Because the Ed.D. program is jointly administered by UC Davis and CSU Fresno, applicants must meet the general admission requirements for both universities. These include: (a) a master's degree or equivalent from an accredited institution; and (b) a grade point average of at least 3.2 in upper division undergraduate and master's degree course work. Applicants must demonstrate high potential for educational leadership and scholarly achievement through professional experience, academic achievement, and professional recommendations. Applicants possessing graduate degrees in fields other than education are encouraged to apply.

Ph.D. Degree. Applicants to the Ph.D. program in Education normally will have completed a Master's Degree (or equivalent) in a field that supports their intended area of emphasis. A minimum GPA of 3.0 in previous graduate course work is required for graduate admission at the University of California, Davis. Applicants must demonstrate a high potential for scholarly achievement and research. Individuals possessing graduate degrees in fields other than education are encouraged to apply. Experience in teaching, research, or related areas of education are desirable.

Applying for Admission

School of Education students are admitted for fall term only, with the exception of the UCD/CSU Sacramento Joint Elementary Teaching Credential Program. Applicants for the joint credential program are admitted in summer only. Applications are available each year after October 1. Application deadlines and requirements vary by program. Applicants with underrepresented or non-traditional backgrounds are encouraged to apply.

Minor in Education

No admission deadline.

For more information or an application package, contact the School of Education Student Services Office at 530-752-0757 or eduavising@ucdavis.edu.

Steps in declaring a minor in education:

- Consult with the education minor advisor in 2078 Academic Surge.
- Complete an "Intention to Declare Education Minor" form.
- Complete course work.
- Prior to graduation, declare minor by completing a "Declaration of Minor" form available in Dean's Offices.

Teaching Credential/M.A. Degree Program

Early Application Deadline: December 1
Regular Application Deadline: February 15

For more information or an application package, contact the School of Education Student Services Office at 530-752-0757 or eduavising@ucdavis.edu.

Steps in the admission process:

- Complete the School of Education Program Application.
- Complete the UC Davis Graduate Studies Application.
- Include $60 non-refundable application fee payable to UC Regents.
- Submit two official transcripts for all college and university work completed.
- Submit any supporting documentation (verification of classroom experience, copies of test scores etc.).
- Applicants will be screened and scheduled for an admissions interview.
- All applicants will be evaluated and reviewed by an admissions committee.
- Applicants will be recommended to Graduate Studies Office for admission or denial.
- All applicants will be notified of admission or non-admission by the Graduate Studies Office

UCD/CSU Sacramento Joint Elementary Teaching Credential Program

Application Deadline: February 15

For more information or an application package, contact the School of Education Student Services Office at 530-752-0757 or eduavising@ucdavis.edu.

Steps in the admission process:

- Complete the School of Education Program Application.
- Complete the UC Davis Graduate Studies Application.
- Complete the CSUS Graduate Studies Application.
- Include $60 non-refundable application fee made payable to UC Regents.
- Submit three official transcripts for all college and university work completed.
- Submit any supporting documentation (verification of classroom experience, copies of test scores etc.).
- Applicants will be screened and scheduled for an admissions interview.
- All applicants will be evaluated and reviewed by a joint admissions committee.
- Applicants will be recommended to UCD and CSUS Graduate Studies Offices for admission or denial.
- All applicants will be notified of admission or non-admission by the UCD and CSUS Graduate Studies Offices.

M.A. Degree

Application deadline: December 15

For more information or an application package, contact the

School of Education Student Services Office at 530-752-0757 or eduavising@ucdavis.edu.

Steps in the application process:

- Complete the UC Davis Office of Graduate Studies Application.
- Include $60 application fee made payable to UC Regents.
- Complete School of Education M.A. Program Application.
- Submit official score(s) for the Graduate Record Examination (GRE) General Test.
- Include three letters of recommendation (have these letters mailed to you in a signed sealed envelope and include them in your application packet).
- Submit two official transcripts from all institutions attended.

Ed.D. Degree

Application deadline: February 1

For more information call (559) 278-0427, or e-mail diane_rivera-pasillas@csufresno.edu

Steps in the application process:

- Complete the Program Application Form for the Joint Doctoral Program in Educational Leadership.
- Include application fee of $55 (non-refundable) made payable to California State University, Fresno.
- Complete the CSU Residency Questionnaire, unless you have lived in California since birth.
- Submit two official transcripts in sealed envelopes as received from the registrar(s) of each college or university attended, including Fresno State.
- Submit Official Score(s) for the Graduate Record Examination (GRE) General Test or the Miller Analogies Test (MAT).
- Submit letters of recommendation (3) written by three employers, professors or others in a position to assess the applicant's potential for graduate work.
- Complete Statement of Purpose—a separate document describing the reasons for pursuing a doctoral degree in educational leadership and describing the applicant's interests in education.
- Include a statement from employer—a separate document from the applicant's current employer verifying a commitment to provide periodic leave for intensive program activities.
- Finalists will be interviewed by the Joint Doctoral Program Admissions Committee.

Ph.D. Degree

Application deadline: December 15

For more information or an application package, contact the School of Education Student Services Office at 530-752-0757 or eduavising@ucdavis.edu.

Steps in the application process:

- Complete UC Davis Office of Graduate Studies Application.
- Include $60 application fee made payable to UC Regents.
- Complete School of Education Ph.D. Program Application.
- Submit official score(s) for the Graduate Record Examination (GRE) General Test.
- Include three letters of recommendation (have these letters mailed to you in a signed sealed envelope and include them in your application packet).
- Submit two official transcripts from all institutions attended.

SCHOOL OF LAW

UCDAVIS





2004–2005 · 2005–2006

SCHOOL OF LAW

School of Law, Admission Office
530-752-6477; http://www.law.ucdavis.edu
lawadmissions@ucdavis.edu

The School of Law offers a three-year professional curriculum leading to the degree of Juris Doctor. In addition to the traditional professional curriculum, the School provides professional skills training in interviewing and counseling, negotiation and dispute resolution and trial practice. It also offers opportunities for practical experience through clinical programs and for in-depth study of an area of law in an individualized program of classroom work, research, writing, or experience in the community. The School seeks to promote critical evaluation of law and legal institutions in a broad perspective, integrating non-legal disciplines with professional legal education.

The School is fully accredited by the American Bar Association, is a member of the Association of American Law Schools, and has a chapter of the Order of the Coif.

Preparing for the Study of Law

No specific college major is required for admission to the School of Law, and there is no prescribed pre-legal program. Your college record and Law School Admission Test (LSAT) score must, of course, demonstrate that you are highly qualified for the study of law.

As a pre-law student, you should plan a course of study that will give you a broad cultural background and include intensive work for a substantial period of time in a selected field of study. Pre-law students should develop the ability to think critically. They should gain an understanding of people and institutions and know how to gather and weigh facts, to solve problems and think creatively. They should be able to read rapidly with comprehension, and express themselves clearly, completely and concisely, both orally and in writing.

You can get help with program planning from the Pre-Law Advising Office, 111 South Hall, 752-3009.

For additional information, see the *Official Guide to ABA-Approved Law Schools,* a publication of the Law School Admission Council and the American Bar Association. This book includes information on the law and lawyers, pre-law preparation, applying to law school and the study of law, together with individualized information on all ABA approved law schools. It can be found at college and major bookstores or ordered online at www.LSAC.org.

Applying for Admission

February 1 Deadline for filing applications for admission to the School of Law

1. Request application forms and the school catalog at http://www.law.ucdavis.edu. *Return your completed application to the Office of Admission, School of Law, University of California, 400 Mrak Hall Drive, Davis, CA 95616-5201, plus a $75 nonrefundable application fee,* in the form of a check or money order made payable to the Regents of the University of California.

The last date for filing completed application forms, together with all supporting documents, including LSAT scores, Law School Data Assembly Service (LSDAS) reports and letters of recommendation, is *February 1* of the year in which admission is sought. Early filing of all application materials is strongly recommended.

2. You must take the Law School Admission Test and register with the Law School Data Assembly Service so that the score will be reported to the school. You are urged to take the test as early as possible, and no later than December preceding the year in which admission is sought. The February test date is too late.

Testing centers are located in all parts of the United States and in many foreign countries. Tests are given four times a year: February, June, September and December. The completed test application blank, accompanied by the required fee, should be postmarked approximately six weeks before the date of the test to ensure that you will be registered for that test date.

To obtain application forms, information about the test, specific test dates and the location of testing centers, write to: Law School Admission Council, 661 Penn Street, Box 2000, Newtown, PA 18940-0998. You can also contact LSAC via e-mail at Lsacinfo@LSAC.org. The LSAT and LSDAS Registration and Information book is also available in the Law School Admission Office and the Pre-Law Advising Office on campus.

3. Register with the Law School Data Assembly Service, LSDAS, no later than December 1 by completing and mailing the registration form supplied in each LSAT and LSDAS Registration and Information book. Have a transcript from each college or university you have attended sent directly to LSAC. Complete instructions and a mailing envelope are available in the book.

4. Submit an official transcript of college work completed during the first semester or quarter of your senior year directly to the School of Law as soon as it is available. Failure to do so may delay consideration of your application materials. Successful applicants must submit directly to the School of Law a final transcript showing the award of a bachelor's degree.

5. Provide two letters of recommendation from objective and responsible persons to whom you are well known. At least one of these letters should come from a faculty member under whom you studied while in college. There are three options for submission of recommendations: *(1)* submit recommendations to LSDAS for inclusion with your LSDAS report; *(2)* have your recommender, career center, prelaw office, or other campus recommendation service send the letters directly to the School or Law; *(3)* follow the instructions in the School of Law catalog for submission of recommendations with the admission application. Your application cannot be considered until two letters have been received.

Your application will be reviewed by the School of Law Admissions Committee, which seeks students of demonstrated academic ability, as evidenced by LSAT scores and the undergraduate grade point average (GPA). The committee seeks students of diverse backgrounds and considers economic factors, advanced degrees or other advanced studies, significant work experience and extracurricular and community activities during and after the college years. An applicant's growth, maturity and commitment to the study of law are also major considerations. Students are admitted only on a full-time basis and only in August.

6. When accepted by the School of Law, you are simultaneously admitted to Graduate Studies on the Davis campus of the university for the program leading to the degree of Juris Doctor. If you intend to pursue studies leading to other graduate degrees, or wish to become a candidate for a Combined Degree Program, you must make separate application to Graduate Studies or the Graduate School of Management before commencing such studies.

Admission to Advanced Standing

If you have completed at least one year of full-time law course work in another approved law school, you may be considered for admission to advanced standing with credit for not more than one year of such work. The application filing period is June 1–30. No application for advanced standing will be considered until the Office of Admissions has received transcripts for all prior law school work.

Application procedures for advanced standing are the same as described above with the addition of *(1)* a letter of good standing including class rank from the dean of any law school previously attended; *(2)* at least one letter of recommendation from a law professor; *(3)* transcripts of all law school work; *(4)* LSAT score provided as part of an updated LSDAS report from LSAC; and *(5)* an official transcript from the school where you earned your undergraduate degree, stating the date the degree was conferred. The deadline for transfer applications is *June 30* of the year for which transfer is sought. Committee decisions on advanced standing are normally made in late July or early August of the year in which admission is sought.

Students who have been disqualified at another law school will not be admitted to this school.

Recruitment of Underrepresented Groups

The students and faculty of the School of Law recognize the great need for lawyers from under-represented groups. The School, therefore, actively solicits applications from those groups that reflect the many diverse populations of California but, traditionally, have been underrepresented in the law school population.

The School of Law, in cooperation with the Association of American Law Schools (AALS) and the Council on Legal Education Opportunity (CLEO), participates in programs designed to increase the number of law students from underrepresented groups. CLEO applications may be obtained by writing to: Council on Legal Education Opportunity, 740 15th Street, N.W., 9th floor, Washington, D.C. 20005; (202-216-4343 or toll free 866-886-4343); www.cleoscholars.com.

Program of Study

The professional curriculum requires six semesters for completion and extends over a period of three years. It is for full-time students only; no part-time or evening program is offered. New students are admitted only at the beginning of the fall semester.

After satisfactorily completing the professional curriculum of 88 semester units and the required period of resident study, you will receive the degree of Juris Doctor. Students who fail to attain satisfactory grades may be required to withdraw from the School at the end of any academic year.

The first year's work is prescribed and provides the essential foundation for subsequent legal study. Satisfactory completion of the first-year courses is, in all cases, prerequisite to second- and third-year courses. The work of the second and third years is elective. The courses of the professional curriculum are listed in the "Programs and Courses" section of this catalog. Courses taken in summer sessions at other accredited law schools may, with prior permission, be credited toward the units required for the professional degree.

Combined Degree Programs

Students may find a combined degree involving law and another discipline such as economics, business, sociology, or science advantageous. To encourage this kind of study, the School, in conjunction with other schools and university departments, has established Combined Degree Programs. Under these programs, a student may work toward a J.D. degree and a master's degree in another discipline at the same time. In some instances it may be possible to work on a Ph.D. degree as well. Students working toward a combined degree are required to spend their first year at the law school.

Normally, a Combined Degree Program will take at least four years. You will usually be able to earn up to 10 semester-hours of law school credit for work in the related discipline and normally can complete the combined degrees in less time than it would take to earn the two degrees separately. The first year of the Combined Degree Program must be taken entirely in the School of Law. During the remaining years, course work may be divided between the law school and the related discipline. You must satisfy the admission requirements for both programs and file applications with both units.

Students have pursued degree programs in combination with UC Davis departments for the M.A. degree in economics, philosophy, computer science and sociology, and with the School of Management for the M.B.A. degree. The law school will attempt to work out an additional program if you are interested in other disciplines. You may enroll in the Combined Degree Program any time before the beginning of your third year in law school. If you are interested in pursuing a Combined Degree Program, and have made a separate application to another school or department, you should notify the School of Law if that application is accepted.

School of Law Academic Calendar 2004–05

The School of Law operates on a semester system rather than the quarter system used on the remainder of the Davis campus.

	FALL 2004	SPRING 2005
Introduction Week	Mon.–Fri., August 16–20	
Law School instruction begins	Mon., Aug. 23	Mon. Jan. 10
Labor Day holiday	Mon., Sept. 6	
Veteran's Day holiday	Thurs., Nov. 11	
Thanksgiving holiday	Thurs.-Fri., Nov. 25-26	
Martin Luther King, Jr., holiday		Mon., Jan. 17
President's Day holiday		Mon., Feb. 21
Spring recess		Mon-Fri, Mar. 21-25
Law School instruction ends	Fri., Dec. 3	Fri., Apr. 29
Reading period	Sat.–Tues., Dec. 4-7	Sat.–Wed., Apr. 30-May 4
Law School examination period	Wed.–Thurs., Dec. 8–23	Thurs.–Fri., May 5–20
Law School Commencement		Sat. May 21

Friday, February 25 is treated as a Monday for class schedule purposes.

The LL.M. Program

530-757-8569; 530-757-8596 (fax);
llm@unexmail.ucdavis.edu

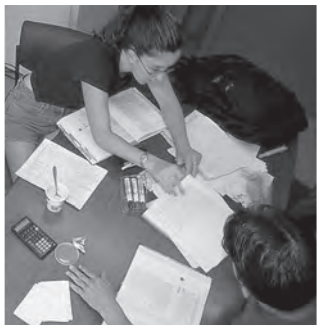
The law school LL.M. (Master of Laws) program integrates American and foreign law students at all levels of study. For foreign law graduates, the program provides an opportunity to gain a basic knowledge of the United States legal system. United States law school graduates and selected foreign LL.M. candidates may also seek admission on a thesis rather than a course basis. Other opportunities available to all graduate law students include developing special expertise in a particular area and doing special projects and original research under the direction of a faculty member.

Each LL.M. candidate must successfully complete a minimum of 20 semester units of work, usually 10 units each semester. Foreign LL.M. students must enroll in the 1-unit course *Introduction to Legal Research* and the 2-unit course *Introduction to the Law of the United States*. They earn the remainder of their required course credit in regular elective J.D. courses. Each foreign student must also complete an intellectually rigorous legal research and writing project, constituting at least 2 units of credit.

All LL.M. candidates begin their year of study with a complete orientation in the academic and social life of the law school, the UC Davis campus and the city of Davis. LL.M. students are encouraged to enroll in the School of Law's Orientation in U.S.A. Law Program, given in the month before the LL.M. Program begins.

GRADUATE SCHOOL OF MANAGEMENT

UC DAVIS

2004–2005 · 2005–2006

GRADUATE SCHOOL OF MANAGEMENT

Graduate School of Management
106 AOB IV
530-752-7399; http://www.gsm.ucdavis.edu

The Graduate School of Management offers a full-time, two-year program leading to the Master of Business Administration degree. The program provides both entry-level and mid-career students with an understanding of management approaches to problem solving and an awareness of the environment within which public and private management decisions are made. Successful completion requires not only a sophisticated understanding of a variety of functional skills in finance, marketing, production, program evaluation and accounting, but also an understanding of computers, information systems and the application of scientific methods to the identification and solution of management problems.

Preparing for the Study of Management

A bachelor's degree and a strong interest in professional management are prerequisites for admission to the Graduate School of Management. The school seeks students from diverse professional and academic backgrounds and does not limit its consideration to applicants from any particular category of majors. Entry-level and mid-career applicants are considered, and women and minorities are encouraged to apply.

Although the program has no specific subject prerequisites, it is strongly recommended that students complete the following course work before enrolling:

Accounting—an introductory course in financial accounting.

Economics—an introductory course in microeconomics.

Mathematics—an introductory course in calculus.

Statistics—a course in elementary statistics.

Applying for Admission

Application Deadline	Decision made no later than
December 1	February 28
February 1	March 31
April 1	May 31

Interviews are highly recommended but not required. A completed application should be on file before scheduling an interview.

Admission is for the fall quarter only. Application materials can be obtained in the following ways:

- apply electronically through the vendor on our Web site
- print the application materials from the Web site at http://www.gsm.ucdavis.edu or e-mail the Graduate School of Management at admissions@gsm.ucdavis.edu
- call 530-752-7399

Complete and return your application, with all supporting documents, by the deadlines given above. The application fee is $95.00.

In addition to your application, you need to submit:

- Transcripts from all colleges or universities previously attended.
- Graduate Management Admission Test (GMAT) taken within the last five years of the admission date. For further information and registration forms contact: Graduate Management Admission Council; 1-609-771-7330; www.mba.com.
- Three letters of recommendation.
- Three essays on specific topics.

To schedule an interview or visit, call 530-752-7658, or e-mail admissions@gsm.ucdavis.edu.

International Students

International applicants for whom English is a second language must take the Test of English as a Foreign Language (TOEFL) within the last two years, and receive a minimum score of 600/paper-based or 250/computer-based test. To receive registration forms, contact TOEFL, Educational Testing Service, 609-771-7100; www.toefl.org.

International students must show proof of financial support for two academic years including fees andliving expenses.

Criteria for Admission

The major criterion of the committee granting admission is what an applicant has to gain from, and offer to, the program. Consideration of an applicant's undergraduate performance includes a review of trends in scholastic performance and areas of academic strength as well as an assessment of overall grade point averages. Admissions standards and grading policies of the schools attended are also considered. Verbal, quantitative and analytical scores on the GMAT are used to evaluate general aptitude for management study. Background and maturity as indicated by employment history, service and activity records, recommendations and the applicant's essays are factors in the committee's evaluation. Professional management experience is not required for admission but is favorably considered.

Program of Study

The hallmark of the two-year UC Davis MBA program is its flexibility. Students are required to take six core courses and then choose three breadth courses to prepare them for in-depth study in their concentration. The series of core courses in the first year focuses on all basic disciplines of business—accounting, economics, finance, marketing, organizational behavior and statistics.

As early as the first year of study, students are able to integrate elective courses into their personal curriculum. Elective courses place an emphasis on real-world application of management principles. Students can focus on one or more of the "standing" concentrations, or may design their own concentration. The concentrations include accounting, agricultural management, entrepreneurship, finance, international management, management of information systems, marketing, not-for-profit management, operations strategy, strategic management and technology management.

MBA Program for Working Professionals

In addition to the full-time program, the Graduate School of Management offers an MBA Program for Working Professionals. Students enrolled in the MBA Program for Working Professionals pay a flat rate per course. Fees are available from our Web site.

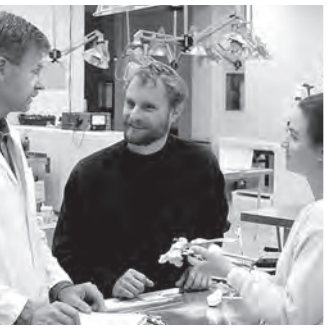
Application Deadline	Decision made no later than
April 1	May 31

Interviews may be scheduled once your application is submitted.

If you would like more information about the working professional program, please contact the Graduate School of Management Admissions office at 530-752-7399 or visit the Web site (www.gsm.ucdavis.edu).

SCHOOL OF MEDICINE

UCDAVIS





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SCHOOL OF MEDICINE

School of Medicine
530-752-2717; http://som.ucdavis.edu

The Doctor of Medicine degree requires the satisfactory completion of a four-year course of study composed of 15 consecutive quarters. Course work is conducted on the Davis campus, at the UC Davis Medical Center, Sacramento and in nearby affiliated hospitals.

Preparing for the Study of Medicine

When you apply to the School of Medicine, you must submit the results from the Medical College Admission Test (MCAT), so it is recommended that you take the MCAT by the spring before application. Information can be obtained at your undergraduate institution or directly from MCAT Program, Box 4056, Iowa City, IA 52243; Telephone 319-337-1357. To be acceptable for the fall entering class, the MCAT must be taken no later than the previous fall. No scores before August 2001 will be accepted.

Applicants must also meet the following academic requirements:

A. Completed at least three years of study in an accredited college or university in the United States or Canada. A minimum of 90 semester hours or 135 quarter units of college-level work is required. Courses in highly specialized fields are acceptable only at the discretion of the medical school.

B. Completed satisfactorily before matriculation each of the following courses:

	Quarter Units	Semester Units
1. English, 1 year or its equivalent	12	6
2. Biological science, 1 ½ years* including laboratory, or its equivalent	15	11
3. General chemistry, 1 year including laboratory, or its equivalent	12	8
4. Organic chemistry, 1 year or its equivalent. If two or more undergraduate organic chemistry courses are offered, it is recommended that you elect the more rigorous option	12	8
5. Physics, 1 year including laboratory or its equivalent.	12	8
6. Mathematics, College level math, including statistics. Note: AP credit does not satisfy math requirement.	6	4

* Upper Division Science Requirements for Admission. One semester or two quarters of upper division biology. This can be satisfied by courses in Biochemistry, Molecular Biology, Cell Biology or Genetics. Admission to medical school requires that the applicant will have an understanding of fundamental concepts of biomedical science. Although a biochemistry course is not absolutely required for admission, it is strongly recommended.

C. Demonstrate the potential to perform academically at least as well as the average of the current first year class. This reflects the School of Medicine's generally higher standards and our emphasis on potential as judged from the application as a whole, including but not limited to MCAT and GPA scores.

For additional information, contact the School of Medicine Admissions Office.

Applying for Admission

November 1 Deadline for filing applications for admission for to the School of Medicine

The School of Medicine participates in the centralized American Medical College Application Service (AMCAS). Visit the Web site for the Association of American Medical Colleges (AAMC) located at http://www.tomorrowsdoctors.org for information on admission to medical school. You need to submit only one application and one set of official transcripts to AMCAS, regardless of the number of member schools to which you are applying.

Submit the completed application and other required credentials directly to AMCAS for verification, reproduction and immediate distribution to the medical schools you have indicated.

After your AMCAS application has been received by the School of Medicine, the Admissions Office will notify you and may request a secondary application and two letters of recommendation along with a nonrefundable application fee of $60. Send these items directly to the Assistant Dean, Office of Admissions and Outreach, School of Medicine, University of California, One Shields Avenue, Davis, CA 95616-8661, and not to AMCAS. Recommendations can be in the form of a report by a premedical advisory committee at the college or university where you are enrolled or letters from two faculty members who are familiar enough with you and your abilities to make a meaningful evaluation. We recommend that one letter be from a science instructor and the other from a non-science instructor.

Applications are accepted by AMCAS between *June 1* and *November 1*. We strongly recommend that you make an early request for application materials from AMCAS and see that the necessary supporting items reach the Committee as soon as possible after the School of Medicine requests them. The Committee reviews only complete application files and schedules interviews for highly qualified applicants throughout the application period and beyond.

A personal interview is usually required before a place in the first-year class can be offered. However, because of the large number of applicants, it is not possible to interview each one, and for this reason interviews are held only at the invitation of the Admissions Committee. Interviews take place at the medical school in order to provide you with first-hand knowledge of programs and facilities and give you the opportunity to meet some of the students.

As decisions are made, letters of acceptance are sent; this can be as early as mid-October and as late as September of the following year.

Applicant Selection. The class entering in the fall will be limited to 93 students selected on the basis of academic achievement, academic promise and personal characteristics. The Admissions Committee uses these criteria to determine if a candidate will be able to complete satisfactorily the requirements of the medical curriculum and become excellent medical practitioners. Factors taken into consideration include

scholastic records, Medical College Admission Test performance, and reports of teachers, advisers and interviewers with regard to intellectual capacity, motivation, emotional stability and personal dedication.

The majority of openings in the entering class will be awarded to students who are California residents. However, the School of Medicine participates in the program of the Western Interstate Commission for Higher Education (WICHE) and residents of participating states will be considered as residents for purposes of admission. For more information, write the WICHE at Post Office Drawer P, Boulder, CO 80302.

The School of Medicine selects students for admission with a view to meeting the needs of society, of the medical profession and of the School. Because we live in a pluralistic society, and the educational experience is enhanced by the interaction of students from various backgrounds, the School desires diversity in its student body. This is reflected in the School's commitment to expand opportunities in medical education for individuals from groups underserved in medicine as the result of socioeconomic disadvantage and to increase the number of physicians practicing in underserved areas. Therefore, the Admissions Committee, composed of individuals from a variety of backgrounds and representative of a broad spectrum of medical sciences, evaluates applicants in terms of all relevant factors. These include academic credentials, with due regard to how they may have been affected by disadvantages experienced by the applicant, such personal traits as character and motivation, experience in the health sciences and/or the community, career objectives, and the ability of the individual to make a positive contribution to society, the profession and the School.

Transfer with Advanced Standing

Currently enrolled students in good standing at approved medical schools in the United States or Canada may apply for admission to the third year of study. In order to provide the best facilities and clinical resources, however, we must limit the number of students in our clinical clerkships. Therefore, applications for transfer to the third year are considered on a space-available basis.

Deadline for application is April 1 of the year of transfer. A nonrefundable application fee of $40.00 is required. Applicants must provide medical school transcripts, and if accepted, must pass Part I of the USMLE at their current institution. Available spaces may be filled by the Admissions Committee based upon the entire content of an application, or they may request additional information including letters of recommendation and a personal interview. All applicants for transfer must meet the usual requirements for admission, as well as satisfactorily completing the equivalent of two years of study at the medical school. Applicants will be notified of the Admissions Committee's decision starting April 30.

Program of Study

Doctor of Medicine. The curriculum for the M.D. degree is normally a four-year program that provides comprehensive training for the practice of medicine, and provides a blend of basic sciences training and clinical experience. The emphasis during the first two years is on the basic-science foundations of medicine. Medical students are introduced to patient care during their very first quarter of study, reflecting the school's commitment to the training of highly skilled clinicians. Several volunteer clinics, largely staffed by UC Davis medical students, provide an ideal setting for hands-on clinical experience.

Combined Degree Program. In addition to the Doctor of Medicine degree, the School of Medicine at Davis offers a variety of dual-degree programs through coordination with other graduate groups and divisions. These advanced degrees can couple the M.D. degree with the M.P.H., Master or Informatics, Ph.D. and M.B.A. that train physicians to meet, respond to and solve the broad diversity of problems and dilemmas facing current and future health care.

Meeting this challenge requires those capable of advancing our biological sciences knowledge base, and others who can recognize and solve the ethical, political and humanitarian issues that confront the broad delivery of health care to all. Hence, the field for the Ph.D. in the joint degree program at UC Davis can be any graduate program offered on the Davis campus, extending beyond the traditional biological sciences boundaries, and strongly encouraging candidates to seek degrees in social sciences and humanities. All requirements for both degrees are met in a course of study that usually lasts seven years. To be admitted, and be concurrently enrolled in both degree programs, students must apply for separate admission to both the M.D. and Ph.D. programs and obtain permission of the School of Medicine M.D./Ph.D. Advisory Committee. Funding for two competitive fellowships is awarded annually to students enrolled in the M.D./Ph.D. program.

Advisory Committee. Inquiries about admission to graduate education should be directed to the Dean of Graduate Studies, University of California, One Shields Avenue, Davis, CA 95616. For more information concerning the combined-degree programs, contact Edward D. Dagang, Office of Admissions, School of Medicine, University of California, One Shields Avenue, Davis, CA 95616-8661.

Family Nurse Practitioner/Physician Assistant Program. The Family Nurse Practitioner/Physician Assistant (FNP/PA) credential program educates health care professionals to act as members of a health care team, and improves the availability of culturally relevant primary health care in underserved populations throughout central and northern California. Enrollment in these courses (see Medicine, School of, Department of Family and Community Medicine) is limited to students who are enrolled in the FNP/PA program.

Academic Calendar

The School of Medicine operates on a different schedule from the rest of the campus. A detailed academic calendar may be viewed online at http://som.ucdavis.edu.

The program is a continuous four-year academic experience, with the first year commencing in fall quarter. A six-week break is scheduled between the first and second year academic schedule following spring quarter. The second year concludes with a three- to four-week period for preparation for USMLE Step 1 examination. The third and fourth year clinical experiences begin in summer and continue through spring.

With approval, students may extend the first two years over three years and use the additional time to individualize their programs. This alternative time is highly suitable for including research experiences and/or meeting other academic objectives. Flexibility in the third and fourth years also permits alternate scheduling.

SCHOOL OF VETERINARY MEDICINE

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SCHOOL OF VETERINARY MEDICINE

School of Veterinary Medicine
Office of the Dean
Surge IV
530-752-1383; http://www.vetmed.ucdavis.edu

The mission of the School of Veterinary Medicine is to provide the best possible health care for animals through teaching, research and public service. Students are offered a rigorous four-year program of study that prepares them for diverse career opportunities in veterinary medicine.

Preparing for the Study of Veterinary Medicine

To be considered for admission to the School, you must have completed 108 quarter units (72 semester units) in an accredited college or university and have completed the following courses:

Lower Division Required Sciences	Quarter Units
General Chemistry	15
Organic Chemistry	6
Physics	6
Biological Sciences	10
Upper Division Required Sciences	
Embryology	4
Genetic	4
Biochemistry	4
Physiology	5
Additional Courses	
Required English	12
Required Humanities and Social Sciences	12
Required Statistics	4

(To convert semester units to quarter units, multiply by 3/2. For example, a 4-unit semester course is equivalent to a 6-unit course in the quarter system.)

You should plan your pre-veterinary medical education carefully. The required courses should be spaced to permit maximum scholastic achievement. An undergraduate major should be selected on the basis of individual interest and aptitude; there is no advantage gained toward admission by selecting one major over another. If you have definite areas of interest within the general field of veterinary medicine, you are encouraged to take courses (for example, computer science, agricultural economics, molecular and biochemical genetics) that will broaden your background in these areas. Some specialized areas include laboratory animal medicine, exotic animal medicine, public health, food animal practice and biomedical research.

Examinations. You must take the General Aptitude Test of the Graduate Record Examination (GRE) by October 1st of the year you apply for admission. Applications for the exams and additional information may be obtained from the Educational Testing Service, Box 23470, Oakland, CA 94623-0470. The GRE must be taken within five years of the time you submit your application. The highest scores will be used when the GRE is taken more than once.

Grade Point Average. To be considered for admission, you must have a minimum grade point average of 2.50 for both the required sciences and the cumulative grade point average. Applicants who do not meet the minimum grade point average can qualify for admission by receiving GRE scores in the upper 30th percentile for the combined General Aptitude Test scores. Applicants who do not have transcripts with letter grading can qualify for consideration with these same scores or by receiving a bachelor's degree with honors.

Practical Experience. Admission to the School requires extensive experience with animals. This experience must entail more than having family pets and should include experience with several animal species if that experience includes activities that give you an appreciation and understanding of the veterinary profession. The minimum requirement for animal, veterinary and biomedical science experience is 180 hours (4.5 weeks). This experience should also include working with veterinarians, to give you an understanding of the duties and responsibilities of a practitioner and the breadth of veterinary medicine.

Applying for Admission

October 1 is the deadline for filing applications for admission to enter the School of Veterinary Medicine the following fall quarter.

Students are admitted to the School of Veterinary Medicine in the fall only. Applications are available any time after July. Visit our Web site at http://www.vetmed.ucdavis.edu/studentprograms/default.html. Applications must be submitted online for California applicants.

Students interested in admission to the School of Veterinary Medicine are urged to request an Announcement of the School of Veterinary Medicine at an early date so that all minimum academic requirements and deadlines are met.

Applicants with disadvantaged backgrounds (cultural, economic, social, educational, disabled and other factors) are encouraged to apply to the Veterinary Medical Opportunity Program (VMOP). For further information and advising services, call the Office of the Dean—Student Programs at 530-752-1383.

Letters of Evaluation. Three letters of evaluation are required. Letters should be requested from those who know you well, who understand academic and professional demands and have had the opportunity to evaluate your personal qualities and potential as a professional person. The evaluator should be willing to write a thorough, comprehensive letter on your behalf.

Interviews. Interviews may be requested, as deemed necessary, by the Dean and Admissions Committee to obtain additional information. The Dean and Admissions Committee may require additional evaluation procedures for selecting candidates for admission.

Out-of-State and Foreign Applicants. California residents are given priority for admission to the school. A small number of uniquely qualified applicants who are not California residents may be admitted as nonresidents. The criteria for determining residency are explained in Residence for Tuition Information in the Appendix of this catalog. Specific questions should be addressed to the Legal Analyst—Residence Matters, 111 Franklin St., 8th Floor, Oakland, CA 94607-5206. No other persons are qualified to give rulings on residency.

If you are from a country other than the United States, you must include a certified English version of your college transcript, and, if English is your second language, the official scores from the Test of English as a Foreign Language (TOEFL) taken within five years of the date when your application is submitted.

Criteria for Selection

I. Academic Factors (50-60%)

A. College course work:

1. Overall GPA in undergraduate/graduate course work
2. GPA of required pre-veterinary medical science courses
3. GPA of last two years of undergraduate/graduate work (minimum of 72 quarters or 45 semester units)

B. Graduate Record Examination (GRE):

1. General Aptitude Test (Verbal, Quantitative and Analytical Writing)

II. Non-Academic Factors (40-50%)

A. Personal Statement

B. Letters of Evaluation

C. Veterinary and Animal Experience

D. Interview

Non-academic factors will be evaluated based on the following criteria: understanding of the veterinary profession and the responsibilities of being a veterinarian; a demonstrated interest in serving the public through the profession of veterinary medicine; and the possession of maturity, motivation and other qualities needed for successful academic and professional work.

Program of Study

Doctor of Veterinary Medicine. To receive a Doctor of Veterinary Medicine degree, students must study veterinary medicine for the equivalent of 13 quarters. A grade point average of 2.0 (C), computed on all courses taken while in the School, is required and students must satisfactorily complete all required work as determined by the faculty of the School.

Master of Preventive Veterinary Medicine. Applicants for candidacy to the Master of Preventive Veterinary Medicine (M.P.V.M.) degree program must have completed the Doctorate in Veterinary Medicine or the equivalent; final admission decisions rest with the Admissions Committee, M.P.V.M program. Application deadline for August admission is March 31. International applicants are encouraged to apply as early as possible.

The M.P.V.M. degree normally takes one year to complete; however, some students may require as much as two years to finish the program. Students who intend to complete the program in one calendar year must begin the program in August. Candidates for the M.P.V.M. degree must satisfactorily complete a total of 40 units of course work while in residence. This includes 27 units of required courses in epidemiology, biostatistics, information management and a minimum of 13 units of approved electives. Students must also complete a research study which culminates in a written report and oral presentation. A committee consisting of three faculty members reviews each paper for acceptability and assigns an appropriate grade.

Application forms and information about the program are available from the Director, M.P.V.M. Program, Office of the Dean, School of Veterinary Medicine, University of California, One Shields Avenue, Davis, CA 95616; or visit the M.P.V.M. Web site at http://www.vetmed.ucdavis.edu/mpvm/mpvm.htm.

Combined Degree Programs. Students may enroll in combined degree programs. General information regarding these degrees can be found in the Announcement of Graduate Studies, available from Graduate Studies, University of California, One Shields Avenue, Davis, CA 95616. For more detailed information, write to the chairperson of the department in which you want to study and the School of Veterinary Medicine.

School of Veterinary Medicine Academic Calendar 2004–05*

Summer Quarter 2004

4th Year Orientation Session	Monday, June 21
4th Year Senior/Summer Clinics begin	Monday, June 21

Fall Quarter 2004

Labor Day Holiday	Monday, Sept. 6
Orientation for 1st-year students	Sept. 8 & 10
Instruction begins for 1st-, 2nd- and 3rd-year students	Mon. Sept. 13
Rosh Hashana Holiday	Thurs., Sept. 16
Veteran's Day Holiday	Thurs., Nov. 11
Thanksgiving Holiday	Mon.-Fri., Nov. 22-26
Instruction ends	Fri., Dec. 10
Finals end	Fri., Dec. 17
4th Year Clinics end	Fri., Dec. 17

Winter Quarter 2005

Instruction begins for 1st-, 2nd- and 3rd-year students	Mon., Jan. 3
4th Year Clinics begin	Mon., Jan. 3
M. L. King Holiday	Mon., Jan. 17
President's Day Holiday	Mon., Feb. 21
Instruction ends	Fri., March 18
Finals end	Thurs., March 24

Spring Quarter 2005

Instruction begins	Mon., April 4
Awards Ceremony	Wed., May 18
Memorial Day Holiday	Mon., May 30
Instruction ends	Fri., May 30
4th Year Clinics ends	Wed., June 15
Finals end	Thurs., June 16
Commencement	Fri., June 17

*All dates are subject to change without notice.

PROGRAMS AND COURSES

UC DAVIS





2004–2005 · 2005–2006

COURSES

Undergraduate Courses

Lower Division Courses

These courses, **numbered 1–99,** are open to all students for lower division credit, but are designed primarily for freshmen and sophomores.

Upper Division Courses

These courses, **numbered 100–199,** are open to all students who have met the necessary prerequisites as indicated in the catalog course description. Preparation should generally include completion of one lower division course in the given subject or completion of two years of college work.

Variable-Unit Courses

Subject to approval by the department chair, an instructor may arrange to give a special study course (numbers 90X, 92, 97T, 97TC, 98, 99, 190X, 192, 194H, 197T, 197TC, 198, 199) to interested students. Theses courses may be offered any fall, winter, or spring quarter as determined by the department.

- **90X/190X (Seminar)** are seminar courses for in-depth examination of a special topic within the subject area.
- **92/192 (Internship)** courses enable individual students to obtain practical experience to complement their educational goals or to explore potential career interests and opportunities. Students must have completed 84 units before enrolling in course 192.
- **97T/197T (Tutoring)** and **97TC/197TC (Tutoring in the Community)** are courses for students who want to tutor in a subject in which they are proficient—generally in their major field—while enrolled as an undergraduate.
- **98/198 (Directed Group Study)** courses are set up on a one-time basis for a group of students in a subject for which no regular courses have been established.
- **99 (Special Study for Undergraduates)** is a course arranged for an individual student who shares, with an instructor, an academic interest that cannot be accommodated within the formal course structure.
- **194H (Special Study for Honors Students)** courses are for individual students with honor status, as determined by the department offering the course, and who have completed 84 units.
- **199 (Special Study for Advanced Undergraduates)** courses are the upper division counterparts of course 99, and involve supervised independent study and research requiring adequate background in the subject proposed for study as well as prior completion of 84 units.

Credit in courses 99, 194H and 199 is limited to a total of 5 units per term.

Autotutorial Courses are courses in which students instruct themselves at their own pace. These courses can be identified by the letters AT at the end of their course numbers, e.g., 13AT, 141AT.

Virtual Courses are courses in which instruction is delivered via the Internet. These courses can be identified by the letter V at the end of their course numbers, e.g., 10V, 162V.

Research Conference Courses are courses in which advanced undergraduate students may participate in critical discussions of staff research activities. These one-unit courses are numbered 190C and are graded on a Passed/Not Passed basis.

Graduate Courses

Courses **numbered 200–299** are open to graduate students and to undergraduates who have completed 18 units of upper division work basic to the subject matter of the course. However, admission is subject to the approval of the instructor in charge of the course. Grading in 290C courses and most variable-unit 299 or 299D courses is Satisfactory/Unsatisfactory. Check the course description for grading information.

Professional Courses for Teachers and Nurse Practitioners

Courses **numbered 300–399** are teacher-training courses in the Division of Education and in other departments and are especially intended for teachers or prospective teachers. Courses designed to provide instruction to teaching assistants are included. Courses for certification of family nurse practitioners and physician assistants are also included. These courses are open only to students enrolled in those programs.

Other Professional Courses

Courses **numbered 400–499** are professional training courses. Graduate students should consult their faculty adviser or contact the Graduate Studies Office before registering in 400 series courses to determine if graduate credit may be awarded for the course in question.

Prerequisites

Prerequisites for courses should be noted carefully; the responsibility for meeting these requirements rests on the student. If you can demonstrate that your preparation is equivalent to that specified by the prerequisites, the instructor may waive these requirements for you. However, the prerequisite that requires that you complete 84 units before registering in the course may not be waived. The instructor may request that a student who has not completed the prerequisites be dropped from the course.

COURSE DESCRIPTIONS

Below is a sample of how a course is listed in this catalog.

190. Proseminar in Nutrition (1)
Seminar—1 hour. Prerequisite: course 111; senior standing. Discussion of human nutrition problems. Each term will involve a different emphasis among experimental, clinical and dietetic problems of community, national and international scope. May be repeated for credit with consent of instructor. (P/NP grading only.)—I, II, III. (I, II, III) Smith

Top line: course number; title; units.

Paragraph following: course instructional format; prerequisite; course description; grading if other than letter grading; quarter offered 2004–05; quarter offered 2005–06 (in parentheses); instructor (if specified).

Quarters offered: the quarter in which a course is intended to be given is shown as follows:

I. Fall Quarter (September to December) or Fall Semester (August to December), School of Law

II. Winter Quarter (January to March) or Spring Semester (January to May), School of Law

III. Spring Quarter (April to June)

IV. Summer Quarter (July to September) for students in the School of Medicine only

The quarter a course is offered is subject to change. Consult the *Class Schedule and Registration Guide* or contact the department for more information.

Alternate Year Designation

Some course descriptions will include the phrase "Offered in alternate years." If the course will be offered in the 2004–05 academic year, the quarter designation immediately follows the description. If the course will be offered in the 2005–06 academic year, the quarter designation is inside parentheses.

Multi-Quarter Courses

A series of course numbers followed by two or three letters (for example, Physics 110A-110B-110C) is continued through three successive quarters, ordinarily from September to June. The first quarter course listed this way is a prerequisite to the second, and the second is prerequisite to the third. On the other hand, where A and B portions of a course are listed separately (for example, Economics 160A and 160B), the A course is not a prerequisite to B, unless it is specifically mentioned in the list of prerequisites.

Expanded Course Descriptions

Because of space limitations, you may find that the descriptions in the *General Catalog* do not include all the information you would like about a course. The faculty has responded to this need by writing the "Expanded Course Descriptions," giving more detailed explanations about each course offering. These descriptions are available each quarter to assist students in selecting their courses. They contain such information as texts used, preparation required of students, basis for grading, course format, special assignments (papers, field trips, etc.), and a topical outline of the material to be covered.

Copies of the "Expanded Course Descriptions" are available for on-campus use at the Shields Library Reference and Periodicals desks, the College deans' offices, advisers' offices, advising centers, departmental offices, and at The First Resort. A limited number of expanded course descriptions are also available in an online archive at http://registrar.ucdavis.edu/cafinfo.

The course offerings and instructors listed in this catalog are subject to change without notice. For more current quarter offerings and instructors, refer to the *Class Schedule and Registration Guide*, available at the UC Davis Bookstore and online at http://registrar.ucdavis.edu/csrg.

African American and African Studies

(College of Letters and Science)

Jacob K. Olupona, Ph.D., Director

Program Office, 2201 Hart Hall (530-752-1548)

http://cougar.ucdavis.edu/aas

Committee in Charge

Christine Acham, Ph. D. *(African American and African Studies)*
Moradewun Adejunmobi, Ph.D. *(African American and African Studies)*
Milmon Harrison, Ph.D. *(African American and African Studies)*
Carl C. Jorgensen, Ph.D. *(Sociology)*
Bettina Ng'weno, Ph.D. *(Anthropology)*
Jacob K. Olupona, Ph.D. *(African American and African Studies)*
Riche Richardson, Ph.D. *(English)*
Patricia A. Turner, Ph.D. *(African American and African Studies)*
Clarence E. Walker, Ph.D. *(History)*

Faculty

Christine Acham, Ph.D., Assistant Professor
Moradewun Adejunmobi, Ph.D., Associate Professor
Milmon F. Harrison, Ph.D., Assistant Professor
Bettina Ng'weno, Ph.D., Assistant Professor
Jacob K. Olupona, Ph.D., Professor
Patricia A. Turner, Ph.D., Professor

Emeriti Faculty

John Stewart, Ph.D., Professor Emeritus

Affiliated Faculty

Kristee Haggins, Ph.D., Adjunct Assistant Professor

The Major Program

The African American and African Studies Program offers courses on the history and culture of African Americans, Africans in the Diaspora, and Africans. The program provides students with a multi-disciplinary learning experience. Students in the major take selected courses in other programs and departments that complement courses offered within African American and African Studies. Majors and minors are also encouraged to take advantage of internship programs.

The Program. The purpose of this program is to give students a sense of the individual characteristics and common concerns of Black communities in the United States, in the wider Diaspora, and in Africa. The African American emphasis includes courses on history, the arts, and the impact of developments in politics and the economy on the social organization of Black people in the United States. The African Diaspora emphasis enables students to study the way Black communities outside Africa and the United States have dealt with questions of race and ethnicity. It also considers how they have defined their identity in the political arena as well as by using religion, theater and dance, literature and film. The African emphasis allows students to focus on Africa's recent history, social issues, and contemporary culture.

Career Alternatives. Students completing the African American and African Studies major are well prepared for graduate study in psychology, education, sociology, human development, history, etc. Majors in African American and African Studies can also pursue professional training in fields such as pharmacy, medicine, or law. Graduates with this major have also pursued employment opportunities in the federal and state government, in international development agencies, in human service units, in county social service programs, and counseling services. African American and African Studies is also an appropriate background for work in community organizations like the Urban League, NAACP, Urban Affairs, and the Office of Economic Opportunity, and for teaching at all levels.

A.B. Major Requirements:

The major program must be developed in consultation with an African American and African Studies faculty member, and approved by the program's Major Adviser.

UNITS

Preparatory Subject Matter 28
African American and African Studies 10 .. 4
One course from African American and African Studies 12, 15, 50, 51, 52, 80 4
One course from Anthropology 2; Economics 1A, 1B; Geography 2; Sociology 1; Political Science 1, 2; Psychology 1 4
One course from Chicana/o Studies 10; Native American Studies 1, 10; American Studies 45; Asian American Studies 1, 2 4
Two courses from History 15, 17A, 17B 8
One course from African American and African Studies 54, 155A, Dramatic Art 41A, 41B, Music 28, 105, 106 4

Depth Subject Matter..... 36
One course from African American and African Studies 100, 101, 107A, 107B, 107C, 110, 145B 4
One course from African American and African Studies 150A, 150B, 151, 152, 155A, 156, 157, 160, 170, 171 4
One course from African American and African Studies 111, 123, 130, 133, 141, 145 4
A coordinated program of upper division courses, selected and approved in consultation with the major adviser and chosen to reflect the student's major emphasis..... 24
(These areas of emphasis are offered as guidelines for students in the major. They are not the only areas students may choose for the major.)

Culture of African American emphasis: African American and African Studies 107A, 107B, 153; Anthropology 140A, 140B; History 177A, 177B; Political Science 167.

African emphasis: African American and African Studies 110, 162, 171; Anthropology 140A, 140B; History 115A, 116; Political Science 134, 146.

Related Upper Division Courses

The following courses are offered by faculty members in other disciplines and focus on African American studies, African diaspora studies, or African studies.

American Studies 156; Anthropology 104N, 139AN, 140A, 140B; Art History 150; Community and Regional Development 151, 151L, 152, 153, 172; Comparative Literature 154, 165; English 167, 178, 179, 181A, 181B; History 102(O), 115A, 115B, 115C, 115D, 116, 177A, 177B, 178; Political Science 134, 149, 176; Sociology 129, 128, 134, 143A, 145A, 145B, 130; Dramatic Art 155A; Women's Studies 160, 180, 182.

Total Units for the Major 64

Major Adviser. M. Adejunmobi.

Minor Program Requirements:

UNITS

African American and African Studies..... 24
Select one course from African American and African Studies 10, 12, 15, 17, or 80 4
Select one course from African American and African Studies 100, 107A, 107B, 107C, or 110..... 4
Select any four additional courses from African American and African Studies 100, 101, 107A, 107B, 107C, 110, 123, 133, 141, 145A, 145B, 151, 152, 160, 162, 163, 170 16

Note: Although a course may be listed more than once, such a course may satisfy only one requirement.

American History and Institutions. This University requirement can be satisfied by completion of African American Studies 10, 100. (See also under University requirements.)

Courses in African American and African Studies (AAS)

Lower Division Courses

10. African-American Culture and Society (4)
Lecture—3 hours; discussion—1 hour. Critical examination of the historical, political, social, and economic factors that have affected the development and status of African-American people in contemporary society. GE credit: Div.—I. Harrison

12. Introduction to African Studies (4)
Lecture/discussion—4 hours. Introduction to African Studies which will focus on the various disciplinary perspectives through which African society and culture are generally studied. A survey of methods, resources and conceptual tools for the study of Africa. GE credit: ArtHum, Div, Wrt.—II. (II.) Olupona, Adejunmobi

15. Introduction to African American Humanities (4)
Lecture—3 hours; discussion—1 hour. Introduction to the humanist tradition developed by writers, philosophers, and artists of African descent in the West. Attention given to African sources, as well as European, Caribbean, Latin-American, and North American variations on this tradition. GE credit: ArtHum, Div, Wrt.—I. (I.) Harrison

16. Verbal and Performance Arts in Africa (4)
Lecture/discussion—4 hours. African verbal arts; oral texts from different African cultures. Types of critical response to oral texts, role of oral artists, context and esthetics of oral performance in Africa. GE credit: ArtHum, Div, Wrt.—II. (II.) Adejunmobi

17. Women in African Societies (4)
Lecture/discussion—4 hours. Gender relations in traditional and contemporary African society. Involvement of African women in politics, religion, the economy, the arts. African responses to feminist theory. Images of women in African literature. GE credit: Div, Wrt.—I. (I.) Adejunmobi

50. Black Images in Popular Culture (4)
Lecture—2 hours; discussion—2 hours. A survey of the depictions of Blacks in popular culture (popular press, stage, radio, film, television, advertising) from the middle of the sixteenth century to the present. GE credit: ArtHum, Div, Wrt.—III. (III.) Turner, Acham

51. History of Afro-American Dance (4)
Lecture—2 hours; discussion—2 hours. Evolution of African American dance, tracing its history and development from West Africa through the Carribean and to the United States. Investigates the social relevance of African American dance and the artistic merits and contributions of African American choreographers and performers.—III. (III.)

52. African Traditional Religion (4)
Lecture—2 hours; discussion—2 hours. Introduction to the traditional religions of the sub-Saharan African peoples: emphasis on myths, rituals and symbols in West, East, Central and South African indigenous religions. Examines themes such as sacred kingship, divination system, women, prophecy, conversion and adaptation to Islam and Christianity. GE credit: ArtHum, Div, Wrt.—II. (II.) Olupona

54. University Gospel Choir (2)
Rehearsal—4 hours. Prerequisite: consent of instructor; open to any student in the university. Rehearsal, study, and performance of Gospel music. May be repeated for credit. (Same course as Music 54.) (P/NP grading only.)—I, II, III. (I, II, III.) Lymos

80. Introduction to Black Politics (4)
Lecture—4 hours. Introduction to the analysis of Afro-American politics, using conceptual frameworks from political science and other social sciences. GE credit: SocSci, Div, Wrt.—III. (III.) Harrison

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Survey of Ethnicity in the U.S. (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing or consent of instructor. Sociological and historical analysis of the experience, culture, and relations of and between groups considered racial and/or ethnic minorities in the United States. GE credit: ArtHum, Div.—II. Harrison

101. Introduction to Research in the Afro-American Community (4)
Lecture—4 hours. Prerequisite: course 10 or consent of instructor. Introductory survey of Afro-American Studies methods and techniques; problems and methodology in Afro-American Studies.—III. (III.) Harrison

107A. African Descent Communities and Culture in the Caribbean and Latin America (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: upper division standing. Origin and development of African descent communities and culture in the Caribbean and Latin America: (a) the evidence for pre-Columbian arrivals; (b) the African slave trade and its aftermath; (c) the emergence of the African-creole cultures. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(I.) Ng'weno

107B. African Descent Communities and Culture in North America (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: upper division standing. Origin and development of African descent communities and culture in the U.S.A., Canada, and Mexico from the African slave trade to contemporary urban society. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(I.)

107C. African Descent Communities and Culture in Europe and Asia (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: upper division standing. The study of early African kingdoms, their relationship with Europe and Asia, and the development of African descent communities and culture in Europe and Asia from the pre-Columbian to the post-colonial era. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(I.)

110. West African Social Organization (4)
Lecture—4 hours. Prerequisite: course 101 or consent of instructor. Ecology, population, social organization, and survival culture of West Africa in the pre-colonial, colonial, and post-colonial periods. GE credit: SocSci, Div.—II. (II.) Olupona, Adejunmobi

111. Cultural Politics in Contemporary Africa (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing or course 12. Themes and style of new cultural forms in Africa as displayed in art, music, film and writing, especially in regard to blending of indigenous and foreign influences. Social and political forces shaping contemporary cultural expression. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(II.) Adejunmobi

123. The Black Female Experience in Contemporary Society (4)
Lecture—4 hours. Prerequisite: upper division standing or consent of instructor. Black female social, intellectual, and psychological development. Black women's contributions in history, literature, and social science; life experiences of Black women and philosophical underpinnings of the feminist movement. GE credit: ArtHum, Div.—III. (III.) Acham

130. Education in the African American Community (4)
Lecture—2 hours; discussion—1 hour; fieldwork—3 hours. Prerequisite: course 10 or 100, and completion of the Subject A requirement. Examination of the history of the education of African Americans in the United States. Examination and critique of contemporary theories concerning the schooling of African Americans. (Former course 140.)—I. (I.) Turner

133. The Black Family in America (4)
Lecture—4 hours. Prerequisite: upper division standing or consent of instructor. Analysis of social science research to examine relationship between Black family structures, patterns of functioning, and political, economic, and social conditions. Examination of role differentiation within families by race and social class. GE credit: SocSci, Div.—III. (III.) Harrison

141. Psychology of the African American Experience (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 10 or consent of instructor. Introduction to the psychological issues faced by African Americans. Analysis of issues from European/Western and Afrocentric frame of reference. Emphasis on Optimal Theory, a psychological theory based on an Afrocentric world view.—III. (III.) Haggins

145A. Black Social and Political Thought (4)
Lecture—4 hours. Prerequisite: course 10 or 80, or consent of instructor. Exploration and analysis of Black social and political thought in the Americas. GE credit: SocSci, Div.—III. (III.) Harrison

145B. Black Intellectuals (4)
Lecture—4 hours. Prerequisite: course 10, 80, 145A, or consent of instructor. Exposition and critical analysis of selected theoretical writings of Black intellectuals, and especially political and social thinkers, in the Americas. GE credit: SocSci, Div.—III. (III.) Harrison, Ng'weno

150A. The Afro-American Visual Arts Tradition: A Historical and Cultural Study (4)
Lecture—4 hours. Prerequisite: upper division standing. Afro-American visual arts tradition, folk and formal, in historical and cultural context, from 1600 through Reconstruction. GE credit: ArtHum, Div.—I. (I.)

150B. The Afro-American Visual Arts Tradition: A Historical and Cultural Study (4)
Lecture—4 hours. Prerequisite: upper division standing. Afro-American visual arts tradition, folk and formal, in historical and cultural context, from Reconstruction to present. GE credit: ArtHum, Div.—II. (II.)

151. Afro-American Vernacular Music and Verbal Arts (4)
Lecture—2 hours; discussion—2 hours. Socio-political dimensions of Afro-American musical forms like spiritual, work song, minstrelsy blues, rhythm and blues, jazz, gospel, soul and contemporary pop, and related verbal arts like preaching, toasting, rapping.—III. (III.) Turner

152. Major Voices in Black World Literature (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: upper division standing, completion of course 15 or comparable course in literature or the humanities. The recurrence of cultural tropes in the works of major black world authors and formation of an African-oriented canon. Principal activities include critical reading and the discovery of literature as a cultural resource. GE credit: ArtHum, Div, Wrt.—II. (II.) Adejunmobi

154. University Gospel Choir (2)
Rehearsal—4 hours. Prerequisite: consent of instructor; open to any student in the university. Rehearsal, study, and performance of Gospel music. May be repeated for credit. (Same course as Music 154.) (P/NP grading only.)—I, II, III. (I, II, III.) Lymos,

155A. African American Dance and Culture in the United States, Brazil and the Caribbean (4)
Lecture/discussion—4 hours. A comparative study of the African American dance forms in the U.S.A., Brazil, Haiti, Cuba, Jamaica, Barbados, and Trinidad. Examination of ritual, folk, and popular dance forms and the socio/historical factors that have influenced these forms. (Same course as Dramatic Art 155A.)—II. (II.)

156. Language and Identity in Africa and the African Diaspora (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing or course 12. Relationship between language and identity in literature from Africa and the African Diaspora. Use of pidgins, Creoles, translation from African languages and impact of language policies. GE credit: Div.—III. (III.) Adejunmobi

157. Literature and Society in South Africa (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing or course 12. Political and social developments in 20th-century South Africa as illustrated by a range of South African writing. Response of different writers to race relations, impact of government policy on types and context of writing. Offered in alternate years. GE credit: Div, Wrt.—(III.) Adejunmobi

160. African American Folklore (4)
Lecture—2 hours; discussion—1 hour; fieldwork—3 hours. Prerequisite: course 10. Theory and history of African American folklore and folklife, including music, material culture, oral narrative, proverbs, and humor. African and Caribbean cultural influences on New World folk genres will be probed. GE credit: ArtHum, Div.—III. (III.) Turner

162. Islam in Africa and the Americas (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course in African American or Religious Studies, preferably course 12 or 110 or Religious Studies 60. A comparative and historical survey of Islam in the regional and cultural settings of Sub-Saharan Africa and the Americas. GE credit: ArtHum, Div, Wrt.—III. (III.) Olupona

163. African Religions in the Americas (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 10; course 15 or consent of instructor. Comparative study of African religious heritage in the Americas: Jamaica, Trinidad, Cuba, U.S.A., Haiti, and Brazil. Emphasis on the origins and development of Candomble, Santeria, Shango, Vodun, and Rastafarianism in the New World. (Former course 153.) GE credit: ArtHum, Div, Wrt.—III. (III.) Olupona

165. Afro-Christianity and the Black Church (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10, 15 or consent of instructor, upper division standing. Examination of the historical role of Christian belief and practice as well as the institution of the Black Church in the experience of African Americans, from slavery to the present. Offered in alternate years. GE credit—SocSci, Div.—II. Harrison

168. Black Documentary: Theory and Practice (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Humanities 10, course 170 and consent of instructor; course 50 recommended. Preference given to African American and African Studies majors and minors. A study of Black documentary history and understanding of the use of the documentary form for political purposes. A discussion of documentary theory. Each student, singly or in a team, will create and carefully edit a documentary project. Offered in alternate years. GE credit: ArtHum, Div.—III. Acham

169. History of African American Television (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 recommended. History of the representation of African Americans in television; how the representations reflect social and political forces in American society. Role of African Americans in actively shaping their representation. GE credit: ArtHum, Div.—II. Acham

170. African American Film and Video (4)
Lecture/discussion—2 hours; term paper; film viewing—2 hours. Prerequisite: one of courses 15, 50, or English 160, or 162. A comparative approach in the study of fictional film and video produced and directed by African Americans, drawing on the social sciences and black feminist theory to examine and discuss selected works. GE credit: ArtHum, Div, Wrt.—II. (II.) Acham

171. Black African and Black European Film and Video (4)
Lecture/discussion—2 hours; term paper; film viewing—2 hours. Prerequisite: one of courses 15, 50, or English 160 or 162. A comparative approach in the study of dramatic films and videos that treat black life in Africa and Europe. Critical attention will focus on the imaginative construction of ethnicity, race, nationality, gender, and sexuality in each particular work. GE credit: ArtHum, Div.—III. (III.)

190. Topics in African and African-Diaspora Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing in African American and African Studies or consent of instructor. Intensive treatment of a special topic or problem in African or African Diaspora Studies. May be repeated once for credit when topic differs.—III. (III.)

192. Internship in African American and African Studies (1-8)
Internship—3-24 hours. Prerequisite: upper division standing, completion of 12 units of upper division study in African American and African Studies courses and consent of instructor. Enrollment limited to African American and African Studies majors and minors. Supervised internship in community, government, or private institutions, in all subject areas offered by the African American and African Studies Program. May be repeated for credit for a total of 12 units. (P/NP grading only.)

197T. Tutoring in Afro-American Studies (1-5)
Tutoring—1-5 hours. Prerequisite: consent of major committee; upper division standing with major in Afro-American Studies. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. May be repeated for credit for a total of 6 units. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Agricultural and Environmental Chemistry (A Graduate Group)

Andrew J. Clifford, Ph.D., Chairperson of the Group
Group Office, 4117 Meyer Hall (530-752-1415)

Faculty

Douglas O. Adams, Ph.D., Associate Professor *(Viticulture and Enology)*
Cort Anastasio, Ph.D., Associate Professor *(Land, Air and Water Resources)*
Charles W. Bamforth, Ph.D., Professor *(Food Science and Technology)*
Everett Bandman, Ph.D., Professor *(Food Science and Technology)*
Linda F. Bisson, Ph.D., Professor *(Viticulture and Enology)*
Roger B. Boulton, Ph.D., Professor *(Viticulture and Enology)*
William H. Casey, Ph.D., Professor *(Land, Air and Water Resources)*
M. Judith Charles, Ph.D., Assistant Professor *(Environmental Toxicology)*
Andrew J. Clifford, Ph.D., Professor *(Nutrition)*
Carroll E. Cross, M.D., Professor *(Internal Medicine)*
Susan E. Ebeler, Ph.D., Associate Professor *(Viticulture and Enology)*
Robert G. Flocchini, Ph.D., Professor *(Land, Air and Water Resources)*
Edwin N. Frankel, Ph.D., Adjunct Professor *(Food Science and Technology)*
J. Bruce German, Ph.D., Professor *(Food Science and Technology)*
Norman F. Haard, Ph.D., Professor *(Food Science and Technology)*
Bruce D. Hammock, Ph.D., Professor *(Entomology)*
William R. Horwath, Ph.D., Associate Professor *(Land, Air and Water Resources)*
You-Lo Hsieh, Ph.D., Professor *(Textiles and Clothing)*
Norman Y. Kado, Ph.D., Associate Adjunct Professor *(Environmental Toxicology)*
Peter B. Kelly, Ph.D., Professor *(Chemistry)*
Annie J. King, Ph.D., Professor *(Animal Science)*
Mark J. Kurth, Ph.D., Professor *(Chemistry)*
Yu-Bang Lee, Ph.D., Professor *(Animal Science)*
Fumio Matsumura, Ph.D., Professor *(Environmental Toxicology)*
Michael J. McCarthy, Ph.D., Professor *(Food Science and Technology)*
Alyson E. Mitchell, Ph.D., Assistant Professor *(Food Science and Technology)*
Tadeusz F. Molinski, Ph.D., Professor *(Chemistry)*
Ann C. Noble, Ph.D., Professor *(Viticulture and Enology)*
David S. Reid, Ph.D., Professor *(Food Science and Technology)*
Gerald F. Russell, Ph.D., Senior Lecturer *(Food Science and Technology)*
James R. Sanborn, Ph.D., Researcher *(Entomology/ Pesticide Regulation)*
Neil E. Schore, Ph.D., Professor *(Chemistry)*
Takayuki Shibamoto, Ph.D., Professor *(Environmental Toxicology)*
Charles F. Shoemaker, Ph.D., Professor *(Food Science and Technology)*
R. Paul Singh, Ph.D., Professor *(Biological and Agricultural Engineering)*
Gary M. Smith, Ph.D., Professor *(Food Science and Technology)*
Randal J. Southard, Ph.D., Professor *(Land, Air and Water Resources)*
Gang Sun, Ph.D., Associate Professor *(Textiles and Clothing)*
Ronald S. Tjeerdema, Ph.D., Professor *(Environmental Toxicology)*
Andrew L. Waterhouse, Ph.D., Professor *(Viticulture and Enology)*
Thomas M. Young, Ph.D., Associate Professor *(Civil and Environmental Engineering)*
Robert J. Zasoski, Ph.D., Professor *(Land, Air and Water Resources)*

Emeriti Faculty

Donald G. Crosby, Ph.D., Professor Emeritus
Al L. Tappel, Ph.D., Professor
John R. Whitaker, Ph.D., Professor
S. Haig Zeronian, Ph.D., D.Sc., Professor

Affiliated Faculty

Lowell L. Ashbaugh, Ph.D., Associate Researcher *(Crocker Nuclear Lab)*
Diane M. Barrett, Ph.D., Associate Specialist *(Food Science and Technology)*
Christian E. Butzke, Ph.D., Associate Specialist *(Viticulture and Enology)*
Teresa W.-M. Fan, Ph.D., Associate Researcher *(Land, Air and Water Resources)*
Terrell P. Salmon, Ph.D., Wildlife Damage Specialist *(Wildlife, Fish, and Conservation Biology)*
Carl K. Winter, Ph.D., Associate Specialist *(Food Science and Technology)*

Graduate Study. The Graduate Group in Agricultural and Environmental Chemistry offers programs of study and research leading to the M.S. and Ph.D. degrees. Study relates to the chemical and biochemical aspects of foods, wine, fibers/polymers, pesticides, and environmental pollution. Detailed information regarding graduate study may be obtained by writing the Group Chairperson.

Graduate Advisers: D.O. Adams *(Viticulture and Enology),* C.F. Shoemaker *(Food Science and Technology),* Y.-L. Hsieh *(Textiles and Clothing),* T. Shibamoto *(Environmental Toxicology),* T. Young *(Civil and Environmental Engineering),* R.J. Zasoski *(Land, Air, and Water Resources).*

Courses in Agricultural and Environmental Chemistry (AGC)

Graduate Courses

290. Seminar (1)
Seminar—1 hour. Selected topics in agricultural and environmental chemistry, presented by students. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
Prerequisite: consent of instructor. The chemistry and biochemistry of foods, nutritional chemicals, pesticides, and other special topics as they apply to agricultural and environmental chemistry.

299. Research (1-12)
Arrangements should be made well in advance with a faculty member of the Group in Agricultural and Environmental Chemistry. (S/U grading only.)

Agricultural Computing and Information Systems

See Applied Computing and Information Systems

Agricultural Education

(College of Agricultural and Environmental Sciences and School of Education)

Undergraduate Program. Various undergraduate majors can provide the preparatory subject matter to satisfy entrance requirements into the graduate teaching credential program. For questions relating to the undergraduate program and/or undergraduate preparation, contact Richard Engel 150 Mrak Hall (530-754-6249 or rrengel@ucdavis.edu).

Teaching Credential Subject Representative. You may make an appointment with a credential counselor and obtain a statement of the complete requirements for the credential at Lynn Martindale (530-754-6655 or lmartindale@ucdavis.edu). Because many majors in the college do not offer the minimum preparation necessary for entering the Agriculture Teaching Credential program, you should seek counseling as early as possible. See also teacher education credentialing.

Graduate Study. For graduate study, refer to the Graduate Announcement.

Graduate Adviser. C.J. Trexler.

Courses in Agricultural Education (AED)

Questions pertaining to the following courses should be directed to the instructor or Lynn Martindale 530-754-6655 or Richard Engel, 530-754-6249.

Lower Division Courses

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: lower division standing; consent of instructor. Supervised internship off and on campus in areas of agricultural education. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Concepts in Agricultural and Environmental Education (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: upper division standing. Philosophy and nature of formal and non-formal agricultural and environmental education programs. Emphasis on understanding the role of the teacher and observing a variety of programs. GE credit: SocSci, Wrt.—I. (I.) Martindale

160. Career and Technical Education (3)
Lecture—3 hours. Philosophy and organization of vocational education, with particular reference to educational principles for agriculture commerce, home economics, and industry. GE credit: SocSci, Wrt.—II. (II.)

171. Audiovisual Communications (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: upper division standing. Theory and principles of audiovisual communications. Comparison of audiovisual materials such as transparencies, slides, computer-generated graphics, and videos. Operation and use of audiovisual equipment is stressed.—II. (II.)

172. Multimedia Productions (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 171 recommended. Design and production of educational, technical, and professional multimedia presentations. Instructional or professional presentations using a variety of media, including slides, video, transparencies, and computer-generated graphics. Offered in alternate years. GE credit: SocSci, Wrt.—(III.)

190. Seminar in Agricultural Education (2)
Seminar—2 hours. Discussion of selected critical issues in agricultural education. May be repeated for credit with consent of instructor. (P/NP grading only.)—II. (II.)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: upper division standing; consent of instructor. Supervised internship off and on campus in areas of agricultural education. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Professional Courses

300. Directed Field Experience in Teaching (2)
Discussion—1 hour; field experience—3 hours. Prerequisite: course 100. Experience as teaching assistant in agriculture or home economics programs in public schools. May be repeated once for credit. (P/NP grading only.)—I, III. (I, III.)

301. Planning for Instructional Programs (3)
Lecture—3 hours. Prerequisite: course 100; course 300 (may be taken concurrently). Major paradigms in program planning and development. Emphasis on key steps in curriculum development, including selection and organization of educational objectives, learning experiences and teaching materials and resources.—II. (II.) Trexler

302. Teaching Methods in Agricultural Education (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: course 100, course 300 (may be taken concurrently). Development of teaching strategies with special emphasis on the designing of learning experiences, instructional execution, and use of teaching aids in agricultural education.—I. (I.)

306A. Field Experience with Future Farmers of America and Supervised Experience Programs (4)
Lecture/discussion—2 hours; field work—6 hours. Prerequisite: acceptance into the Teacher Education Program; course 306B (concurrently). Develop an understanding of the Future Farmers of America and supervised occupational experience programs through planning, conducting, and evaluating actual programs.—I, III. (I, III.)

306B. Field Experience in Teaching Agriculture (5-18)
Student teaching (corresponds with public school session). Prerequisite: acceptance into the Teacher Education Program; course 306A (concurrently); courses 100, 300, 301, 302. Directed teaching including supervision of occupational experience programs and youth activities in secondary schools or community colleges. May be repeated for credit up to a maximum of 18 units.—I, II, III. (I, II, III.)

323. Resource Development: Agricultural Education (3)
Lecture—3 hours. Prerequisite: courses 306A, 306B. Selection and implementation of community resources in teaching.—III. (III.)

390. Seminar: Issues in Agricultural Education (2)
Discussion/laboratory—4 hours. Prerequisite: acceptance into the Teacher Education Program and courses 306A-306B. Discussion and evaluation of current issues, theories and research in agricultural education. (S/U grading only.)—III. (III.)

Agricultural Management and Rangeland Resources

(College of Agricultural and Environmental Sciences)

Faculty. See under the departments of Agronomy and Range Science; Pomology; and Vegetable Crops.

The Major Program

This major is designed for students who are interested in understanding agricultural systems, their management, and their relationship to the environment. Courses are selected to provide an interdisciplinary background that encompasses both natural science and social science. Students will acquire a core understanding of agricultural production systems as managed ecosystems, how they function, how they interact with the natural environment and how they are intimately connected with human society and social changes. In addition, students will develop an area of specialization. Within the two areas of specialization, students chose between a broad-based education and one focused in selected areas.

The Program. The Sustainable Production Systems specialization covers food and agriculture production, agroecology, pest ecology and management, crop improvement and propagation. Students may also develop an emphasis in particular production areas such as agronomy, environmental horticulture, pomology, vegetable crops or viticulture. The Range and Natural Resources specialization emphasizes the theory and practice of natural resource management in grazed ecosystems.

All students gain practical experience through a combination of internships and practica. Students may also pursue an Honors thesis in their senior year.

Career Alternatives. Graduates from this program are prepared to pursue a wide range of careers, including various technical and management positions in agricultural and business enterprises; farming; consulting; private, state and federal agencies concerned with rangeland and natural resource management; Cooperative Extension; international development; teaching; agricultural and environmental journalism, information and communication services. Graduates are qualified to pursue graduate studies in the natural and social sciences, such as agroecology, environmental studies, pest management, education, business management.

B.S. Major Requirements:

UNITS

Written/Oral Expression.....8-12
See college English requirement 8
One of English 102A, 102B, 102C, 102D, 102E, 102F, 102G, or 104A, 104C, 104D, 104E, or 104F 4

Perspectives on Agriculture and the Environment.....13
Agricultural Management and Rangeland Resources 1 3
Agricultural Management and Rangeland Resources 2 4
Applied Biological Systems Technology 49 2
Animal Science 1 or 2 4

Preparatory Subject Matter 41-43
Biological Sciences 1A-1B 10
Chemistry 2A-2B 10
Physics 1A-1B or Physics 7A-7B..... 6-8
Mathematics 16A..... 3
Agricultural Management and Rangeland Resources 21 3
Agricultural Management and Rangeland Resources 120 or Statistics 13 or 102 ... 4
Economics 1A 5

Breadth/General Education 24

See General Education requirement.

Depth Subject Matter.....17-18
Agricultural Management and Rangeland Resources 150 or Environmental Science and Policy 100 or Plant Biology 117 or 142 4
Agricultural and Resource Economics 112 or 113 or 140 4-5
Agricultural Management and Rangeland Resources 101 3
Agricultural Management and Rangeland Resources 92, 99, or 137, or Applied Biological Systems Technology 145; International Agricultural Development 195A, 195B..... 3
Agricultural Management and Rangeland Resources 192, 199 3

Area of Specialization (choose one):

Sustainable Production Systems.....53-57
Includes food and agricultural production, agroecology, crop improvement, propagation, and pest management. Students may choose between a broad education in sustainable agriculture or focus on one or two areas of agriculture (e.g., agricultural management, agronomy, crop improvement, environmental horticulture, pest management, pomology, vegetable crops, viticulture).

Crop biology and ecology depth requirement must be met with Plant Biology 142.
Plant Biology 152 or Biological Sciences 101 4
Chemistry 8A, 8B 6
Agricultural Management and Rangeland Resources 105 3
Soil Science 100..... 4
Select courses from Agricultural Management and Rangeland Resources 107, 110A, 110B, 110C, 112, 134, 135, 150, 160, 170A, 170B; Environmental Horticulture 120, 125, 130, 133; Plant Biology 173, 174; Viticulture and Enology 101A, 101B, 101C, 111, 115, 116 12-16
Restricted elective courses chosen from the following groups with approval of the academic adviser.....(minimum 24 units)

Plant improvement and propagation
(Agricultural Management and Rangeland Resources 118; Biotechnology 171; Plant Biology 143, 152, 153, 154, 160, 171)

Plant physiology or plant nutrition
(Environmental Horticulture 102; Plant Biology 111, 146, 157, 158, 172, 175; Viticulture and Enology 110)

Atmospheric, soil or water science
(Atmospheric Science 133; Environmental and Resource Sciences 100; Hydrologic Science 110, 124; Soil Science 107, 109, 111)

Pest ecology and management
(Plant Biology 176, 177; Entomology 110, 135; Nematology 100; Plant Pathology 120; Viticulture and Enology 118)

Agricultural economics
(Agricultural and Resource Economics 100A, 120, 130, 147; International Agricultural Development 110)

Agricultural management
(Agricultural and Resource Economics 100B, 140, 145, 150, 157; Applied Biological Systems Technology 142, 147; Agricultural Management and Rangeland Resources 121)

Animal production
(Animal Science 41, 41L, 104)

Policy, social science and ethics
(Agricultural and Resource Economics 147, 176; Agricultural Management and Rangeland Resources 121; Economics 123; Environmental Science and Policy 161, 175; International Agricultural Development 103, 104; Plant Pathology 140; Political Science 107)

Unrestricted Electives 13-24

Range and Natural Resources 47-53
This specialization brings together courses that provide a unified understanding of the interaction between livestock production and environmental quality in rangelands.

Agricultural Management and Rangeland Resources 112, 121, 130, 131, 134, 135, Plant Biology 102 or 145 21-23
Soil Science 100..... 4
Environmental and Resource Sciences 100 or 121 or Hydrologic Science 141 or 143 4
Wildlife, Fish and Conservation Biology 110, 111, 120, 151 6-7
Animal Science 41, Nutrition 115 6
Agricultural Management and Rangeland Resources 180, Applied Biological Systems Technology 180, 182, or Hydrologic Science 182, 186 3-5
Environmental Science and Policy 172..... 4
Unrestricted Electives 17-30

Total Units for the Major 180
Major Adviser: T. Foin.

Advising Center located in 1220A Plant and Environmental Sciences (530-752-1715).

Minor Program Requirements:

UNITS

Agricultural Systems and Environment 18
Preparatory material: Statistics 13, 32, Agricultural Management and Rangeland Resources 120 or Sociology 42B, or the equivalent.
Select one of the two following tracks:
Sustainable Agriculture track
Agricultural Management and Rangeland Resources 105, 150, Plant Biology 142, Soil Science 100..... 15
Minimum of three units from the following: Agricultural Management and Rangeland Resources 107, 110A, 110B, 110C, 112, 170A, 170B 3
Range and Natural Resources track
Agricultural Management and Rangeland Resources 121, 130 7
Minimum of 11 units from the following: Agricultural Management and Rangeland Resources 131, 134, 135, 150, Environmental Science and Policy 123, 172 11

Minor Advisers: T.C. Foin *(Agronomy and Range Science),* K.J. Rice *(Agronomy and Range Science).*

Advising Center is located in 1220A Plant and Environmental Sciences.

Honors. The Senior Honors Thesis (Agricultural and Environmental Sciences 194H) includes two or three successive quarters of guided, scientific and/or scholarly research on an agricultural and/or environmental subject of special interest to the student. With adviser approval, the Senior Thesis can satisfy up to 12 units of restricted electives in the major.

Courses in Agricultural Management and Rangeland Resources (AMR)

(Formerly courses in Agricultural Systems and Environment.)

Lower Division Courses

1. Agriculture, Nature and Society (3)
Lecture—2 hours; discussion/laboratory—1 hour. Multiple perspectives and connections between the natural sciences, social sciences, and agriculture. Emphasis on agriculture's central position between nature and society and its key role in our search for a productive, lasting and hospitable environment. Several full-period field trips provide hands-on learning.—I. (I.) Gradziel

2. Botany and Physiology of Cultivated Plants (4)
Lecture—3 hours; discussion/laboratory—3 hours. Prerequisite: high school course in biology and chemistry recommended. A holistic introduction to the underlying botanical and physiological principles of cultivated plants and their response to the environment. Includes concepts behind plant selection, cultivation, and utilization. Laboratories include discussion and interactive demonstrations.—II. (II.) Saltveit, Marrush

21. Applications of Microcomputers in Agriculture (3)
Lecture—1.5 hours; laboratory/discussion—2 hours; autotutorial—2 hours. Prerequisite: high school algebra. Concepts of computing and applications using personal computers, spreadsheets, database management, word processing and communications. Not open for students who have completed Computer Science Engineering 15, 30, 35 or Engineering 5.—I, II, III. (I, II, III.) Laca, Geng

49. Organic Crop Production Practices (3)
Lecture—1 hour; discussion—1 hour; field work—3 hours. Principles and practices of organic production of annual crops. Topics include organic crop, soil, and pest management, cover cropping, composting, seeding, transplanting, irrigation, harvesting and marketing. Includes field trip(s). (P/NP grading only.)—I, III. (I, III.) Van Horn

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience on or off campus in all subject areas pertaining to agricultural and environmental sciences. Internship supervised by faculty member in the animal, plant, and environmental sciences. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Primarily intended for lower division students. (P/NP grading only.)

Upper Division Courses

101. Agriculture and the Environment (3)
Lecture—3 hours. Prerequisite: course 2 or consent of instructor. Interaction between agriculture and the environment. Principles required to analyze conflict and develop solutions to complex problems facing society.—II. (II.) Phillips

105. Concepts in Pest Management (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Biological Sciences 1C or course 2, Chemistry 8B. Introduction to the ecological principles of integrated pest management, biology of different classes of pests and the types of losses they cause, population assessment, evaluation of advantages and disadvantages of different techniques used for pest management, IPM programs.

107. Small Fruit Production (2)
Lecture—2 hours; two field trips arranged at mutual convenience. Prerequisite: Biological Sciences 1C or the equivalent. Strawberries (Fragaria), blackberries-raspberries (Rubus), blueberries-cranberries (Vaccinium) as important nutritional resources; their origin, production and utilization with emphasis on recent progress in integrated management. Offered in alternate years.—(II.) Shaw

110A. Principles of Agronomic Crop Production in Temperate and Tropical Systems (3)
Lecture—3 hours. Prerequisite: course in general botany or course 2 recommended. Fundamentals of field crop production in temperate and tropical climates. Resource utilization and economic, political and social problems are considered in relation to technological problems and their influences on agricultural development.—II. (II.) Travis, Rains

110B. Management of Agronomic Crops in Temperate and Tropical Systems (3)
Lecture—3 hours. Prerequisite: course in general botany or course 2; course 110A recommended. Application of agronomic principles in production of temperate and tropical crops. Specific crops discussed with reference to management and efficient use of physical and biological resources.—III. (III.) Travis, Rains

110C. Crop Management Systems for Vegetable Production (4)
Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 2; course 110A recommended. Horticultural principles applied to production and management systems for vegetable crops. Laboratory and discussion will illustrate efficient field management and resource use practices.—I. (I.) Bloom, Marrush

110L. Principles of Agronomy Laboratory (1)
Laboratory—3 hours. Prerequisite: course 110B (may be taken concurrently). Field-oriented introduction to principles of agronomic crop production.—III. (III.) Travis, Rains

112. Forage Crop Ecology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1C or consent of instructor. Forages as a world re-source in food production. Ecological principles governing the adaptation, establishment, growth and management of perennial and annual forages, including pastures, rangelands and hay; aspects of forage quality which affect feeding value to livestock. Offered in alternate years.—III. Teuber

118. Seed Production and Quality (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 1C; Plant Biology 152 recommended. Principles of crop seed production, storage and utilization. Biological and environmental factors influencing seed quality. Measurement and preservation of seed vigor and viability. Technological aspects of crop establishment from seeds. Laboratories include field trips to seed industry facilities. Offered in alternate years.—(III.) Bradford

120. Applied Statistics in Agricultural Science (4)
Lecture—3 hours; discussion/laboratory—2 hours. Prerequisite: upper division standing. Applications of statistical methods to the analysis and interpretation of research data in plant, animal, behavioral, food and nutritional sciences. Lectures cover basic concepts and statistical methods. Specialized laboratory sections cover procedures, data processing and interpretations. GE credit: SciEng.—I. (I.) Teuber

121. Systems Analysis in Agriculture and Resource Management (4)
Lecture—2 hours; discussion/laboratory—2 hours. Prerequisite: course 21 or equivalent computer experience, and Mathematics 16A. The process of systems analysis and dynamic simulation of biological and environmental systems, use of systems analysis for development of optimal management strategies for agricultural and environmental systems. GE credit: SciEng, Wrt.—I. (I.) Foin

122. Management of Information for the Agricultural and Environmental Sciences (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 21 or consent of instructor. Introduction to systems and technology for acquiring, storing,

manipulating and communicating various types of information including numerical data, text, graphics and multimedia images. Laboratory exercises introduce a wide variety of information management systems used in offices and laboratories.

130. Rangelands: Ecology, Conservation and Restoration (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1C; introductory ecology course and junior standing recommended. Introduction to the ecological principles and processes important for an understanding of the dynamics of range ecosystems. Emphasis on ecological and evolutionary concepts underlying management strategies for conserving biological diversity and environmental quality in rangelands. Offered in alternate years. GE credit: SciEng, Wrt.—(II.) Rice

131. Identification and Ecology of Grasses (2)
Lecture—7.5 hours; laboratory—20 hours; discussion—5 hours (total for course). Prerequisite: Biological Sciences 1C or course 2; Plant Biology 102 and junior standing recommended. Taxonomy and identification of western grasses. Development of skills in using plant identification keys. Ecology and evolution of grasses in grazing ecosystems. Given the week following spring quarter. Offered in alternate years.—III. Rice

134. Comparative Ecology of Major Rangeland Systems (3)
Lecture—3 hours; one Saturday field trip required. Prerequisite: course 130 or the equivalent; Environmental Studies 100 recommended. Study of vegetation structure, composition, and succession in North American rangeland communities. Description and comparison of interactions between vegetation and grazing animals on grassland, desert, forested, and tundra rangelands. Discussion of current rangeland management strategies.

135. Ecology and Community Structure of Grassland and Savannah Herbivores (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A or 1B and course 2, or Biological Sciences 1C; general ecology course (Environmental Studies 100) recommended. Feeding ecology of grassland herbivores and its importance in evolution of herbivore communities and social systems. Optimal foraging, interspecific interactions, and primary productivity are considered as factors structuring natural and managed grassland and savannah systems. Offered in alternate years. (Former course Range Science 135.)—(I.) Demment

137. Field Course in Rangeland Monitoring and Management (2)
Lecture—1 hour; fieldwork—3 hours (week-long intensive field course given the week following spring quarter). Prerequisite: course 2 or the equivalent; Plant Biology 102 and junior standing recommended. Introduction to rangeland vegetation monitoring methods and management strategies. Field sampling of vegetation composition and structure, soil status, and wildlife and fish habitat. Grazing management strategies to achieve desired future condition of rangelands.

150. Cropping Systems of the World (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or Biological Sciences 1C, and Soil Science 10. General concepts of the functioning of cropping systems as related to resource availability, energy flow, economic yield, sustainability and integration; means of increasing resource use efficiency; low and high input cropping systems in temperate and tropical zones.—II. (II.) van Kessel

160. Agroforestry: Global and Local Perspectives (3)
Lecture/discussion—3 hours. Prerequisite: course 2 or Biological Sciences 1C, Plant Biology 142 or a general ecology course (Environmental Science and Policy 100). Traditional and evolving use of trees in agricultural ecosystems; their multiple roles in environmental stabilization and production of food, fuel, and fiber; and socioeconomic barriers to the adoption and implementation of agroforestry practices. (Same course as International Agricultural Development 160.) Offered in alternate years.—I. Weinbaum

170A. Fruit and Nut Cropping Systems (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2, Biological Sciences 1C, or consent of instructor. Overview of production and handling systems of major pomological crops, analysis of current cultural and harvesting problems and concerns associated with commercial fruit growing. Offered in alternate years.—(I.) Gradziel

170B. Fruit and Nut Cropping Systems (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2, Biological Sciences 1C, or consent of instructor. Overview of production and handling systems of major pomological crops, including analysis of current cultural and harvesting problems and concerns associated with commercial fruit growing. Offered in alternate years.—(III.) Gradziel, McGranahan

180. Introduction to Geographic Information Systems (4)
Lecture—3 hours; laboratory/discussion—3 hours. Prerequisite: course 21 or equivalent familiarity with computers, course 120 or the equivalent, Mathematics 16A. Management and analysis of georeferenced data. Spatial database management and modeling. Applications to agriculture, biological resource management and social sciences. Cartographic modeling. Vector and raster-based geographic information systems. Not open for credit to students who have completed course 132. (Same course as Applied Biological Systems Technology 180.)—II. (I) Plant

190. Seminar on Alternatives in Agriculture (2)
Seminar—2 hours. Prerequisite: upper division standing. Seminar on topics related to alternative theories, practices and systems of agriculture and the relationship of agriculture to the environment and society. Scientific, technological, social, political and economic perspectives. (P/NP grading only.)—I, II. (II.) Van Horn

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Supervised internship on and off campus in agricultural and environmental sciences. (P/NP grading only.)

194H. Senior Honors Thesis (2-6)
Independent study. Prerequisite: Agricultural Systems and Environment major; senior standing; overall GPA of 3.25 or higher and consent of master adviser. Two or three successive quarters of guided research on an agriculturally related subject of special interest to the student. (P/NP grading only; deferred grading only, pending completion of thesis.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Agricultural and Managerial Economics

See Managerial Economics

Agricultural and Resource Economics

(College of Agricultural and Environmental Sciences)

James A. Chalfant, Ph.D., Chairperson of the Department

Department Office, 2118 Social Sciences and Humanities Building (530-752-1517)

Undergraduate Student Information, 1176 Social Sciences and Humanities Building (530-752-4932)

Graduate Student Information, 1176 Social Sciences and Humanities Building (530-752-6185)

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Faculty

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Julian M. Alston, Ph.D., Professor
Steven Blank, Ph.D., Lecturer
Stephen R. Boucher, Ph.D., Assistant Professor
Garland L. Brinkley, Ph.D., Lecturer
Bayford D. Butler, M.S., Lecturer
Leslie J. Butler, Ph.D., Lecturer
Hoy F. Carman, Ph.D., Professor
Colin A. Carter, Ph.D., Professor
James A. Chalfant, Ph.D., Professor
John Constantine, Ph.D., Lecturer
Roberta L. Cook, Ph.D., Lecturer
Y. Hossein Farzin, Ph.D., Professor
Rachael Goodhue, Ph.D., Assistant Professor
Richard D. Green, Ph.D., Professor
Shermain Hardesty, Ph.D., Lecturer
Arthur Havenner, Ph.D., Professor
Richard E. Howitt, Ph.D., Professor
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Hyunok Lee, Ph.D., Lecturer
Philip L. Martin, Ph.D., Professor
Catherine J. Morrison Paul, Ph.D., Professor
Quirino Paris, Ph.D., Professor
Ralph Pavey, B.S., Lecturer
Scott Rozelle, Ph.D., Professor
Richard J. Sexton, Ph.D., Professor
Lawrence E. Shepard, Ph.D., Senior Lecturer
Aaron D. Smith, Ph.D., Assistant Professor
Daniel A. Sumner, Ph.D., Professor
J. Edward Taylor, Ph.D., Professor
Steven A. Vosti, Ph.D., Adjunct Professor
Marilyn Whitney, Ph.D., Lecturer
James E. Wilen, Ph.D., Professor
Jeffrey Williams, Ph.D., Professor

Emeriti Faculty

Oscar R. Burt, Ph.D., Professor Emeritus
Harold O. Carter, Ph.D., Professor Emeritus
Benjamin C. French, Ph.D., Professor Emeritus
Dale M. Heien, Ph.D., Professor Emeritus
Warren E. Johnston, Ph.D., Professor Emeritus
Gordon A. King, Ph.D., Professor Emeritus
Sylvia Lane, Ph.D., Professor Emerita
Elmer W. Learn, Ph.D., Professor Emeritus
Samuel H. Logan, Ph.D., Professor Emeritus
Alexander F. McCalla, Ph.D., Professor Emeritus
Chester O. McCorkle, Jr., Ph.D., Professor Emeritus
Refugio I. Rochin, Ph.D., Professor Emeritus
Stephen H. Sosnick, Ph.D., Professor Emeritus

Major Program and Graduate Study. See the major in Managerial Economics; and for graduate study, see the Graduate Studies chapter in this catalog.

Major Advisers. Contact Student Services Office, 1176 Social Sciences and Humanities Building for a complete listing.

Related courses. See Environmental Biology and Management 110; Environmental Science and Policy 160, 168A, 168B, 173; and courses in Economics.

Courses in Agricultural and Resource Economics (ARE)

Lower Division Courses

1. Economic Basis of the Agricultural Industry (4)
Lecture—4 hours. Agriculture and man; the agricultural industry in U.S. and world economies; production and supply, marketing and demand; agricultural land, capital and labor markets; economic and social problems of agriculture in an urban and industrialized economy emphasizing California. GE credit: SocSci.—III. (III.)

15. Population, Environment and World Agriculture (4)
Lecture—3 hours; discussion—1 hour. Economic analysis of interactions among population, environment, natural resources and development of world agriculture. Introduces students to economic thinking about population growth, its causes and consequences for world food demand, and environmental and technological limits to increasing food supplies. GE credit: SocSci, Div, Wrt.—III. (I.)

18. Business Law (4)
Lecture—4 hours. Prerequisite: sophomore standing. General principles of business law in the areas of contracts, business organization, real property, uniform commercial code, sales, commercial paper, employment relations, and creditor-debtor against a background of the history and functioning of our present legal system.—I, II, III, summer. (I, II, III, summer.)

49A-49B-49C. Field Practice (1)
Discussion—1 hour; three field trips. Prerequisite: consent of instructor. Field trips and experiences to observe the various management aspects of Agricultural Production. Emphasis will be placed on developing the student's understanding and awareness of economics and management and their application in agricultural production. (P/NP grading only.)—I, II, III. (I, II, III.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100A. Intermediate Microeconomics: Theory of Production and Consumption (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A, 1B; Mathematics 16B. Theory of individual consumer and market demand; theory of production and supply of agricultural products, with particular reference to the individual firm; pricing, output determination, and employment of resources under pure competition. (Not open for credit to students who have completed Economics 100 or the equivalent; however, Economics 100 will not serve as prerequisite to course 100B.)—I, II, III. (I, II, III.)

100B. Intermediate Microeconomics: Imperfect Competition, Markets and Welfare Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A. Pricing, output determination, and employment of resources under conditions of monopoly, oligopoly, and monopolistic competition.—I, II, III. (I, II, III.)

106. Quantitative Methods in Agricultural Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A, Statistics 103. Statistical methods for analyzing quantitative agricultural economics data: linear and multiple correlation and regression analysis.—I, II, III. (I, II, III.)

112. Fundamentals of Business Organization (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: upper division standing or consent of instructor. The role of organizational design and behavior in business and public agencies. Principles of planning, decision making; individual behavior, motivation, leadership; informal groups; conflict and change in the organization.—I, III. (I, III.)

113. Fundamentals of Marketing Management (4)
Lecture—4 hours. Prerequisite: Economics 1A. For non-majors only. Nature of product marketing by the business firm. Customer-product relationships, pricing and demand; new product development and marketing strategy; promotion and advertising; product life cycles; the distribution system; manufacturing, wholesaling, retailing. Government regulation and restraints. (Not open for credit to students who have completed course 136.)—I. (I.)

115A. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A and 1B. Major issues encountered in emerging from international poverty, problems of growth and structural change, human welfare, population growth and health, labor markets and internal migration. Important issues of policy concerning international trade and industrialization. (Same course as Economics 115A.) GE credit: SocSci, Div.—I, II, III. (I, II, III.)

115B. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A and 1B. Major macroeconomic issues of developing countries. Issues include problems in generating capital, conduct of monetary and fiscal policies, foreign aid and investment. Important issues of policy concerning international borrowing and external debt of developing countries. (Same course as Economics 115B.) GE credit: SocSci.—II, III. (II, III.)

118. Tax Accounting (4)
Lecture—4 hours. Prerequisite: Management 11A, 11B; course 18 recommended. Development and application of a framework to understand the tax effects of typical management decisions on both entities and their owners. Impacts that different methods of taxation have on business entities with emphasis on tax planning, using income and deduction strategies, retirement plans, and choice of business entity for tax minimization.—III. (III.)

120. Agricultural Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A or the equivalent. Analytical treatment of historical and current economic problems and governmental policies influencing American agriculture. Uses of economic theory to develop historical and conceptual understanding of the economics of agriculture; how public policy influences the nature and performance of American agriculture. GE credit: SocSci.—III. (III.)

130. Agricultural Markets (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A. The nature, function, organizational structure, and operation of agricultural markets; prices, costs, and margins; market information, regulation, and controls; cooperative marketing.—III. (III.)

132. Cooperative Business Enterprises (3)
Lecture—3 hours. Prerequisite: Economics 1A. Study of cooperative business enterprise in the United States and elsewhere; economic theories of behavior, principles of operation, finance, decision-making, and taxation.—III. (III.)

135. Agribusiness Marketing Plan Development (2)
Lecture/discussion—2 hours. Prerequisite: upper division standing. Fundamental components required to develop a marketing plan. Appreciation of the concept of a marketing plan, appropriate research required, including the use of library and Internet, survey and interview instruments, government documents, market analysis, business proposition, action planning, financial evaluation and monitoring. (P/NP grading only.)—I. (I.)

136. Managerial Marketing (4)
Lecture—4 hours. Prerequisite: course 100A; Statistics 103. Application of economic theory and statistics in the study of marketing. Marketing measurement and forecasting, market planning, market segmentation, determination of optimal product market mix, sales and cost analysis, conduct of marketing re-search, marketing models and systems.—II, III. (II, III.)

138. International Commodity and Resource Markets (3)
Lecture—3 hours. Prerequisite: course 100A, Economics 100 or 104. Basic nature and scope of international trade in agricultural commodities, agricultural inputs, and natural resources. Market dimensions and policy institutions. Case studies to illustrate import and export problems associated with different regions and commodities.—II. (II.)

139. Futures and Options Markets (3)
Lecture—3 hours. Prerequisite: course 100A; Statistics 103. History, mechanics, and economic functions of futures and options markets; hedging; theory of inter-temporal price formation and behavior of futures and options prices; price forecasting; futures and options as policy tools.—I. (I, III.)

140. Farm Management (5)
Lecture—5 hours. Prerequisite: Economics 1A. Farm organization and resources; economic and technological principles in decision making; analytical techniques and management control; problems in organizing and managing the farm business.—II. (II.)

142. Personal Finance (3)
Lecture—3 hours. Prerequisite: Economics 1B. Management of income and expenditures by the household. Use of consumer credit, savings, and insurance by households. Principles of tax, retirement, and estate planning.—I, II, summer. (I, II, summer.)

143. Investments (3)
Lecture—3 hours. Prerequisite: course 142 or consent of instructor. Survey of investment institutions, sources of investment information, and portfolio theory. Analysis of the stock, bond and real estate markets from the perspective of the investor.—II. (II.)

144. Real Estate Economics (3)
Lecture—3 hours. Prerequisite: course 100A. The economic theory, analysis, and institutions of real estate markets and related financial markets. Case studies drawn from the raw land, single family, multi-family, industrial and office real estate markets.—III. (III.)

145. Farm and Rural Resources Appraisal (4)
Lecture/discussion—4 hours. Principles, procedures, and practice of the valuation process with specific emphasis placed on farm real estate. Concepts of value, description of land, identification of the major physical and economic determinants of value, the three primary appraisal approaches to valuation, discussion of appraisal activity and practice.—II. (II.)

146. Government Regulation of Business (3)
Lecture—3 hours. Prerequisite: course 100A or the equivalent. Variety, nature and impact of government regulation: anti-trust laws and economic and social regulation. Nature of the legislative process, promulgation of regulations, and their impact, especially as analyzed by economists. GE credit: SocSci.—I. (I.)

147. Resource and Environmental Policy Analysis (3)
Lecture—3 hours. Prerequisite: Economics 1A; enrollment open to non-majors only. Natural resource use problems with emphasis on past and current policies and institutions affecting resource use; determinants, principles, and patterns of natural resource use; property rights; conservation; private and public resource use problems; and public issues. (Students who have had or are taking course 100A, Economics 100, or the equivalent, may receive only 2 units of credit, so must enroll in course 147M instead.) GE credit: SocSci.—III. (III.)

147M. Resource and Environmental Policy Analysis (2)
Lecture—3 hours. Prerequisite: Economics 1A; enrollment open to non-majors only. Natural resource use problems with emphasis on past and current policies and institutions affecting resource use; determinants, principles, and patterns of natural resource use; property rights; conservation; private and public resource use problems; and public issues. (Students who have had or are taking course

100A, Economics 100, or the equivalent, must enroll in this course (for 2 units) rather than course 147.)—III. (III.)

150. Agricultural Labor (4)
Lecture—3 hours; discussion—1 hour. Importance of family and hired labor in agriculture; farm labor market; unions and collective bargaining in California agriculture; simulated collective bargaining exercise; effects of unions on farm wages and earnings. GE credit: SocSci, Div, Wrt.—I. (I.)

155. Quantitative Analysis for Business Decisions (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A; Statistics 103. Introduction to selected topics in management science and operations research: decision analysis for management, mathematical programming, competitive analysis, and others.—I, II, III. (I, II, III.)

156. Introduction to Mathematical Economics (4)
Lecture—4 hours. Prerequisite: courses 100A and 155; Mathematics 16C or 21C recommended (students should note that the formal mathematical content of this course is higher than other courses in the curriculum). Linear algebra for economists; necessary and sufficient conditions in static optimization problems; implicit function theorem; economic methodology and mathematics; comparative statics; envelope theorem; Le Chatelier principle; applications to production and consumer models.—I. (I.)

157. Analysis for Production Management (4)
Lecture—4 hours. Prerequisite: course 100A; Statistics 103. Application of economic theory and quantitative methods in analyzing production management problems including inventory control, production scheduling, quality control, simulation, systems approach, and work measurement.—II, III. (II, III.)

171A. Financial Management of the Firm (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106; Management 11A-11B. Financial analysis at the firm level: methods of depreciation; influence of the tax structure; inventory, cash, and accounts receivable management; sources of short-term and long-term financing, and financial problem solving using a computer spreadsheet program. Not open for credit to students who have completed Economics 134.—I, II. (I, II.)

171B. Financial Management of the Firm (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 171A. Financial analysis at the firm level: methods of capital budgeting; calculating the cost of capital; dividend policies; mergers and acquisitions; and special current topics in finance.—II, III. (II, III.)

175. Natural Resource Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B or Economics 100 or the equivalent. Economic concepts and policy issues associated with natural resources, renewable resources, (ground water, forests, fisheries, and wildlife populations) and non-renewable resources (minerals and energy resources, soil). (Same course as Environmental Science and Policy 175.) GE Credit: SocSci.—I. (I.)

176. Environmental Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B or Economics 100. Role of the environment in economic activity and methods for protecting and enhancing environmental quality; implications of market failures for public policy; design of environmental policy; theory of welfare measurement; measuring the benefits of environmental improvement. GE credit: SocSci.—II. (II.)

192. Internship (1-6)
Internship—3-18 hours. Internship experience off and on campus in all subject areas offered in the Department of Agricultural and Resource Economics. Internships are supervised by a member of the staff. (P/NP grading only.)

194HA-194HB. Special Study for Honors Students (4-4)
Independent Study—3 hours; seminar—1 hour. Prerequisite: Minimum GPA of 3.50; course 100B; courses 106 and 155 (may be taken concurrently); major in Agricultural and Managerial Economics or Managerial Economics; senior standing. A program of research culminating in the writing of a senior honors thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of sequence.)—I, II. (I, II.)

197T. Tutoring in Agricultural Economics (1-3)
Hours and duties will vary depending upon the course being tutored. Prerequisite: senior standing in Agricultural and Resource Economics and consent of Department Chairperson. Tutor will lead small discussion groups affiliated with one of the department's regular courses, under the supervision of, and at the option of the instructor in charge of the course. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200A. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: graduate standing. Linear and non-linear optimization theory applied to develop the theory of the profit-maximizing firm and the utility-maximizing consumer. (Same course as Economics 200A.)—I. (I.)

200B. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 200A. Characteristics of market equilibrium under perfect competition, simple monopoly and monopsony. Emphasis on general equilibrium and welfare economics; the sources of market success and market failures. (Same course as Economics 200B.)—II. (II.)

200C. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 200B. Uncertainty and information economics. Individual decision making under uncertainty. Introduction to game theory, with emphasis on applications to markets with firms that are imperfect competitors or consumers that are imperfectly in-formed. (Same course as Economics 200C.)—III. (III.)

202A. Introduction to Applied Research Methods (3)
Lecture/discussion—3 hours. Prerequisite: courses 204 and 256, or the equivalent; 200A concurrently. Study of philosophy and methodology of applied research in agricultural economics. Methods of conceptualization of researchable topics. Method of communication and constructive criticism.—I. (I.)

202B. Applied Microeconomics I: Consumer and Producer Behavior (3)
Lecture/discussion—3 hours. Prerequisite: courses 200A and 202A; course 200B concurrently. Application of consumer and producer theory in models of individual behavior and market-level phenomena. Implications of consumer and producer theory for specification of empirical models of supply and demand for inputs and outputs and market equilibrium displacement models.—II. (II.)

202C. Applied Microeconomics II: Welfare Analysis and Imperfect Competition (3)
Lecture/discussion—3 hours. Prerequisite: course 202B; course 200C concurrently. Methods of applied welfare economics with emphasis on problems arising in agriculture and the environment. Models of imperfectly competitive markets and their application to industries and institutions in the agricultural sector.—III. (III.)

204. Microeconomic Analysis (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: Economics 100 or courses 100A-100B and Mathematics 16A-16B; open to advanced undergraduates with consent of instructor. Economic reasoning and social choice: behavior of firms and households, theory of markets, partial and general equilibrium analysis, welfare economics, illustrations and applications. (Same course as Economics 204.)—I. (I.)

214. Development Economics (4)
Lecture—4 hours. Prerequisite: course 100A, 100B, Economics 101; course 204 and Economics 160A, 160B recommended. Re-view of the principal theoretical and empirical issues whose analysis has formed development economics. Analysis of economic development theories and development strategies and their application to specific policy issues in developing country contexts. (Same course as Economics 214.)—II. (II.)

215A. Microdevelopment Theory and Methods I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A or 204; course 240A recommended. Agricultural development theory, with a focus on microeconomics. Agricultural household behavior with and without imperfections and uncertainty. Analysis of rural land, labor, credit and insurance markets, institutions, and contracts. (Same course as Economics 215A.)—I. (I.)

215B. Open Macroeconomics of Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200A or 204, 200D or 205, and 214 or 215A. Models and policy approaches regarding trade, monetary and fiscal issues, capital flows and debt are discussed in the macroeconomic framework of an open developing country. The basic analytical focus is real exchange rate and its impact on sectoral allocation of resources. (Same course as Economics 215B.)—II. (II.)

215C. Microdevelopment Theory and Methods II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 215A. Extension of development theory and microeconomic methods. Agricultural growth and technological change; poverty and income inequality; multisectoral, including village and regional models. Computable general equilibrium methods and applications. (Same course as Economics 215C.)—III. (III.)

215D. Environment and Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A, 204 or 275. Interdisciplinary course drawing on theoretical and empirical research on interactions between environmental resource use and economic development processes. Analysis of issues emerging at the interface of environmental and development economics. (Same course as Economics 215D.)—III. (III.)

222. International Agricultural Trade and Policy (3)
Lecture—3 hours. Prerequisite: course 100B or 204; Economics 160A or the equivalent. Analysis of country interdependence through world agricultural markets. Partial equilibrium analysis is used to study the impacts of national intervention on world markets, national policy choice in an open economy and multinational policy issues. Offered in alternate years.—I. (I.)

231. Supply and Demand for Agricultural Products (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200A, 202A, and 240A or consent of instructor. Analysis of supply and demand for agricultural commodities emphasizing the effective use of microeconomic theory with econometric methods, and other empirical procedures, in conducting applied analysis of supply and demand at the firm and industry level.—II. (II.)

232. Agricultural Commodity Markets (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200A, 202A, and 240A or consent of instructor. Economic analysis of industries that produce, market, transport, store, and process basic commodities. Analysis of market equilibrium under perfect and imperfect competition, with and without government involvement.—I. (I.)

233. Agricultural Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200A, 202A, and 240A or consent of instructor. Nature, formation, evolution, and institutions of economic policy applied to food, agricultural, and rural issues. Examples for detailed consideration include food security, commodity issues, and trade policy. Analytical approaches include static and dynamic welfare analysis, policy design, and political-economic analysis.—III. (III.)

240A. Econometric Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 133 and a course in linear algebra or the equivalent. Least squares, instrumental variables, and maximum likelihood estimation and inference for single equation linear regression model; linear restrictions; hetero-skedasticity; autocorrelation; lagged dependent variables. (Same course as Economics 240A.)—II. (II.)

240B. Econometric Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240A. Topics include asymptotic theory and instrumental variables, pooled time-series cross-section estimation, seemingly unrelated regression, classical hypothesis tests, identification and estimation of simultaneous equation models, cointegration, error-correction models, and qualitative and limited dependent variable models. (Same course as Economics 240B.)—III. (III.)

240C. Econometric Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240B. Finite sampling theory; nonlinear and dynamic econometric models; asymptotic distribution theory. (Same course as Economics 240C.)—I. (I.)

240D. Topics in Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240B. Advanced topics in nonlinear econometric modeling. Contents may vary from year to year. (Same course as Economics 240D.)—III. (III.)

240E. Topics in Applied Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 240A and 240B. Examination of modern econometric techniques used in applied fields of economic research, such as demand analysis, environmental economics, macroeconomics/finance, etc. Emphasis on selection of appropriate tools for individual fields. Course focus will expand topics covered in courses 240A and 240B. (Same course as Economics 240E.)—III. (III.)

252. Applied Linear Programming (4)
Lecture—3 hours; discussion—1 hour. Applied linear programming methods emphasizing uses for business decisions: production, diet, blending, network and related problems.—II. (II.)

253. Optimization Techniques with Economic Applications (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200C. Optimization techniques and methods including linear and nonlinear programming. Empirical applications to household, firm, general equilibrium and economic growth problems.—(I.)

254. Dynamic Optimization Techniques with Economic Applications (4)
Lecture—4 hours. Prerequisite: course 253 and elementary knowledge of ordinary differential equations. Necessary and sufficient conditions in the calculus of variations and optimal control, economic interpretations, the dynamic envelope theorem and transversality conditions, infinite horizon problems and phase diagrams, local stability and comparative statics of the steady state, comparative dynamics.—II. (II.)

255. Advanced Topics in Economic Dynamics (3)
Lecture—3 hours. Prerequisite: course 254. Local stability analysis, steady state comparative statics and comparative dynamics, dynamic duality theory and the principle of optimality, differential games, numerical solution of deterministic and stochastic dynamic models using GAMS, stochastic optimal control, plus other advanced topics in economic dynamics. Offered in alternate years.—III. (III.)

256. Applied Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106, Economics 140 or the equivalent, or consent of instructor. Application of statistical tools to economic and business analysis. Emphasis on regression analysis, problems of specification, and model development. (Same course as Economics 256.)—II. (II.)

258. Demand and Market Analysis (3)
Lecture—3 hours. Prerequisite: courses 204 and 256 or consent of instructor. Quantitative and theoretical analysis of the factors affecting supply, demand and price determination for agricultural products. Emphasis on analytical tools for assessing the impacts of changes in government policies and macroeconomic variables.—III. (III.)

275. Economic Analysis of Resource and Environmental Policies (4)
Lecture/discussion—4 hours. Prerequisite: course 204/Economics 204. Development of externality theory, market failure concepts, welfare economics, theory of renewable and non-renewable resource use, and political economic models. Applications to policy issues regarding the agricultural/environment interface and managing resources in the public domain. (Same course as Environmental Science and Policy 275.)—III. (III.)

276. Environmental Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 204 or consent of instructor. Applications of externality theory to the design of efficient environmental policies. Evaluation of pollution control policy instruments in light of information limitations and market imperfections. Methods for nonmarket valuation of the benefits of environmental improvement.—I. (I.)

277. Natural Resource Economics (4)
Lecture—4 hours. Prerequisite: course 254 or consent of instructor. Application of capital theory and dynamic methods to issues of optimal use of renewable and nonrenewable resources. Examination of policy issues associated with forests, fisheries, groundwater, energy resources, watersheds, soil, global climate, and wildlife.—III. (III.)

290. Topics in Agricultural and Resource Economics (3)
Lecture—3 hours. Selected topics in agricultural and resource economics, focusing on current research. May be repeated 4 times for credit. Not offered every year.—I, II, III. (I, II, III.)

293. Analysis of California Agriculture and Resources (3)
Lecture—1.5 hours; fieldwork—45 hours total of field trip, including one 5-day summer field trip. Review and analysis of production, marketing, and resource issues facing agricultural firms in California. Application of economic theory and measurement to individual firm and industry decisions in an applied setting. (S/U grading only.)—II. (II.)

293M. Analysis of California Agriculture and Resources (2)
Lecture—0.5 hours; fieldwork—45 hours total, including one 5-day summer field trip. Prerequisite: Ph.D. level standing. Review and analysis of production, marketing, and resource issues facing agricultural firms in California. (S/U grading only.)—II. (II.)

298. Directed Group Study (1-5)
Advanced study through special seminars, informal group studies, or group research on problems for analysis and experimentation. Sections: (1) Managerial Economics; (2) Agricultural Policy; (3) Community and Regional Development; (4) Natural Resources; (5) Human Resources; (6) Research Methods and Quantitative Analysis.

299. Individual Study (1-12)
Sections: (1) Managerial Economics; (2) Agricultural Policy; (3) Community and Regional Development; (4) Natural Resources; (5) Human Resources; (6) Research Methods and Quantitative Analysis; and (7) Dissertation Research Prospectus. (S/U grading only.)

299D. Special Study for Doctoral Dissertation (1-12)
(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Agricultural Systems and Environment

See Agricultural Management and Rangeland Resources

Agronomy

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Agronomy and Range Science.

Major Program. See the major in Agricultural Management and Rangeland Resources.

Graduate Study. A program of study is offered leading to the M.S. degree in Horticulture and Agronomy. Information may be obtained in the Advising Office at 140 Environmental Horticulture. Also see the Graduate Studies chapter of this catalog.

Graduate Adviser. R. Plant.

Related Courses. Agronomy and Range Science faculty also teach the following courses that contribute to majors and graduate programs in Agricultural Management and Rangeland Resources, Ecology, Genetics, International Agricultural Development, and Plant Biology:

Agricultural Management and Rangeland Resources 21, 101, 110A, 110B, 110L, 112, 120, 121, 122, 130, 131, 134, 135, 137, 150, 180, 190; Ecology 207; International Agricultural Development 202N; Plant Biology Graduate Group 225; Plant Biology 116, 142, 143, 146, 152, 161A.

Courses in Agronomy (AGR)

Questions pertaining to the following courses should be directed to the instructor or to the Advising Center, Plant and Environmental Sciences.

Lower Division Course

92. Agronomy Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Internship on or off campus in all subject areas pertaining to agronomy. Internships supervised by a member of the faculty. (P/NP grading only.)

Upper Division Courses

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Internship on or off campus in all subject areas pertaining to agronomy. Internships supervised by a member of the faculty. (P/NP grading only.)

197T. Tutoring in Agronomy (1-5)
Tutorial—1-5 hours. Prerequisite: course to be tutored or the equivalent, upper division standing and consent of instructor. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. May be repeated for up to 8 units of credit. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: 6 upper division units of agronomy. (P/NP grading only.)

Graduate Courses

205. Experimental Design and Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural Systems and Environment 120 or the equivalent. Graduate students in agricultural and environmental sciences will be introduced to the research process and statistical methods to plan, conduct and interpret experiments. Not open for credit to students who have completed course 205A. (Former course 205A.)—II. (II.) Dubcovsky

206. Multivariate Systems and Modeling (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural Systems and Environment 120 or the equivalent. Graduate students in the biological and environmental sciences will be presented multiple regression, multivariate and computer modeling methods needed to conduct research experiments and analyze multivariate data systems. Not open for credit to students who have completed course 205B. (Former course 205B.)—III. (III.) Laca

211. Principles and Practices of HPLC (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: undergraduate physics and chemistry; Biological Sciences 102, 103 recommended. Principles and theory of HPLC involving various modes of separation and detection. Optimization of separation using isocratic and gradient elution. Develop practical knowledge about the use, maintenance and troubleshooting of HPLC equipment, including HPLC columns. Development of new HPLC methods.—III. (III.) Goyal

221. Advanced Plant Breeding (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 205; Genetics Graduate Group 201D or Animal Genetics 107; Plant Science 113. Philosophy, methods, and problems in developing improved plant species. Topics include: inbreeding, heterosis, progeny testing, breeding methodology, index selection, germplasm conservation, and breeding for stress resistance. Laboratories include tours of breeding facilities and calculation and interpretation of quantitative data. Offered in alternate years.—(III.) Teuber

290. Seminar in Agronomy and Range Science (1-2)
Seminar—1-2 hours. Topics of current interest related to plant growth, plant breeding, and the production, management, and utilization of cultivated food, feed, and fiber crops. (S/U grading only.)—I, II, III. (I, II, III.)

297T. Tutoring in Agronomy (1-5)
Tutoring—1-5 hours. Prerequisite: graduate standing; consent of instructor; and course to be tutored or the equivalent. Designed for graduate students who desire teaching experience but are not teaching assistants. May be repeated for credit for a total of 5 units. Same course may not be tutored more than one time. (S/U grading only.)

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Professional Courses

396. Teaching Assistant Training Practicum (1-4)
(S/U grading only.)

Agronomy and Range Science

(College of Agricultural and Environmental Sciences)
Chris van Kessel, Ph.D., Chairperson of the Department
Department Office, 1210 Plant and Environmental Sciences (530-752-1703)
http://agronomy.ucdavis.edu/agronomy

Faculty

Montague W. Demment, Ph.D., Professor
R. Ford Denison, Ph.D., Professor
Jorge Dubcovsky, Ph.D., Professor
Jan Dvorak, Ph.D., Professor
Theodore C. Foin, Jr., Ph.D., Professor
Shu Geng, Ph.D., Professor
Paul L. Gepts, Ph.D., Professor
Judy Jernstedt, Ph.D., Professor
Emilio A. Laca, Ph.D., Associate Professor
Donald A. Phillips, Ph.D., Professor
Richard E. Plant, Ph.D., Professor
D. William Rains, Ph.D., Professor
Kevin J. Rice, Ph.D., Professor
VenKatesan Sundaresan, Ph.D., Professor
Larry R. Teuber, Ph.D., Professor
Robert L. Travis, Ph.D., Professor
Chris van Kessel, Ph.D., Professor
Thea A. Wilkins, Ph.D., Professor

Emeriti Faculty

R. William Breidenbach, Ph.D., Lecturer Emeritus
Ivan W. Buddenhagen, Ph.D., Professor Emeritus
William J. Clawson, M.S., Lecturer Emeritus
Ray C. Huffaker, Ph.D., Professor Emeritus
Subodh K. Jain, Ph.D., Professor Emeritus
Milton B. Jones, Ph.D., Lecturer Emeritus
Horton M. Laude, Ph.D., Professor Emeritus
William C. Liebhardt, Ph.D., Lecturer Emeritus
William M. Longhurst, Ph.D., Professor Emeritus
Robert S. Loomis, Ph.D., Professor Emeritus
Vern L. Marble, Ph.D., Lecturer Emeritus
Duane S. Mikkelsen, Ph.D., Professor Emeritus
Y. P. Puri, Ph.D., Lecturer Emeritus
Calvin O. Qualset, Ph.D., Professor Emeritus
Charles A. Raguse, Ph.D., Professor Emeritus
Charles W. Schaller, Ph.D., Professor Emeritus
Raymond C. Valentine, Ph.D., Professor Emeritus
Barbara D. Webster, Ph.D., Professor Emeritus

Affiliated Faculty

Shane T. Ball, Ph.D., Specialist
Melvin, R. George, Ph.D., Lecturer
Sham S. Goyal, Ph.D., Lecturer
James E. Hill, Ph.D., Lecturer
Robert B. Hutmacher, Ph.D., Associate Specialist, Agronomist
Leland F. Jackson, Ph.D., Lecturer
Stephen R. Kaffka, Ph.D. Lecturer
Daniel H. Putnam, Ph.D., Lecturer
Frederick J. Sundstrom, Ph.D., Academic Administrator
Kenneth W. Tate, Ph.D., Lecturer
Steven R. Temple, Ph.D., Lecturer

Courses. See the Agricultural Management and Rangeland Resources, Agronomy, Plant Biology, and the Range Science course listings.

American Studies

(College of Letters and Science)
Jay Mechling, Ph.D., Program Director
Program Office, 2134A Hart Hall (530-752-3377; e-mail: americanstudies@ucdavis.edu)
http://cougar.ucdavis.edu/ams

Committee in Charge

Carolyn Thomas de la Peña, Ph.D. *(American Studies)*
Nicole R. Fleetwood, Ph.D. *(American Studies)*
Laura Grindstaff, Ph.D. *(Sociology)*
Milmon Harrison, Ph.D. *(African American and African Studies)*
Jay Mechling, Ph.D. *(American Studies)*
Michael L. Smith, Ph.D. *(American Studies)*
Eric Smoodin, Ph.*D. (American Studies)*
Julie Sze, Ph.*D. (American Studies)*
Patricia Turner, Ph.D. *(African American and African Studies, American Studies)*
Jon Wagner, Ph.D. *(Education)*

Faculty

Carolyn Thomas de la Peña, Ph.D., Assistant Professor
Nicole R. Fleetwood, Ph.D., Assistant Professor
Jay Mechling, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Michael L. Smith, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Eric Smoodin, Ph.D., Professor
Julie Sze, Ph.D., Assistant Professor
Patricia Turner, Ph.D., Professor

Emeriti Faculty

David Scofield Wilson, Ph.D., Senior Lecturer Emeritus

Affiliated Faculty

Eric Schroeder, Ph.D., Lecturer, *Academic Federation Excellence in Teaching Award*

The Major Program

American Studies offers an alternative approach to the study of American experience for students who feel too limited by departmental approaches. Lower division, introductory classes explore the ways in which cultural systems shape and reflect life in the United States. These classes pay close attention to the ways in which differences of class, race, gender, generation, ethnicity, religion, and sexual orientation unevenly affect American lives.

The Program. American Studies majors take seven upper division, in-depth classes and seminars devoted to close study of major thinkers and of issues crucial to the practice of American Studies. Advanced work in at least two other departments or programs allows each student to emphasize a period, a problem, or a subject tailored to his or her own individual education goals. Students have the option of writing a senior thesis within this emphasis.

Career Alternatives. As an interdisciplinary program, American Studies provides a good liberal arts and sciences undergraduate education. American Studies maximizes a student's contact with a variety of subject matter and approaches. Graduates have moved into a broad range of career settings, including journalism, law, medicine, nursing, law enforcement, teaching, environmental planning, library science, museum curatorship, and business. Some students discover new career possibilities through their internships in American institutions.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**24**
One lower division American Studies course	4
One course from African American and African Studies 10, Asian American Studies 1, Chicana/o Studies 10 or 50, or Native American Studies 10	4
One course from Women's Studies 20, 50, or 70	4
Two courses from History 17A, 17B, 72A, 72B	8
One course from English 30A, 30B	4
Depth Subject Matter	**44**
American Studies 100, 111, 115, 120, and 160	20
American Cultural Themes, choose any two courses from the 120, 130, 140, or 150 series	8
Emphasis	16

In consultation with an American Studies adviser, the student designs a program of 16 units of upper division course work around a unifying theme, period, or subject matter in American cultures. The course work should come from at

least two disciplines or interdisciplinary programs. The student may choose the senior thesis option (190A-190B) for 8 of these 16 units.

Total Units for the Major 68

Recommended
Completion of the college requirement in English composition before enrollment in American Studies 190A.

Minor Program Requirements:

UNITS

American Studies 20
American Studies, upper division courses 20
No more than 8 units of course 192 may be counted toward this total.

Faculty Advisers. C de la Peña, N. Fleetwood, J. Mechling, M. Smith, E. Smoodin, J. Sze.

Teaching Credential Subject Representative. J. Mechling. See also the Teacher Education Program.

Courses in American Studies (AMS)

Lower Division Course

1A. Science and American Culture (4)
Lecture—3 hours; discussion—1 hour. American science as a cultural system. Mutual influence and interaction of that system with other cultural systems including religion, social thought, art, architecture, literature, music, and common sense. GE credit: ArtHum, Div, Wrt.—I. Mechling

1B. Religion in American Lives (4)
Lecture—3 hours; discussion—1 hour. Religions and spiritual practices in the United States, and their interrelationships with other aspects of U.S. history, society and culture; indigenous and imported faiths, and the impact of immigration, colonization and culture contact on religious systems. GE credit: ArtHum or SocSci, Div, Wrt.—I. (I.)

1C. American Lives Through Autobiography (4)
Lecture—3 hours; discussion—1 hour. American culture as understood through the individual life stories told by Americans, with attention to the roles of gender, race, ethnicity, social class, and sexual orientation in the individual's life course. GE credit: ArtHum or SocSci, Div, Wrt.—II.

1E. Nature and Culture in America (4)
Lecture—3 hours; fieldwork—3 hours. Uses and abuses of nature in America; patterns of inhabitation, exploitation, appreciation, and neglect; attention to California; emphasis on metaphor as a key to understanding ourselves and the natural world; attention to models of healing: stewardship, ecology, the "rights" movement. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—III. Smith

4. Freshman Seminar (2)
Seminar—2 hours. Prerequisite: open only to students who have completed fewer than 40 quarter units. Investigation of a special topic in American Studies through shared readings, discussions, written assignments, and special activities (such as fieldwork, site visits). Emphasis on student participation in learning. Limited enrollment.—II, III. (II, III.)

5. Technology in American Lives (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: completion of Subject A requirement. Technology as both a material cultural force and a symbol in American culture; the lives of engineers at work and play; images of the engineer and technology in popular culture; social political and ethical issues raised by technology. GE credit: ArtHum or SocSci, Wrt.—I. (I.) Smith

10. Introduction to American Studies (4)
Lecture—3 hours; discussion—1 hour. United States history, culture and society. Examination of cultural objects and social practices. Topics include popular culture (film, TV, Internet), cultural diversity, social activism, play, and communication. GE credit: ArtHum or SocSci, Div, Wrt.—III. de la Peña

21. Objects and Everyday Life (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: completion of subject A requirement. Material culture (objects and artifacts ranging from everyday objects like toys and furnishings to buildings and constructed landscapes) as evidence for understanding the everyday (vernacular) lives (gender, social class, ethnicity, region, age, and other factors; collecting and displaying material culture; commodity capitalism) of individuals and communities in colonial North America and the United States. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I. de la Peña

30. Images of America and Americans in Popular Culture (4)
Lecture—3 hours; discussion—1 hour. Investigation of verbal and visual discourses about American identity in various popular culture products, including film, television, radio, music, fiction, art, advertising, and commercial experiences; discourses about the United States in the popular culture of other societies. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—(I.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Individual Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

100. Interdisciplinary Skills (4)
Lecture/discussion—3 hours; term paper. Design and implementation of interdisciplinary research, analysis and writing for American Studies and other cultural studies fields. Library and Internet research skills, project/problem definition, methods of study of texts, individuals, communities. Hands-on, skill-building, focused reading, discussion.—I. (I.)

101A-H. Special Topics (4)
Seminar—3 hours, intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors. Content will vary according to the instructor and in accord with the following titles: **(A)** Popular Culture Studies; **(B)** Women's Studies; **(C)** Material Aspects of American Culture; **(D)** American National Character; **(E)** American Lives Through Autobiography; **(F)** The Interrelationship Between Arts and Ideas; **(G)** New Directions in American Culture Studies; **(H)** Problems in Cross-Cultural American Studies. May be repeated for credit in different subject area only.—I, II, III. (I, II, III.)

110. A Decade in American Civilization (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: one of courses 1A, 1B, 1C, 1D, 1E or 1F. Close examination of a single decade in American civilization; the connections between the history, literature, arts, customs, and ideas of Americans living in the decade. Issues and representations of race, class, gender, age, and sexuality in the decade. May be repeated for credit if decades studied are different. GE credit: ArtHum or SocSci, Div, Wrt.—I. (I.)

111. Theories and Practices of Everyday Life in the United States (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division status; preparatory courses for the American Studies major or the equivalent interdisciplinary experience. Introduction to the cultural studies theories and to critical practices that seek to understand everyday life in the United States, with special attention to uncovering the vernacular theories governing these practices.—I. (I.)

115. Living in Bodies: Body Politics in the United States (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division status; preparatory courses for the American Studies major or the equivalent interdisciplinary experience. Examination of human bodies as sites for cultural constructions of identities and "selves" in the United States; attention to bodily norms, crises, and transgressions; the relation between disciplining the body and controlling social categories, including race, gender, class and sexualities.—II. (II.)

120. American Folklore and Folklife (4)
Lecture—3 hours; fieldwork—1 hour. Theory and method of the study of American folk traditions, including oral lore, customs, music, and material folk culture; the uses and meanings of those traditions in various folk communities, including families, ethnic institutions, voluntary organizations, and occupational groups GE credit: ArtHum or SocSci, Div, Wrt.—III. (III.) Mechling

125. Corporate Cultures (4)
Lecture—2 hours; discussion—1 hour; fieldwork—1 hour. Prerequisite: one course chosen from course 120, Anthropology 2, Psychology 16, or Sociology 1; or consent of instructor. Exploration of the small group cultures of American corporate workplaces, including the role of environment, stories, jokes, rituals, ceremonies, personal style, and play. The effects of cultural diversity upon corporate cultures, both from within and in contact with foreign corporations.—III. (III.) de la Peña

130. American Popular Culture (4)
Lecture/discussion—3 hours; fieldwork—1 hour. Prerequisite: course 1 or upper division standing. American popular expression and experience as a cultural system, and the relationship between this system and elite and folk cultures. Exploration of theories and methods for discovering and interpreting patterns of meaning in American popular culture. GE credit: ArtHum or SocSci, Div, Wrt.—II. (II.)

132. Critical Approaches to Media Culture (4)
Lecture/discussion—4 hours; film viewing—2 hours. Critical approaches to the study of contemporary media culture, focusing specifically on film, television, computer, and print media and their products and on the various interrelationships between media and U.S. culture. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—II. (II.)

133. Rhetoric of Media on Social Issues (4)
Lecture/discussion—4 hours. An introduction to rhetorical analysis of social issues as depicted within media culture, with specific emphasis on the way media frame messages about new social problems. Not open to students who have taken Rhetoric and Communication 124. Offered in alternate years. GE credit: SocSci, Div, Wrt.—(III.)

139. Feminist Cultural Studies (4)
Lecture/discussion—4 hours. Prerequisite: one course in Women's Studies or American Studies. The histories, theories, and practices of feminist traditions within cultural studies. (Same course as Women's Studies 139.) GE credit: SocSci, Div, Wrt.—III. (III.)

151. American Landscapes and Places (4)
Lecture—2 hours; discussion—1 hour; fieldwork—3 hours. Prerequisite: course 1, upper division standing. Comparative study of several American cultural populations inhabiting a region, including their relationship to a shared biological, physical, and social environment, their intercultural relations, and their relationships to the dominant American popular and elite culture and folk traditions. GE credit: ArtHum or SocSci, Div, Wrt.—II. (II.)

152. The Lives of Children in America (4)
Lecture—2 hours; discussion—2 hours. Experience of childhood and adolescence in American culture, as understood through historical, literary, artistic, and social scientific approaches. GE credit: ArtHum or SocSci, Div, Wrt.—III. (III.) Mechling

153. The Individual and Community in America (4)
Lecture—2 hours; discussion—2 hours. Interdisciplinary examination of past and present tensions between the individual and the community in American experience, as those tensions are expressed in such cultural systems as folklore, public ritual, popular entertainment, literature, fine arts, architecture, and social thought. GE credit: ArtHum or SocSci, Div, Wrt.—II. (II.)

154. The Lives of Men in America (4)
Lecture—2 hours; discussion—2 hours. Interdisciplinary examination of the lives of boys and men in America, toward understanding cultural definitions of masculinity, the ways individuals have accepted

or resisted these definitions, and the broader consequences of the struggle over the social construction of gender. GE credit: ArtHum or SocSci, Div, Wrt.—I. (I.) Mechling

155. Symbols and Rituals in American Life (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 1. Interdisciplinary examination of selected, richly expressive events (parades, festivals, holidays) and symbols (flags, memorials, temples) which en-code nationwide values and understandings (Thanksgiving, New Year's, etc.) or which realize more limited, special meanings (Mardi Gras, rodeo, Kwanza, graduation, bar mitzvah, etc.). Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—III. de la Peña

156. Race, Culture and Society in the United States (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 1. Interdisciplinary examination of the significance of race in the making of America; how race shapes culture, identities and social processes in the United States; the interweaving of race with gender, class and nationhood in self and community. GE credit: ArtHum or SocSci, Div, Wrt.—II. (II.)

157. Animals in American Culture (4)
Lecture—3 hours, discussion—1 hour. Animals as symbols in American thought, as found in folklore, popular culture, literature, and art; customs and stories around human-animal interactions, including hunting, religion, foodways, pets, zoos, circuses, rodeos, theme parks, and scientific research on animals. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—III. Mechling

158. Technology and the Modern American Body (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Technocultural Studies 1 and either course 1A or 5. The history and analysis of the relationships between human bodies and technologies in modern society. Dominant and eccentric examples of how human bodies and technologies influence one another and reveal underlying cultural assumptions. (Same course as Technocultural Studies 158.) GE credit: ArtHum.—I, III. de la Pena

160. Undergraduate Seminar in American Studies (4)
Seminar—3 hours; term paper. Prerequisite: open to junior and senior American Studies majors only. Intensive reading, discussion, research, and writing by small groups in selected topics of American Studies scholarship; emphasis on theory and its application to American material. Limited enrollment. May be repeated once for credit when content differs.—II, III. (II, III.)

190A. Senior Thesis Research Seminar (4)
Seminar—2 hours; extensive writing. Prerequisite: senior standing in American Studies major. Research and prospectus writing for senior thesis.—I. (I.)

190B. Senior Thesis (4)
Independent study—12 hours. Prerequisite: senior standing in American Studies major and course 190A. In consultation with advisor, student writes an extended research paper on a topic proposed in course 190A.—I, II, III. (I, II, III.)

192. Internship in American Institutions (1-12)
Internship—1-12 hours. Prerequisite: enrollment dependent on availability of intern positions, with priority to American Studies majors. Supervised internship and study within and about key organizations in American civilization at archives, museums, schools, historical societies, governmental and social agencies, etc., with attention to the techniques of participant observation and the collection of ethnographical data. May be repeated for credit for a total of 12 units. (P/ NP grading only.)

197T. Tutoring in American Studies (1-5)
Tutorial—1-5 hours. Prerequisite: consent of Chairperson of American Studies Program. Tutoring in lower division American Studies courses, usually in small discussion groups. Periodic meetings with the instructor in charge; reports and readings. May be repeated for credit when the tutoring is for a different course. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor and chairperson of American Studies Program. (P/NP grading only)

Graduate Courses

207. The Critical Study of Whiteness (4)
Seminar—4 hours. Prerequisite: Graduate standing in social science, humanities, arts, or cultural studies. Critical study of the emergence and significance of the social and racial status "whiteness" and its cultural practices. The colonial context for emergence of whiteness, its centrality to class, race, gender formation, and to social, cultural, legal, and educational processes. Offered in alternate years.—II.

220. American Folklore and Folklife (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Theory and methods for the study of the folklore and the folk customary behavior of Americans; contributions of folklore studies to scholarship in humanities and social science disciplines.—III. (III.) Mechling, Turner

250. Cultural Study of Masculinities (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Interdisciplinary approaches to understanding the social and cultural construction of masculinities; attention to the effects of biology, gender, race, class, sexual and national identities; criticism of oral, printed, visual, and mass mediated texts, and of social relations and structures. (Same course as Women's Studies 250.)—II. Newton, Mechling

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Individual Study (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Anatomy

See Anatomy, Physiology, and Cell Biology (Veterinary Medicine, School of); and Cell Biology and Human Anatomy (Medicine, School of)

Anatomy, Physiology, and Cell Biology

See Veterinary Medicine, School of

Anesthesiology and Pain Medicine

See Medicine, School of

Animal Behavior (A Graduate Group)

Judy Stamps, Ph.D., Chairperson of the Group

Group Office, 310 Life Sciences Addition
(530-752-4863; Fax: 530-752-8822;
e-mail: swalvarado@ucdavis.edu)

http://www.dbs.ucdavis.edu/gradgroups/ab

Faculty. The Group includes faculty from 11 departments in three schools and colleges.

Graduate Study. The Ph.D. program in Animal Behavior is an interdepartmental program that trains students for teaching and research in a variety of areas, including anthropology, animal science, ecology, entomology, neurobiology, psychology, physiology, veterinary science, wildlife biology, and zoology. Students choose one of the five areas of specialization: (1) ethology and evolutionary bases of animal behavior, (2) physiological basis of animal behavior, (3) behavior and conservation of wild animals, (4) behavior and management of domestic animals, and (5) integrative studies. All five specializations emphasize the adaptive and evolutionary bases of animal behavior. Resources available to students, in addition to various departmental facilities, include those of the California Regional Primate Research Center, Bodega Marine Laboratory, and the Agricultural Field Stations.

There is an early application deadline of December 15 for fall quarter.

Preparation. Appropriate preparation is a bachelor's or master's degree in a discipline relevant to the biology of behavior. In addition, at least one course from each of the following areas must be taken before admission into the program or before the end of the first year in the program.

Ecology: e.g., Evolution and Ecology 101, Environmental Science and Policy 100
Genetics: e.g., Biological Sciences 101
Statistics: e.g., Statistics 102 or Psychology 103
Evolution: e.g., Evolution and Ecology 100
Animal behavior: Neurobiology, Physiology and Behavior 102
Physiology: e.g. Neurobiology, Physiology and Behavior 100

Core Requirements. Students take two "breadth" courses, at least one course in statistics, a methodology and grant writing course, and a graduate seminar. Required courses:

Comparative psychology: Psychology 250
Methodology and grant writing: Animal Behavior 201
Advanced statistics: Psychology 204A, 204B, 204C, or 204D, Statistics 106, 108, 138, 205, Agronomy 205, 206
Graduate seminars: Animal Behavior 290

Strongly recommended: a course on teaching science: Biological Sciences 310, Psychology 390A, 390B

Strongly recommended: at least one additional course in statistics or modeling. In addition to the above listed courses, modeling courses include Population Biology 231 and Psychology 128.

We also strongly recommend that students increase their breadth of training in animal behavior by taking at least one additional required course from the track other than their chosen track.

12 additional units should be taken in the specialty track that you choose.

Specialization. In addition to the requirements listed above, students must also take courses in one of the three areas of specialization with substitution as approved by the adviser.

Courses in Animal Behavior (ANB)

Graduate Courses

201. Scientific Approaches to Animal Behavior Research (3)
Lecture—3 hours. Prerequisite: consent of instructor. Philosophical issues, goals, strategies and tools in field and laboratory research. May be repeated for credit when topics differ.—III. (III.)

210. History of Animal Behavior (1)
Discussion—1 hour. Prerequisite: consent of instructor. Classic, seminal papers in animal behavior. Discussion of readings and broader historical context in which papers were written. (S/U grading only.)—I. Capitanio

221. Animal Behavior, Ecology and Evolution (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 102, Evolution and Ecology 100, 101 or the equivalent, graduate standing, and consent of instructor. The interface between animal behavior, ecology and evolution. New developments in behavioral ecology and development and testing of hypotheses in this discipline. (Same course as Population Biology 221.)—Stamps

230A. Interdisciplinary Approaches to Animal Behavior (3)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Analysis of literature in behavior and an allied discipline or disciplines that offer the potential, in combination, to advance the understanding of a topic in animal behavior conceptually and empirically. Topics will vary from year to year.—II. (II.)

230B. Interdisciplinary Approaches to Animal Behavior (5)
Workshop—4 days total; discussion—3 hours; term paper. Prerequisite: course 230A the previous quarter. Development of an empirical or theoretical interdisciplinary approach to research on a current topic in animal behavior.

270. Research Conference in Behavioral Ecology (1)
Conference—1 hour. Prerequisite: graduate standing and consent of instructor. Critical presentation and evaluation of current literature and ongoing research in behavioral ecology. Limited enrollment. May be repeated for credit. (S/U grading only.)—II, III. (II, III.)

287. Advanced Animal Behavior (2)
Seminar—2 hours. Prerequisite: graduate standing and consent of instructor, courses in animal behavior (Neurobiology, Physiology, and Behavior 102 or the equivalent), and either evolution (Evolution and Ecology 100 or the equivalent) or ecology (Evolution and Ecology 101 or the equivalent). Reading, reports and discussion on current topics in animal behavior, with a focus on topics that lie at the interface between animal behavior, ecology and evolution. (Same course as Population Biology 287.) May be repeated twice for credit.—III. Stamps

290. Seminar in Animal Behavior (1-3)
Seminar—1-3 hours. Prerequisite: consent of instructor. Selected topics in animal behavior. (S/U grading only.)—I, II, III. (I, II, III.)

294. Seminar in Behavioral Ecology of Predators and Prey (3)
Seminar—2 hours. Prerequisite: graduate standing. Presentation and analysis of research papers on social and foraging behavior of predatory animals, antipredator strategies of prey species, co-evolution of predators and prey, and ecology of predator prey interactions. May be repeated twice for credit. (Same course as Wildlife, Fish, and Conservation Biology 294.) Offered in alternate years.—II. Caro

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor.

299. Research (1-12)
Prerequisite: and consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Animal Biology

(College of Agricultural and Environmental Sciences)

Faculty. Faculty includes members of the Departments of Animal Science; Entomology; Nematology; and Wildlife, Fish, and Conservation Biology.

The Major Program

The Animal Biology major offers students training in the biological and natural sciences as they apply to animals. The major covers the basic biological sciences that explain animal evolution, systematics, ecology, physiology and molecular biology. Students are not restricted to the study of a particular group of animals. Emphasis is on biological principles that can be used in research or in solving societal problems associated with animals in agriculture, urban areas, or natural environments.

The Program. The Animal Biology major consists of core courses in the biological sciences that build an understanding of animal biology from the molecular to the ecological and evolutionary levels of organization. After completing these core courses, students have the option of specializing in various interdisciplinary aspects of animal biology, and plan their chosen emphasis of study as part of a required discussion course and in consultation with their adviser. The Animal Biology major emphasizes courses on biological principles as opposed to courses on animal care and husbandry. This program includes a senior thesis, which each student designs to bridge the disciplines of the major.

Internships and Career Alternatives. The program and interests of each student in solving societal problems guides him or her to logical internship and career choices. On- and off-campus internship opportunities are available in research laboratories, in field situations, with governmental agencies, with private industry, and in international programs. A degree in Animal Biology prepares students for careers in research, teaching, governmental regulation, health or agriculture as each relates to the integrative biology or ecology of animals. Careers in veterinary medicine, animal husbandry and animal management are open to Animal Biology majors, however, other preparation may be required. Students in the major gain research experience and may choose to continue their training at the graduate or professional level in a variety of biological disciplines.

B.S. Major Requirements

UNITS

English Composition Requirement..... 8
See College requirement

Preparatory Subject Matter 69-74
Biological Sciences 1A-1B-1C 15
Chemistry 2A-2B-2C, 8A-8B or 118A-118B 21-23
Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C 9-12
Physics 7A-7B-7C 12
Statistics 13 or 100 or 102 or Agricultural Management and Rangeland Resources 120 4
Animal Biology 50A, 50B, 50C 8

Breadth/General Education 24

Depth Subject Matter..... 36-39
Biological Sciences 101 4
Animal Biology 102 and 103 or Biological Sciences 102 and 103 6-10
One from Neurobiology, Physiology, and Behavior 101, 117; Entomology 102; Wildlife, Fish, and Conservation Biology 121 3-5
One from Anatomy, Physiology and Cell Biology 100; Entomology 101; Neurobiology, Physiology, and Behavior 123..... 3-4
Evolution and Ecology 100..... 4
One from Environmental Science and Policy 100, 121; Evolution and Ecology 101, 102 4
Animal Biology 187..... 2
Animal Biology 189 and 189D..... 4-6

Restricted Electives 25
Focused specialty as outlined in the student's major proposal (from course 187) with approval of an adviser. 18 of these units must be selected from courses offered by divisional faculty in any of the following departments: Animal Science; Entomology; Nematology; Wildlife, Fish, and Conservation Biology.

Unrestricted Electives..... 10-18

Total Units for the Major 180

Master Adviser. B. W. Wilson

Advising Center for the major, including peer advising, is located in 1202 Meyer Hall, (530) 754-7915.

Courses in Animal Biology (ABI)

Lower Division Courses

50A. Animal Biology Laboratory (2)
Lecture/laboratory—4 hours. Scientific methods for answering questions in animal biology by doing exercises to demonstrate hypothesis testing and reporting, short laboratory, population and field experiments. Maintain notebooks, analyze data, interpret results and write reports.—I. (I.) Kimsey

50B. Animal Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, Biological Sciences 1B (may be taken concurrently). Basic biological disciplines important to an understanding of practical animal biology issues including the evolution of animal groups, genetic mechanisms, animal physiology as it relates to maintenance and production, and aspects of comparative anatomy, behavior and ecology.—II. (II.) Caswell-Chen, Page

50C. Animal Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1B, 1C, courses 50A, 50B. Animal management and conservation. Societal concerns arising from management and conservation issues, including economics, aesthetics, regulations, safety, public perspectives and advocacy.—III. (III.) Woodroffe

92. Internship in Animal Biology (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Office, laboratory or fieldwork off or on campus in research, governmental regulation, policy making, and private enterprise dealing with animal related issues of production, welfare, pest management, biodiversity and the environment. All requirements of Internship Approval Request form must be met. (P/NP grading only.)

98. Directed Group Study (1-5)
(P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

102. Animal Biochemistry and Metabolism (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: Chemistry 2A-2B, 8A-8B. Water and biological buffers; thermodynamics of metabolism; structure and function of biomolecules; enzyme kinetics and function; membrane biology; digestion and absorption; carbohydrate metabolism. Not open for credit to students who have completed Biological Sciences 102.—I. (I.) Calvert

103. Animal Biochemistry and Metabolism (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 102. Physiological function and metabolism of lipids and amino acids; integrative metabolism;

biochemical basis for nutrient requirements; structure and function of vitamins; mineral metabolism and requirements. Not open for credit to students who have completed Biological Sciences 103.—II. (II.) Calvert

187. Animal Biology Seminar (2)
Seminar—1 hour; discussion—1 hour. Prerequisite: junior standing, courses 50A, 50B, 50C. Seminar leading to development of the Major Proposal for the Animal Biology major.—I. (I.) Granett, Wilson

189. Senior Practicum (2)
Independent study—6 hours. Prerequisite: junior standing, courses 50A, 50B, 50C, and 187; course 189D concurrently the first time course 189 is taken. The practicum may be an experimental research project, a library research project or some other creative activity that will serve as a capstone experience for the Animal Biology major. May be repeated once for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

189D. Senior Practicum Discussion (1)
Discussion—1 hour. Prerequisite: junior standing, courses 50A, 50B, 50C, and 187; course 189 required concurrently. Course helps prevent or solve problems during the students' senior practicum activity. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship in Animal Biology (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Office, laboratory or fieldwork off or on campus in research, governmental regulation, policy making, and private enterprise dealing with animal related issues of production, welfare, pest management, biodiversity and the environment. All requirements of Internship Approval Request form must be met. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Animal Genetics

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Animal Science.

Major Program. See the major in Animal Science.

Related Courses. See Agronomy 221; Biological Sciences 101, 101D; Evolution and Ecology 102, 175; Genetics Graduate Group courses; Microbiology 150, 170, 215, 260, 274, 292; Molecular and Cellular Biology 121, 141, 160L, 161, 162, 163, 164, 178, 182, 221C, 257, 262, 263; Neurobiology, Physiology, and Behavior 131; Plant Biology 151, 152, 154, 161A, 161B; Plant Pathology 215X, 217; Vegetable Crops 220.

Courses in Animal Genetics (ANG)

Questions pertaining to the following courses should be directed to the instructor or to the Animal Science Advising Center, 1202 Meyer Hall (530-754-7915).

Upper Division Courses

101. Animal Cytogenetics (3)
Laboratory/discussion—1 hour; laboratory—6 hours. Prerequisite: Biological Sciences 101, 102 or the equivalent. Principles and techniques of cytogenetics applied to animal systems; chromosome harvest techniques, analysis of mitosis and meiosis, karyotyping, chromosome banding, cytogenetic mapping, chromosome structure and function, comparative cytogenetics.—III. Delany

105. Horse Genetics (2)
Lecture—2 hours. Prerequisite: course 15 and Biological Sciences 101. Coat color, parentage testing, medical genetics, pedigrees, breeds, the gene map and genus Equus. Emphasis on understanding horse genetics based on the unity of mammalian genetics and making breeding decisions based on fundamental genetic concepts.—(III.)

107. Genetics and Animal Breeding (5)
Lecture—4 hours; laboratory—3 hours. Prerequisite: Biological Sciences 101. Principles of quantitative genetics applied to improvement of livestock and poultry. Effects of mating systems and selection methods are emphasized with illustration from current breeding practices.—I. (I.) Medrano

111. Molecular Biology Laboratory Techniques (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1C, 101, 102, 103. Introduction to the concepts and techniques used in molecular biology; the role of this technology in both basic and applied animal research, and participation in laboratories using some of the most common techniques in molecular biology.—II. (II.) Murray, Williamson, Kueltz

120. Introduction to Statistical Genomics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, Agricultural Management and Rangeland Resources 120 or Statistics 100 or 102. Statistical concepts associated with genomics. Linkage analysis and grouping, theory and methods for identifying quantitative trait loci, and algorithms useful in genomics.—III. (III.) Famula

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. Selected topics relating to animal genetics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

204. Theory of Quantitative Genetics (3)
Lecture—3 hours. Prerequisite: course 107 or the equivalent. Theoretical basis of quantitative genetics and the consequences of Mendelian inheritance. Concepts used to estimate quantitative genetic differences and basis for partitioning the phenotypic variance. Offered in alternate years.—III.

206. Advanced Domestic Animal Breeding (3)
Lecture—3 hours. Prerequisite: course 107 and Animal Science 205; course 204 recommended. Procedures for the genetic evaluation of individuals to include selection indices and mixed model evaluation for single and multiple traits. Methods of estimating genetic trends. Offered in alternate years.—III. Famula

208. Estimation of Genetic Parameters (3)
Lecture—3 hours. Prerequisite: course 107 and Animal Science 205; courses 204 and 108 recommended. General methods for the estimation of components of variance and covariance and their application to the estimation of heritability, repeatability and genetic correlations are considered. Specific emphasis is given to procedures applicable to livestock populations under selection.

211. Genetic Engineering of Animals (2)
Lecture—1 hour; lecture/discussion—1 hour. Review of techniques for the genetic engineering of animals and their limitations and applications. Student-led discussions of recent papers in the field and possible future applications of genetically engineered animals in basic research and applied agricultural and medical research. Offered in alternate years. (S/U grading only.)—(III.) Murray

212. Sequence Analysis in Molecular Genetics (2)
Lecture/laboratory—2 hours. Prerequisite: Biological Sciences 101 or the equivalent, graduate standing or consent of instructor. The use of computer algorithms and online databases to analyze nucleic acid and protein sequences in molecular genetics research. Offered in alternate years.—II. Medrano

298. Group Study (1-5)
Prerequisite: consent of instructor. Lectures and discussions of advanced topics in animal genetics. (S/U grading only.)

299. Research in Animal Genetics (1-12)
(S/U grading only.)

Animal Physiology

See Animal Biology; Animal Science; Biological Sciences—Neurobiology, Physiology and Behavior; and Physiology (A Graduate Group)

Animal Science

(College of Agricultural and Environmental Sciences)

Gary B. Anderson, Ph.D., Chairperson of the Department

C. Christopher Calvert, Ph.D., Vice Chairperson of the Department

James R. Millam, Ph.D., Vice Chairperson of the Department

Department Office, 2223 Meyer Hall (530-752-1250)

http://animalscience.ucdavis.edu

Undergraduate Advising, 1202 Meyer Hall (530-754-7915)

Graduate Advising, 1202 Meyer Hall (530-752-2382) http://asac.ucdavis.edu

Bodega Marine Laboratory (707-875-2211); P.O. Box 247, Bodega Bay, CA, http://www-bml.ucdavis.edu/index.html

Faculty

Thomas E. Adams, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Gary B. Anderson, Ph.D., Professor, *Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement*
Patricia J. Berger, Ph.D., Professor
C. Christopher Calvert, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Ernest S. Chang, Ph.D., Professor *(Biological Sciences, Bodega Marine Laboratory)*
Douglas E. Conklin, Ph.D., Associate Professor
Mary E. Delany, Ph.D., Associate Professor
Edward J. DePeters, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Serge I. Doroshov, Ph.D., Professor
John M. Eadie, Ph.D., Professor
James G. Fadel, Ph.D., Professor
Thomas R. Famula, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Silas S. O. Hung, Ph.D., Professor
Annie J. King, Ph.D., Professor
Dietmar Kueltz, Ph.D., Associate Professor
Kirk C. Klasing, Ph.D., Professor
Yu-Bang Lee, Ph.D., Professor
Juan F. Medrano, Ph.D., Professor
Joy A. Mench, Ph.D., Professor
James R. Millam, Ph.D., Professor
James D. Murray, Ph.D., Professor
Anita M. Oberbauer, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Wolfgang Pittroff, Ph.D., Assistant Professor
Kathryn Radke, Ph.D., Associate Professor
Janet F. Roser, Ph.D., Professor
Roberto D. Sainz, Ph.D., Associate Professor
Wesley W. Weathers, Ph.D., Professor
Barry W. Wilson, Ph.D., Professor
Richard A. Zinn, Ph.D., Professor

Emeriti Faculty

Ursula K. Abbott, Ph.D., Professor Emerita
Hans Abplanalp, Ph.D., Professor Emeritus
C. Robert Ashmore, Ph.D., Professor Emeritus
R. Leland Baldwin, Jr., Ph.D., Professor Emeritus
G. Eric Bradford, Ph.D., Professor Emeritus
Wallis H. Clark, Jr., Ph.D., Professor Emeritus
Perry T. Cupps, Ph.D., Professor Emeritus
Graham A. E. Gall, Ph.D., Professor Emeritus
William N. Garrett, Ph.D., Professor Emeritus
F. Howard Kratzer, Ph.D., Professor Emeritus
Robert C. Laben, Ph.D., Professor Emeritus

Glen P. Lofgreen, Ph.D., Professor Emeritus
Edward O. Price, Ph.D., Professor Emeritus
Robert W. Touchberry, Ph.D., Professor Emeritus
Pran N. Vohra, Ph.D., Professor Emeritus

Affiliated Faculty

Steven L. Berry, D.V.M., Specialist in Cooperative Extension
Francine A. Bradley, Ph.D., Lecturer and Specialist in Cooperative Extension
Fred S. Conte, Ph.D., Lecturer and Specialist in Cooperative Extension
Ralph A. Ernst, Ph.D., Lecturer and Specialist in Cooperative Extension
Elizabeth A. Maga, Ph.D., Assistant Researcher
Bernard P. May, Ph.D., Adjunct Professor
Deanne Meyer, Ph.D., Associate Specialist in Cooperative Extension
Frank M. Mitloehner, Ph.D., Assistant Specialist in Cooperative Extension
James W. Oltjen, Ph.D., Lecturer and Specialist in Cooperative Extension
Peter H. Robinson, Ph.D., Specialist in Cooperative Extension
Alison L. Van Eenennaam, Ph.D., Assistant Specialist in Cooperative Extension
Dana B. Van Liew, M.Ed., Lecturer, Academic Federation Excellence in Teaching Award
Gideon Zeidler, Ph.D., Specialist in Cooperative Extension

The Major Program

The Animal Science major is devoted to the sciences central to understanding biological function of domestic and captive animals including birds, their care, management, and utilization by people for food, fiber, companionship and recreation. Advances in science and technology, and an ever growing human population, have increased the complexity of issues surrounding the care and management of animals. Specializations within the major allow students to develop a scientific appreciation of animals and their relationship to their environment. Graduates in Animal Science are able to advance the science and technology of animal care in an objective and effective manner for the betterment of animals and society.

The Program. The curriculum provides depth in the biological and physiological sciences and allows students to specialize within the broad field of applied animal science. Study begins with introductory courses in animal science, biology, chemistry, mathematics, and statistics. Students undertake advanced courses in animal behavior, biochemistry, genetics, nutrition, and physiology and the integration of these sciences to animal function, growth, reproduction, and lactation. Students complete the curriculum by choosing a specialization in either an animal science discipline (behavior, biochemistry, genetics, nutrition, or physiology) or in the sciences particular to a class of animals (aquatic, avian, companion, captive, equine, laboratory, livestock, dairy, or poultry).

Career Alternatives. A wide range of career opportunities are available to graduates. The primary goal of the major is to prepare students for graduate study leading to the M.S. and Ph.D. degree; for continued study in a professional school such as veterinary medicine, human medicine or dentistry; for careers in research, agricultural production, farm and ranch management, or positions in business, sales, financial services, health care, agricultural extension, consulting services, teaching, journalism, or laboratory technology.

B.S. Major Requirements:

UNITS

Written and Oral Expression 0-8
See College requirement

Preparatory Subject Matter 56- 61
Animal Science 1, 2, 41, 41L..... 12
Biological Sciences 1A, 1B, 1C..... 15
Chemistry 2A, 2B and 8A, 8B or 118A, 118B 16-18
Agricultural Management and Rangeland Resources 21 or Computer Science Engineering 15..... 3-4
Mathematics 16A, 16B or 17A, 17B or 21A, 21B..... 6-8
Agricultural Management and Rangeland Resources 120 or Statistics 100..... 4
Note: Some professional and graduate schools may require additional preparatory subject matter. Please consult the advising center.

Breadth/General Education 24
See General Education requirement

Depth Subject Matter..... 38-42
Biology (Biological Sciences 101; Animal Genetics 107; Animal Biology 102, 103; Neurobiology, Physiology, and Behavior 101)..... 24
Integrative Animal Biology (Animal Science 123, 124, and Neurobiology, Physiology and Behavior 121 and 121L)..... 12
Laboratory (Select one from the following: Animal Genetics 111; Animal Science 106 or 136 and 137; Microbiology 102L; Molecular and Cellular Biology 120L or 160L; Neurobiology, Physiology, and Behavior 101L or 104L; Pathology, Microbiology, and Immunology 126L)..... 2-6

Area of Specialization 20-23
Choose one area of specialization below; the program of study must be approved in advance by your faculty adviser.

Animal Science with a Disciplinary Focus.... 20
Select 20 upper division units, with approval from your faculty adviser, to form a coherent series of courses in one of the following disciplines: animal behavior, biochemistry, genetics, nutrition, or physiology.

Aquatic Animals 20
Animal Science 18 and 131; Nutrition 124; and Animal Science 118 or 119.
Select additional units from any Animal Genetics or Animal Science course, or other courses approved by your faculty adviser.
Students in this specialization must take Animal Science 136 and 137 to meet their Laboratory Depth Subject Matter requirement.
Students in this specialization may elect to substitute any of Biological Sciences 104, Evolution and Ecology 112, or Wildlife, Fish, and Conservation Biology 120 and 121 for the 12-unit requirement under Integrative Animal Biology, with approval of your faculty adviser.

Avian Sciences 20
Avian Sciences 13, 100, 150; Nutrition 123, 123L.
Select additional upper division units from any Animal Genetics, Animal Science, or Avian Sciences courses or other courses approved by your adviser.
Students in this specialization must substitute Avian Sciences 103, 121, and Neurobiology, Physiology and Behavior 117 for the Animal Science 124 and Neurobiology, Physiology, and Behavior 121 and 121L requirement under Integrative Animal Biology.

Companion and Captive Animals 20
Animal Science 42, 142; Nutrition 122 or 123 and 123L; Animal Science 170 or Veterinary Medicine 170.
Select additional units from any Animal Genetics, Animal Science or Avian Sciences course, or from Nutrition 115, 122, 123, 123L or other courses approved by your faculty adviser.

Equine Science 20
Animal Science 15, 115, 141 and one of Animal Science 125, 126 or 127.
Select additional units from any Animal Genetics or Animal Science course, or from Nutrition 115, 122, 123, 123L or other courses approved by your faculty adviser.

Laboratory Animals..... 23
Animal Science 42, 103, 140, Nutrition 123, 123L, Animal Science 104 or Neurobiology, Physiology, and Behavior 102, and Anatomy, Physiology, and Cell Biology 100 or Neurobiology, Physiology, and Behavior 123.

Livestock and Dairy..... 20
Select two of Animal Science 143, 144, 146; Animal Science 145 or 147; Nutrition 115.
Select additional upper division units from any Animal Genetics, Animal Science or Avian Sciences course, or from Nutrition 122, 123, 123L or other courses approved by your faculty adviser.

Poultry 20
Avian Sciences 11, 100, 150; Animal Science 143; Avian Science 149 or Food Science and Technology 121; Nutrition 123, 123L.
Select additional upper division units from any Animal Genetics, Animal Science, Avian Sciences, or other courses approved by your faculty adviser.
Students in this specialization must substitute Avian Sciences 103, 121, and Neurobiology, Physiology, and Behavior 117 for the Animal Science 124 and Neurobiology, Physiology, and Behavior 121 and 121L requirement under Integrative Animal Biology.

Unrestricted Electives..... 23-42

Total Units for Degree 180

Master Adviser. T. R. Famula

Advising Center for the major, including peer advising, is located in 1202 Meyer Hall, 530-754-7915. Students must secure their faculty adviser through this office upon entering the major.

Minor Program Requirements

The Department of Animal Science offers five minor programs open to students majoring in other disciplines who wish to complement their study programs with a minor in Animal Science. Some courses have required prerequisites not included as part of the minor, and students should plan accordingly.

UNITS

Animal Science—Animal Biology 20
Animal Science 15, 42, 41 and 41L, or 41 and 21..... 3-4
Animal Science 103 or 104..... 3-4
Animal Science 123, 124, or Neurobiology, Physiology and Behavior 121 and 121L 4
Additional upper division courses..... 8-10
Select additional units to complete the 20-unit total from upper division Animal Science courses, Animal Genetics courses, Neurobiology, Physiology, and Behavior 121, 121L, Nutrition 115, 122, 123, 123L. Variable unit courses (92, 99, 192, 197T, 198, 199) are not allowed for the completion of this requirement.

Animal Science—Animal Genetics 20
Animal Science 15, 42, 41 and 41L, or 41 and 21..... 3-4
Animal Genetics 107, 111..... 9
Additional upper division courses..... 7-8
Select additional units to complete the 20-unit total from upper division Animal Science courses, Animal Genetics courses, Avian Science 103, Neurobiology, Physiology, and Behavior 121, 121L, Nutrition 115, 122, 123, 123L. Variable unit courses (92, 99, 192, 197T, 198,

199) are not allowed for the completion of this requirement.

Animal Science—Aquaculture 20
Animal Science 18..... 4
Animal Science 118, 119..... 8
Additional upper division courses..... 8
Select additional units to complete the 20-unit total from upper division Animal Science courses, Animal Genetics courses, Applied Biological Systems Technology 161, Nutrition 124, Wildlife, Fish, and Conservation Biology 121. Variable unit courses (92, 99, 192, 197T, 198, 199) are not allowed for the completion of this requirement.

Animal Science—Dairy/Livestock..... 20
Animal Science 41 and 41L or 21 4
Animal Science 104..... 4
Additional upper division courses..... 12
Select 4 or 8 units from Animal Science 143, 144, 146.
Select additional units to complete the 20-unit total from upper division Animal Science courses, Animal Genetics courses, Neurobiology, Physiology, and Behavior 121, 121L, Nutrition 115, 122, 123, 123L. Variable unit courses (92, 99, 192, 197T, 198, 199) are not allowed for the completion of this requirement.

Animal Science—Equine 21
Animal Science 15..... 3
Animal Science 103 or 104 3-4
Animal Science 115, 141..... 8
Animal Science 125 or 126 3
One additional upper division course 2-3
Select from upper division Animal Science courses, Animal Genetics courses, Neurobiology, Physiology, and Behavior 121, 121L, Nutrition 115, 122, 123, 123L. Variable unit courses (92, 99, 192, 197T, 198, 199) are not allowed for the completion of this requirement.

Minor Adviser. T. R. Famula.

Graduate Study. The Department of Animal Science offers a program of study and research leading to the M.S. degree. Admission to a second Master's degree, Master of Agriculture and Management (M.A.M.) is currently suspended. Detailed information may be obtained by contacting the Advising Center.

Graduate Adviser. D.E. Conklin.

Courses in Animal Science (ANS)

Lower Division Courses

1. Domestic Animals and People (4)
Lecture—3 hours; laboratory—3 hours. Animal domestication and factors affecting their characteristics and distribution. Animal use for food, fiber, work, drugs, research and recreation; present and future roles in society. Laboratory exercises with beef and dairy cattle, poultry, sheep, swine, laboratory animals, fish, horses, meat and dairy products. GE credit: SciEng, Wrt.—I. (I.) Famula

2. Introductory Animal Science (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 1 and Biological Sciences 1A recommended. Growth, reproduction, lactation, inheritance, nutrition, and disease control in domesticated animals and species used in aquaculture; the application of sciences to animal production. GE credit: SciEng, Wrt.—III. (III.) Pittroff

15. Introductory Horse Husbandry (3)
Lecture—3 hours. Prerequisite: course 2 recommended. Introduction to care and use of light horses emphasizing the basic principles for selection of horses, responsibilities of ownership, recreational use and raising of foals.—II. (II.) Roser

18. Introductory Aquaculture (4)
Lecture—3 hours; discussion—1 hour. Historical and contemporary aquacultural practices. Interaction between the aqueous culture environment and the biology of aquatic animals. Impact of economics and governmental policies on the development of aquaculture. Interaction of aquacultural practices with larger societal goals. GE credit: SciEng.—I. (I.) Conklin

21. Livestock and Dairy Cattle Judging (2)
Laboratory—6 hours. Prerequisite: course 1 or 2 recommended. Evaluation of type as presently applied to light horses, meat animals and dairy cattle. Relationship between form and function, form and carcass quality, and form and milk production.—III. (III.) Van Liew

22A. Animal Evaluation (2)
Laboratory—3 hours; fieldwork—30 hours (total). Prerequisite: course 21 or the equivalent. Attendance at 3 one-day weekend field trips required. Domestic livestock species with emphasis on visual appraisal, carcass evaluation, and application of performance information. Emphasis on accurate written and oral descriptions of evaluations. Prerequisite to intercollegiate judging competition. Offered in alternate years. (P/NP grading only.)—(I.) Van Liew

22B. Animal Evaluation (2)
Laboratory—3 hours; fieldwork—30 hours (total). Prerequisite: course 22A or the equivalent. Attendance at 3 one-day weekend field trips required. Continuation of course 22A with emphasis on specific species: swine, beef cattle and sheep. Application of animal science principles to selection and management problem-solving scenarios. Prerequisite to intercollegiate judging competition. Offered in alternate years. (P/NP grading only.)—(II.) Van Liew

41. Domestic Animal Production (2)
Lecture—2 hours. Principles of farm animal management, including dairy and beef cattle, sheep, and swine. Industry trends, care and management, nutrition, and reproduction.—I. (I.) DePeters

41L. Domestic Animal Production Laboratory (2)
Discussion—1 hour; laboratory—3 hours. Prerequisite: course 41 (may be taken concurrently). Animal production principles and practices, including five field trips to dairy cattle, beef cattle, sheep, and swine operations and campus labs. (P/NP grading only.)—I, II. (I, II.) DePeters, Van Liew

42. Introductory Companion Animal Biology (4)
Lecture—3 hours; discussion—1 hour. Companion animal domestication. Historical, contemporary perspectives. Legislation concerning companion animals. Selected topics in anatomy, physiology, genetics, nutrition, behavior and management. Scientific methods in studying the human-animal bond. Discussions: application of biological concepts to problems related to companion animals. GE credit: SciEng, Wrt.—II. (II.) Oberbauer

49A-J. Animal Management Practices (2)
Discussion—1 hour; laboratory—3 hours. The application of the principles of elementary biology to the management of a specific animal species. Among the topics offered: **(A)** Aquaculture, **(B)** Beef, **(C)** Dairy, **(D)** Goats, **(E)** Horses, **(F)** Laboratory Animals, **(G)** Meats, **(H)** Poultry, **(I)** Sheep, **(J)** Swine. Up to four different topics may be taken. (P/NP grading only.)—I, II, III. (I, II, III.)

90C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: lower division standing, consent of instructor. Weekly conference on research problems, progress and techniques in the animal sciences. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

92. Internship in Animal Science (1-12)
Internship—3-18 hours. Prerequisite: consent of instructor. Internship off and on campus in dairy, livestock, and aquaculture production, research and management; or in a business, industry, or agency associated with these or other animal enterprises. All requirements of Internship Approval form must be met. (P/NP grading only.)—I, II, III. (I, II, III.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

103. Animal Welfare (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 104 or Neurobiology, Physiology, and Behavior 102 or the equivalent or consent of instructor. The application of principles of animal behavior and physiology to assessment and improvement of the welfare of wild, captive, and domestic animals. Topics include animal pain, stress, cognition, motivation, emotions, and preferences, as well as environmental enrichment methods.—I. Mench

104. Principles of Domestic Animal Behavior (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A or 1B or the equivalent. Basic principles of animal behavior as applied to domesticated species. Emphasis will be placed on behavioral development and social behavior. External (exogenous) and physiological mechanisms influencing behavior will be discussed. GE credit: SciEng.—III. (III.)

105. Domestic Animal Behavior (2)
Lecture—2 hours. Prerequisite: an introductory animal behavior course (e.g., course 104, Psychology 150, Neurobiology, Physiology and Behavior 102) or consent of instructor. Application of the principles of animal behavior in the management of domestic animals. Includes reproductive behavior, feeding behavior, agonistic behavior, animal handling and human-animal interactions. GE credit: SciEng.—I. (I.)

106. Domestic Animal Behavior Laboratory (2)
Laboratory—6 hours. Prerequisite: course 104 or the equivalent. Research experience with the behavior of large domestic animals. Experimental design, methods of data collection and analysis, and reporting of experimental results. GE credit: SciEng, Wrt.—II. (II.)

115. Advanced Horse Production (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 15; Biological Sciences 101; Nutrition 115; Neurobiology, Physiology and Behavior 101; or consent of instructor. Feeding, breeding, and management of horses; application of the basic principles of animal science to problems of production of all types of horses. Designed for students who wish to become professionally involved in the horse industry. GE credit: SciEng.—I. (I.) Roser

118. Fish Production (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Wildlife, Fish and Conservation Biology 120 and 121. Current practices in fish production; relationship between the biological aspects of a species and the production systems, husbandry, management, and marketing practices utilized. Emphasis on species currently reared in California.—II. (II.) Doroshov

119. Invertebrate Aquaculture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1B. Management, breeding and feeding of aquatic invertebrates; application of basic principles of physiology, reproduction, and nutrition to production of mollusks and crustaceans for human food; emphasis on interaction of species biology and managerial techniques on production efficiencies.—II. (II.) Conklin

120. Principles of Meat Science (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A. Anatomical, physiological, developmental, and biochemical aspects of muscle underlying the conversion of muscle to meat. Includes meat processing, preservation, microbiology, and public health issues associated with meat products. (Same course as Food Science and Technology 120.) GE credit: SciEng.—III. (III.) Lee, Bandman

120L. Meat Science Laboratory (2)
Discussion—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1A; course 120 (may be taken concurrently). Laboratory exercises and student participation in transformation of live animal

to carcass and meat, structural and biochemical changes related to meat quality, chemical and sensory evaluation of meat, and field trips to packing plant and processing plant. (Same course as Food Science and Technology 120L.)—III. (III.) Lee, Bandman

123. Animal Growth and Development (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Biological Sciences 1B; Biological Sciences 104 and Molecular and Cellular Biology 150 recommended. Growth and development of animals from conception to maturity, viewed from practical and biological perspectives; includes genetic, metabolic, nutritional control of cell and organism function. GE credit: SciEng.—III. (III.) Sainz

124. Lactation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101; Animal Biology 103 (may be taken concurrently); or the equivalent background knowledge. Consideration of the biochemical, genetic, physiological, nutritional, and structural factors relating to mammary gland development, the initiation of lactation, the composition of milk and lactational performance. GE credit: SciEng, Wrt.—II. (II.)

125. Equine Exercise Physiology (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101. Distance learning class broadcast from Cal Poly, Pomona, on basic and applied physiology of the exercising horse. Includes physiological systems, gait analysis, lameness, pharmacology, sports medicine; sport horse performance evaluation and conditioning. (Students and instructor have two-way communication capabilities.)—II. (II.) Roser

126. Equine Nutrition (3)
Lecture—3 hours. Prerequisite: course 15, Nutrition 115. Distance learning class broadcast from Cal Poly, Pomona and CSU Fresno on equine nutrition. Includes equine digestion, digestive physiology, diet development and evaluation, and the relationship of the topics to recommended feeding practices and nutritional portfolios.—I. (I.) Roser

127. Advanced Equine Reproduction (3)
Lecture—3 hours. Prerequisite: an upper division physiology course (e.g., Neurobiology, Physiology and Behavior 101) and an advanced horse production and management course (e.g., course 115). Distance learning course that provides in-depth knowledge of the reproductive physiology, anatomy and endocrinology of the mare and stallion. Emphasis on structure/function relationships as they are applied to improving equine reproductive management and efficiency.—III. (III.) Roser

128. Agricultural Applications of Linear Programming (4)
Lecture—2 hours; laboratory—2 hours; discussion—1 hour. Prerequisite: upper division standing and Agricultural Systems and Environment 21 or the equivalent. Applications of linear programming in agriculture, emphasizing resource allocation problems and decision making. Problems include crop production, ration formulation, and farm management. Hands-on experience in developing linear programs and interpreting the results.—II. (II.) Fadel

129. Environmental Stewardship in Animal Production Systems (3)
Lecture—3 hours. Prerequisite: Biological Sciences 10 or 1A and 1B, Chemistry 2A, 2B, 8A, 8B. Management principles of environmental stewardship for grazing lands, animal feeding, operations and aquaculture operations; existing regulations, sample analyses, interpretation and utilization of data, evaluation of alternative practices, and policy development.—II. (II.) Meyer, Conklin

131. Reproduction and Early Development in Aquatic Animals (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Molecular and Cellular Biology 150; Wildlife, Fish and Conservation Biology 120, 121; or consent of instructor. Physiological and developmental functions related to reproduction, breeding efficiency and fertility of animals commonly used in aquaculture.—III. (III.) Doroshov

136. Techniques and Practices of Fish Culture (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1A and Chemistry 8B or the equivalent. Daily care and maintenance of fish in the personal aquarium, research, and commercial facilities. Biological and environmental factors important to sound fish management. Laboratories focus on fish culture and include growth trials. GE credit: SciEng, Wrt.—I. (I.) Hung

137. Animal Biochemistry Laboratory (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: Animal Biology 102 or Biological Sciences 102 or the equivalent. Chemical and biochemical methods, and instruments commonly used in animal science. Wet chemical methods, UV/visible and atomic absorption spectrophotometry, thin-layer and gas-liquid chromatography, commercial chemical kits. Attention to safety.—I. (I.) Hung

140. Management of Laboratory Animals (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101. Laboratory animal management procedures in view of animal physiology, health and welfare, government regulations, and experimental needs. Clinical techniques using rodents and rabbits as models.—I. (I.)

141. Equine Enterprise Management (4)
Lecture/discussion—4 hours. Prerequisite: course 115; Economics 1A, 1B recommended. Examination of the concepts and principles involved in the operation of an equine enterprise. Essential aspects of equine enterprise management, including equine law, marketing, cash flow analysis, and impact of state and federal regulations. GE credit: SocSci, Wrt.—II. (II.)

142. Companion Animal Care and Management (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 42, Biological Sciences 101, Neurobiology, Physiology, and Behavior 101; Animal Biology 102 and 103 recommended. Management and production of companion animals. Integration of the disciplinary principles of behavior, genetics, nutrition, and physiology as related to the care of companion animals.—I. (I.) Oberbauer

143. Pig and Poultry Care and Management (4)
Lecture—3 hours; laboratory—3 hours; Saturday field trips. Prerequisite: Nutrition 115, Neurobiology, Physiology and Behavior 101. Care and management of swine, broilers and turkeys as related to environmental physiology, nutrition and metabolism, disease management and reproduction.—I. (I.) King

144. Beef Cattle and Sheep Production (4)
Lecture—3 hours; laboratory—3 hours; one or two Saturday field trips. Prerequisite: course 41, Animal Genetics 107, Nutrition 115, or consent of instructor; a course in Range Science and a course in microcomputing are recommended. Genetics, physiology, nutrition, economics and business in beef cattle and sheep production. Resources used, species differences, range and feedlot operations. Emphasis on integration and information needed in methods for management of livestock enterprises.—III. (III.) Sainz

145. Meat Processing and Marketing (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 143 or 144 or consent of instructor. Distribution, processing and marketing of meat and meat products. Meat and meat animal grading and pricing. Government regulations and social/consumer concerns. Future trends and impact on production management practices. Includes poultry.—II. (II.) Lee

146. Dairy Cattle Production (4)
Lecture—3 hours; laboratory—3 hours; one mandatory Saturday field trip. Prerequisite: course 124, Animal Genetics 107, and Nutrition 115, or consent of instructor. Scientific principles from genetics, nutrition, physiology, and related fields applied to conversion of animal feed to human food through dairy animals. Management and economic decisions are related to animal biology considering the environment and animal well-being. GE credit: SciEng, Wrt.—III. (III.) DePeters

147. Dairy Processing and Marketing (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 146 or consent of instructor. Examination of distribution systems, processing practices, product quality, impact of government policy (domestic and foreign), marketing alternatives, and product development.—II. (II.)

148. Enterprise Analysis in Animal Industries (4)
Lecture/discussion—4 hours. Prerequisite: course 141 or 145 or 147 or consent of instructor. Examination and application of decision making and problem solving in the production enterprise. The areas of production analysis, problem solving, risk analysis and cost-benefit analysis will be examined in terms of the total enterprise. GE credit: SocSci, Wrt.—III. (III.)

149. Farrier Science (3)
Lecture—3 hours. Prerequisite: course 115. Distance learning class broadcast from California Polytechnic State University San Luis Obispo, California Polytechnic State University Pomona, and California State University Fresno. In-depth examination of the structure-function relationship of the equine hoof and how it relates to conformation, injury, and performance.—III. (III.) Roser

149L. Farrier Science Laboratory (1)
Laboratory—3 hours. Prerequisite: course 149 (may be taken concurrently) or consent of instructor. The art and science of horseshoeing in equine related fields. Proper use of the tools, materials and techniques in the fabrication of shoes and safe preparation of the hoof for application of shoes. (P/NP grading only.)—III. (III.) Roser

170. Ethics of Animal Use (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: any basic course in composition or speech. Ethical issues relating to animal use in contemporary society. Integration of philosophical theories with scientific evidence relating to animal behavior, mentality, and welfare. Uses of animals in agriculture, research, and as companions. Ethical responsibilities regarding wildlife and the environment. (Same course as Veterinary Medicine 170.) GE credit: SocSci, Wrt.—III. (III.) Tannenbaum, Mench

190C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: advanced standing; consent of instructor. Weekly conference on research problems, progress and techniques in the animal sciences. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship in Animal Science (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Internship off and on campus in dairy, livestock and aquaculture production, research and management; or in a business, industry, or agency associated with these or other animal enterprises. All requirements of Internship Approval Form must be met. (P/NP grading only.)—I, II, III. (I, II, III.)

194. Research in Animal Science (3)
Laboratory—6 hours; discussion—1 hour. Prerequisite: upper division standing, course 193, one laboratory course in animal biology and consent of instructor. Research with a faculty mentor. Weekly discussion and laboratory on specific research topic. May include a seminar to research group. Choose from sections: (1) Animal Behavior; (2) Animal Genetics; (3) Animal Nutrition; (4) Animal Physiology. May be repeated for credit for a total of four times.—I, II, III. (I, II, III.)

194HA-194HB-194HC. Undergraduate Honors Thesis in Animal Science (4-4-4)
Lecture—1 hour; laboratory—9 hours. Prerequisite: Neurobiology, Physiology and Behavior 101, Animal Biology 103; minimum cumulative GPA of 3.2 and selection by the Honors Selection Committee. Students will carry out a research project (chosen from faculty-suggested or approved proposals) during

the academic year under the guidance of a faculty member. Upon completion, student will write a thesis and present a public seminar describing his/her research. (Deferred grading only, pending completion of sequence.)

197T. Tutoring in Animal Science (1-2)
Tutorial—1-2 hours. Prerequisite: Animal Science or related major, advanced standing, consent of instructor. Tutoring of students in lower division animal science courses; weekly conference with instructors in charge of courses; written critiques of teaching procedures. May be repeated once for credit. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200. Strategies in Animal Production (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Examines the forces and issues in animal agriculture through the strategic management process.—(I.)

206. Models in Agriculture and Nutrition (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Mathematics 16B; Statistics 108. Basic model building principles and techniques for statistical and systems simulation models. Optimization techniques for non-linear experimental designs and management models are presented. Quantitative analysis and evaluation of linear and non-linear equations used in agriculture and nutrition. Offered in alternate years.—Fadel

290. Seminar (1)
Seminar—1 hour. Reports and discussions of topics of interest in genetics, nutrition, and physiology as they apply to animal science. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: graduate standing. Weekly conference on research problems, progress and techniques in the animal sciences. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291. Current Research in Animal Science (1)
Seminar—1 hour. Prerequisite: graduate standing. Current research in animal science explored at weekly seminars presented by guest lecturers. Discussion of research presented. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

297. Supervised Teaching in Animal Science (2)
Supervised teaching—6 hours. Prerequisite: consent of instructor. Practical experience in teaching Animal Science at the University level; curriculum design and evaluation; preparation and presentation of material. Assistance in laboratories, discussion sections, and evaluation of student work. An evaluation letter sent to the Graduate Adviser with a copy to the student. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
Prerequisite: consent of instructor. (Sect. 1, 2, 3—letter grading; from Sect. 4 on—S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Animal Science and Management

(College of Agricultural and Environmental Sciences)

The Major Program

The Animal Science and Management major combines a thorough education in the basic biology of domestic animal species with a strong background in agricultural economics. Graduates of this interdisciplinary major will be well positioned to adjust to our rapidly changing world and job market.

The Program. The interdisciplinary program in Animal Science and Management combines a fundamental background in the natural sciences (chemistry, biology, physiology, nutrition, genetics, mathematics, and behavior), with an understanding of economics and humanities. After completing preparatory courses, students focus on both the animal species that interest them (horses, cattle, sheep, companion animals, goats, fish, crustaceans or mollusks, among others) and principles of managerial economics (marketing, finance, business organization or systems analysis). Students preparing for medical or veterinary school can meet professional entrance requirements with those of this major if they plan ahead.

Career Alternatives. Job opportunities for successful graduates are plentiful and include positions with banking and financial institutions, agribusiness, Peace Corps, and farms of all scales. Most Animal Science and Management graduates are well prepared for professional study (medical, law, veterinary, and graduate business schools) as well as graduate research programs leading to the M.S. or Ph.D. degrees. Advanced degrees open doors to work as extension specialists, farm advisers, and teachers, and prepare students for international service.

B.S. Major Requirements:

UNITS

English Composition Requirement..... 8-16
See College requirement..... 8
Select two courses (if not selected for English college requirement) from Communication 130, 134, 135, 136, 140; English 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, 104F 0-8

Preparatory Subject Matter 71-75
Animal Science 1 and 2, and one of Animal Science 15, 18, 41-41L, 42, or Avian Sciences 11..... 11-12
Biological Sciences 1A, 1B, and one of 1C, Agricultural Management and Rangeland Resources 2, 110A, 112, or Environmental Horticulture 6..... 13-15
Chemistry 2A, 2B, 8A, 8B..... 16
Agricultural Management and Rangeland Resources 21 or Computer Science Engineering 15..... 3-4
Economics 1A, 1B; Management 11A, 11B 18
Mathematics 16A-16B or the more advanced mathematics courses..... 6
Agricultural Management and Rangeland Resources 120, Statistics 100 or 103, or other courses in quantitative skills with prior approval of the Master Adviser.... 4

Breadth/General Education Subject Matter 12-24

Depth Subject Matter..... 38-42
Biological Sciences 101..... 4
Nutrition 115..... 4
Neurobiology, Physiology, and Behavior 101 5
Business Management..... 14-17
Agricultural and Resource Economics 100A;
One course from Agricultural and Resource Economics 113, 130, 136, 138;
One course from Agricultural and Resource Economics 120, 132, 140, 145, 157;
Plus one course from Animal Science 128 or Agricultural and Resource Economics 155.
Production/Management/Processing/ Marketing 11-12
At least one course from Animal Science 115, 118, 119, 140, 143, 144, 146;
At least one course from Animal Science 141, 142, 145, 147;
Animal Science 148.

Restricted Electives 5-9
At least two additional courses (minimum 8 units; duplicate from Depth courses not counted) selected with approval of adviser from: Agricultural and Resource Economics 18, 112, 113, 118, 120, 130, 132, 136, 138, 140, 142, 143, 144, 145, 150, 155, 157, 171A, 171B, 176; Animal Science 103, 104, 105, 106, 115, 118, 119, 120, 120L, 123, 124, 125, 126, 127, 128, 129, 131, 136, 137, 140, 141, 142, 143, 144, 145, 146, 147, 192, 194, 194H; Avian Sciences 100, 103, 115, 121, 123, 149, 150; Animal Genetics 101, 105, 107, 111; Nutrition 122, 123, 123L, 124; Animal Biology 102 (strongly recommended), 103; Computer Science Engineering 124; Food Science and Technology 121, 122; Management 100; Neurobiology, Physiology, and Behavior 117, 121, 121L, 130; Wildlife, Fish, and Conservation Biology 120, 120L, 130.

Unrestricted Electives..... 15-44

Total Units for the Degree..... 180

Major Adviser. J.G. Fadel.

Advising Center for the major (including peer advising) is located in 1202 Meyer Hall (530-754-7915). *Students must secure their faculty adviser through this office upon entering the major.*

Anthropology

College of Letters and Science)

Carol A. Smith, Ph.D., Chairperson of the Department

Department Office, 330 Young Hall (530-752-0745/0746)

http://www.anthro.ucdavis.edu

Faculty

Robert L. Bettinger, Ph.D., Professor
Monique Borgerhoff Mulder, Ph.D., Professor
David J. Boyd, Ph.D., Associate Professor
Christyann Darwent, Ph.D., Assistant Professor
Marisol de la Cadena, Ph.D., Associate Professor
Donald L. Donham, Ph.D., Professor
Jelmer W. Eerkens, Ph.D., Assistant Professor
Alexander H. Harcourt, Ph.D., Professor
Lynne A. Isbell, Ph.D., Associate Professor
Suad Joseph, Ph.D., Professor *(Anthropology, Women and Gender Studies)*
Richard McElreath, Ph.D., Assistant Professor
Henry M. McHenry, Ph.D., Professor, *UC Davis Prize for Undergraduate Teaching and Scholarly Achievement*
Peter S. Rodman, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Roger Rouse, Ph.D., Assistant Professor
Suzana M. Sawyer, Ph.D., Assistant Professor
Janet S. Shibamoto Smith, Ph.D., Professor
G. William Skinner, Ph.D., Professor *(Anthropology, Center for Comparative Research)*
Carol A. Smith, Ph. D., Professor

David G. Smith, Ph.D., Professor
Bruce P. Winterhalder, Ph.D., Professor
Aram A. Yengoyan, Ph.D., Professor
Li Zhang, Ph.D., Associate Professor

Emeriti Faculty

Richard T. Curley, Ph.D., Senior Lecturer Emeritus
William G. Davis, Ph.D., Professor Emeritus
Jack D. Forbes, Ph.D., Professor Emeritus
Sarah B. Hrdy, Ph.D., Professor Emerita
David L. Olmsted, Ph.D., Professor Emeritus

Affiliated Faculty

Margaret B. Swain, Ph.D., Associate Adjunct Professor

The Major Program

Anthropology is the systematic study of human beings. The student of anthropology learns about human biology, ecology, and social life—past and present—and gains a broad understanding of humans and societies. It is a diverse field, and the courses, faculty, and degree programs at UC Davis are subdivided into two wings—*Evolutionary* and *Sociocultural*. *Evolutionary anthropologists* are united by their common application of science to understand the behavior, ecology, history, and evolution of humans and non-human primates, as individuals and as societies. The many useful approaches to these topics bring together archaeology, human behavioral ecology, molecular anthropology, paleoanthropology, biogeography, conservation biology, and primatology. *Archaeology* is the study of the history or prehistory by analysis of a people's artifacts, or their material culture, with the goal of constructing culture history and reconstructing human behavior. *Human behavioral ecology* is the study of how variation in ecology and social organization can help us understand variation in human behavior. *Molecular anthropology* uses DNA to study the genetic relationships among different populations and the adaptive significance of specific genetic traits. *Paleoanthropology* uses comparisons among fossilized remains to understand what morphological changes occurred during the course of human evolution. *Biogeography* investigates the biology behind the geographic distribution of species, and also of human cultures. *Conservation biology* explores the causes of loss of biological diversity—in this department, it focuses on threatened non-human primates and the conservation of natural resources by a rapidly growing population. *Primatology* is the study of behavior, ecology and morphology of primates to address questions about the evolution and function of behavioral and morphological patterns in nonhuman primates and to test models of the origins of human morphology and behavior.

Sociocultural anthropologists study the varied ways in which people around the world organize their lives and interpret the circumstances in which they operate. Their principle method is extended field research, which combines attention to global issues with the close study of human relations and culture. Among the themes addressed in the department's undergraduate courses are globalization and transnationalism; human ecology and environmental change; the global spread of media and technology; migration multiculturalism and urban life; colonialism, neocolonialism and development; race, class and gender, rebellion, resistance and the cultural politics of everyday life; language use and discourse; and self, identity and family. The track in *sociocultural* anthropology thus offers an unusually rich set of resources for understanding and engaging pressing issues in a globalizing world characterized by new forms of international culture and community as well as by increasing material inequality and political volatility.

The Program. The Bachelor of Arts program is divided into two tracks, *Sociocultural* and *Evolutionary*, which parallel the two wings described above. Students interested in the study of recent and contemporary human languages and societies should follow the Sociocultural Track. To obtain a B.A. degree in sociocultural anthropology, each student is required to complete courses that provide (1) foundational skills, (2) language and cultural skills, (3) comprehensive skills, and (4) specialized skills. Students interested in the study of archaeology; primate studies; or human biology, ecology or origins should follow the Evolutionary Track. The B.A. degree offered by the Evolutionary Track provides general training in anthropology from an evolutionary perspective. The Evolutionary Track also offers a B.S. degree that requires more rigorous lower division coursework in math and science than the B.A. degree and upper division coursework in biological anthropology and closely related disciplines.

Students in both tracks are encouraged to gain practical experience through courses taken while studying abroad (under the administration of the Education Abroad Center) and through internships performed for credit (under the administration of the Internship and Career Center). Students showing exceptional ability are welcome to seek permission from instructors to participate in graduate seminars offered by the department and to have these courses count towards the fulfillment of upper division requirements for the major.

Career Alternatives. A Bachelor of Arts degree in Anthropology is suited for students seeking a solid liberal arts education. With its broad goal to facilitate understanding across lines of cultural difference, sociocultural anthropology prepares students for lives that are influenced by increasingly pervasive cultural exchange, as well as cultural conflict, around the world. The program serves as excellent preparation for careers in which inter-cultural skills are increasingly needed, including social and environmental activism, business, diplomacy and social administration, journalism, law, education and international relations. Students that focus on evolutionary processes will be well prepared to enter fields such as medical or health anthropology, museum studies, cultural resource management and wildlife conservation. A Bachelor of Science degree in Anthropology provides suitable pre-medical, pre-dental, and pre-veterinary training, and the educational background for further training in the health professions, biological/evolutionary sciences and forensic investigation. The B.A. or B.S. degree in anthropology with appropriate courses in education is good preparation for high school teaching in social, biological and natural sciences. An anthropology degree also provides the foundation for advanced study leading to careers in college-level teaching and research.

A.B. Major Requirements:

UNITS

Evolutionary Track:

Preparatory Subject Matter 19-21
Anthropology 1, 2, 3 12
Anthropology 15 or 23 4-5
Anthropology 13; Statistics 13, 32, 100 or 102 3-4

Depth Subject Matter 42-47
Two courses from Anthropology 101, 102, 103, 105, 122A, 128A, 154A, 154B, 158, 178 7-9
Anthropology 153 or 157 3-5
Anthropology 151 or 152 4-5
One course from Anthropology 170, 171, 172, 173, 176, 180 or 184 4
One course from sociocultural track in consultation with evolutionary track undergraduate adviser 4
Select 20 additional units from any upper division evolutionary track Anthropology courses chosen in consultation with an evolutionary track undergraduate adviser 20

Total Units for the Major 61-68

UNITS

Sociocultural Track:

Preparatory Subject Matter 16-22
Anthropology 1, 2, 3 12
Three quarters of one foreign language plus one of the following three options:
1) two additional quarters in same language cited above 8-10
2) two upper division area-focus sociocultural track courses 8
3) pass exam in a language at fifth-quarter level of competence and complete one additional area-focus sociocultural track course 4

Depth Subject Matter 38-41
Anthropology 100, 110 8
Select two upper division area-focus courses 8
Select one of the following two options in consultation with, and only after prior written approval of, sociocultural track undergraduate adviser:
1) six additional upper division courses (two courses may be in the evolutionary track; and up to six units can be internships) 22-25
2) six additional upper division courses that combine two to four sociocultural track courses with two to four courses in a single related academic discipline (including but not limited to: African American and African Studies, American Studies, Art Studio, Art History, Asian American Studies, Chicana/o Studies, Communication, Community and Regional Development, Economics, East Asian Studies, History, Linguistics, Music, Native American Studies, Nature and Culture, Philosophy, Political Science, Psychology, Religious Studies, Sociology, Textiles and Clothing, Theatre and Dance, Women and Gender Studies) 24

Total Units for the Major 54-63

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 55-59
Anthropology 1, 2, 3 12
Biological Sciences 1A, 1B, 1C 15
Chemistry 2A, 2B, 8A, 8B 16
Mathematics 16A-16B-16C or 21A-21B-21C 9-12
Anthropology 13; Statistics 13, 32, 100, or 102 3-4

Depth Subject Matter 45
Anthropology 152, 153, 154A 15
Three additional courses in anthropology chosen in consultation with evolutionary track undergraduate adviser 8-12
Biological Sciences 101 4
Evolution and Ecology 100 4
Additional units from the list below to achieve a minimum of 45 upper division units 10-14
Anthropology 151, 154B, 154BL, 155, 156, 157, 157L, 158, 159, 180; Anatomy, Physiology, and Cell Biology 100; Biological Sciences 102, 103; Cell Biology and Human Anatomy 101, 101L; Environmental Science and Policy 100; Evolution and Ecology 101, 102, 103, 104, 105, 138, 141, 147, 149, 175; Exercise Science 103, 115; Geology, 107, 107L, 108, 144, 146; History and Philosophy of Science 131; Molecular and Cellular Biology 120L, 121, 150, 150L, 160L, 161, 162, 163, 164; Neurobiology, Physiology, and Behavior 101, 101L, 102, 123, 124, 150, 152; Psychology 101, 113, 121, 122, 123, 124; Statistics 104, 106, 108, 130A,

130B; Wildlife, Fish and Conservation Biology 141, 154

Total Units for the Major 100-104

Recommended
Anthropology 15; Geology 1; Psychology 1.

Minor Program Requirements:

UNITS

Anthropology 19-23

General emphasis 19-21
One course from Anthropology 151, 152, 153, 154A, 155, 156, 157, 158, 159 .. 3-5
One course from Anthropology 170, 171, 172, 173, 176, 180, 183, 184 4
One course from Anthropology 140A through 149B, or 178 4
Two courses from Anthropology 100 through 139BN 8

Evolutionary emphasis 20-23
Anthropology 152, 153, 154A 15
Two additional upper division Anthropology courses chosen in consultation with evolutionary track undergraduate adviser 5-8

Sociocultural emphasis 19-21
Anthropology 100, 110 4
One course from Anthropology 140A through 149B 4
Two courses from Anthropology 101 through 139BN 8
One additional upper division Anthropology course chosen in consultation with sociocultural track undergraduate adviser 3-5

Honors Program. Candidates for high or highest honors in Anthropology must write a senior thesis under the direction of a faculty member. The thesis project will have a minimum duration of two quarters. Honors candidates must take at least six units of Anthropology 194H. Only students who, at the end of their junior year (135 units), have attained a cumulative grade point average of 3.5 in Anthropology courses will be eligible for the honors program. The quality of the thesis work will be the primary determinant for designating high or highest honors at graduation.

Teaching Credential Subject Representative.
————. See also the Teacher Education Program.

Graduate Study. The Department offers a program of study leading to the M.A. and Ph.D. degrees in Anthropology. Further information regarding graduate study may be obtained at the Department Office and at Graduate Studies.

Courses in Anthropology (ANT)

Lower Division Courses

1. Human Evolutionary Biology (4)
Lecture—3 hours; discussion—1 hour. Processes and course of human evolution; primatology; biological and social diversity within *Homo sapiens*; human paleontology. GE Credit: SciEng, Div, Wrt.—I, II, III. McHenry, Rodman

2. Cultural Anthropology (4)
Lecture—3 hours; discussion—1 hour. Introduction to cultural diversity and the methods used by anthropologists to account for it. Family relations, economic activities, politics, gender, and religion in a wide range of societies. Current problems in tribal and peasant societies. GE credit: SocSci, Div, Wrt.—I, II, III. Sawyer, Klima, de la Cadena

3. Introduction to Archaeology (4)
Lecture—3 hours; discussion—1 hour. Development of archaeology as an anthropological study; objectives and methods of modern archaeology. GE credit: SocSci, Div.—I, II, III. Darwent, Bettinger, Eerkens

4. Introduction to Anthropological Linguistics (4)
Lecture—3 hours; discussion—1 hour. Exploration of the role of language in social interaction and world view, minority languages and dialects, bilingualism, literacy, the social motivation of language change. Introduction of analytical techniques of linguistics and demonstration of their relevance to language in sociocultural issues. GE credit: SocSci, Div, Wrt.—I.

5. Proseminar in Biological Anthropology (4)
Seminar—3 hours; term paper. Prerequisite: course 1 and consent of instructor. Course primarily for majors. Integration of related disciplines in the study of biological anthropology through discussion and research projects. Principal emphasis in human adaptation to the environment. GE credit: SciEng, Wrt.—III. Winterhalder

15. Behavioral and Evolutionary Biology of the Human Life Cycle (5)
Lecture—3 hours; discussion—1 hour; term paper. Introduction to the biology of birth, childhood, marriage, the family, old age, and death. Examines comparative characteristics of nonhuman primates and other animals as well as cross-cultural variation in humans by study of selected cases. GE credit: SciEng, Div, Wrt.—II.

15V. Behavioral and Evolutionary Biology of the Human Life Cycle—Web Taught (5)
Online lecture—3 hours; Online discussion—1 hour; term paper. Introduction to the biology of birth, childhood, marriage, the family, old age, and death. Examines comparative characteristics of nonhuman primates and other animals as well as cross cultural variation in humans by study of selected cases. Not open for credit to students who have completed course 15. GE credit: SciEng, Div, Wrt.

20. Comparative Cultures (4)
Lecture—3 hours; discussion—1 hour. Introduction to the anthropological study of cultural diversity. Case studies of eight societies will be presented to illustrate and compare the distinctive features of major cultural regions of the world. Concludes with a discussion of modernization. GE credit: SocSci, Div.

23. Introduction to World Prehistory (4)
Lecture—3 hours; discussion—1 hour. Broadly surveys patterns and changes in the human species' physical and cultural evolution from earliest evidence for "humanness" to recent development of large-scale complex societies or "civilizations." Lectures emphasize use of archaeology in reconstructing the past. GE credit: SocSci, Div, Wrt.—II. Eerkens

98. Directed Group Study (1-5)
(P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Theory in Social-Cultural Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Discussion of the theoretical and philosophical developments in cultural anthropology from the 19th century to the present. Not open for credit to students who have completed course 137. (Former course 137.) GE credit: SocSci.—I. Yengoyan

101. Human Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course from course 1, 2, Environmental Studies 30, Genetics 10, or the equivalent. Critical variables in the processes that relate to humans and their environment. Emphasis on the biological, cultural, social, and psychological forces which encourage stability or change in human ecological relationships. (Same course as Environmental Science and Policy 101.) GE credit: SocSci.—II. Borgerhoff Mulder, Richerson

102. Cultural Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one lower division course in the social sciences, upper division standing. Comparative survey of the interaction between diverse human cultural systems and the environment. Primary emphasis given to people in rural and relatively undeveloped environments as a basis for interpreting complex environments. Not open for credit to students who have completed course 133. (Former course 133.) (Same course as Environmental Science and Policy 102.) GE credit: SocSci, Div, Wrt.—III. Orlove

103. Indigenous Peoples and Natural Resource Conservation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or Geology 1 or Environmental Science and Policy 30. Integration of the interests of resident and indigenous peoples with the conservation of natural resources and ecosystems, using case study examples from both the developing and the developed world. Offered in alternate years. Not open for credit to students who have completed course 121N. (Former course 121N.)—Borgerhoff Mulder

104N. Cultural Politics of the Environment (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Political economy of environmental struggles. Relationship between social inequality (based on race, class, and/or gender) and ecological degradation. Articulation of local peoples, national policy, and the international global economy in the contestation over the use of environmental resources. Not open for credit to students who have completed course 134N. (Former course 134N.) Offered in alternate years. GE credit: SocSci, Div.—Sawyer

(a) Anthropological Linguistics

110. Elementary Linguistic Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 4 or Linguistics 1. Analytical techniques of articulatory phonetics, phonemics, morphophonemics, and morphology. GE credit: SocSci.—II. J. Shibamoto Smith

112. Comparative Linguistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110. Linguistic prehistory, historical linguistics, and reconstruction. GE credit: SocSci.

113. Indigenous Languages of North America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 4, Linguistics 1, or consent of instructor. Survey of indigenous languages of North America, including their classification, linguistic characteristics, areal features, and socio-cultural aspects. GE credit: SocSci, Div.

117. Language and Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 4, or Linguistics 1 and course 2. Consideration of language in its social context. Methods of data collection and analysis; identification of socially significant linguistic variables. Contributions of the study of contextualized speech to linguistic theory GE credit: SocSci, Div, Wrt.—III.

119. World Writing Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 4 or Linguistics 1. Survey of major world writing systems, including pictographic, syllabic, and alphabetic scripts used in both the Old and New Worlds in ancient and modern times, examined from linguistic and socio-political aspects. GE credit: SocSci.

120. Language and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 4; or course 2 and Linguistics 1. Culture, cognition, meaning, and interpretation; language and the classification of experience; communication and learning in crosscultural perspective. GE credit: SocSci, Div, Wrt.—I. J. Shibamoto Smith

(b) Social-Cultural Anthropology

122A. Economic Anthropology (4)
Lecture—3 hours; discussion—1 hour. Varieties of production, exchange, and consumption behavior in precapitalist economies, their interaction with culture and social-political organization, and the theories that account for these phenomena. The effects of capitalism on precapitalist sectors. Not open for credit to students who have completed course 122. (Former course 122.) GE credit: SocSci, Div, Wrt.—I. McElreath

122B. Anthropology and Political Economy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Survey of anthropological approaches to the study of political organizations; inter-relationships among political institutions, economic infrastructures and cultural complexity. Not open for credit to students who have completed course 123A. (Former course 123A.) GE credit: SocSci, Div, Wrt.

123AN. Resistance, Rebellion, and Popular Movements (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or the equivalent. Analysis of popular protest in Third World and indigenous societies ranging from covert resistance to national revolts. Comparative case studies and theories of peasant rebellions, millenarian movements, social bandits, Indian "wars", ethnic and regional conflicts, gender and class conflicts. Not open for credit to students who have completed course 123B. (Former course 123B.)—II. Srinivas

123BN. Multiculturalism and Minority Identity (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Recent developments in conceptions of minority identity, from the point of view of minority populations in the Third World, Europe, and the United States. Challenges to existing categories of gender, race and class, as well as nationalism and imperialism. Not open for credit to students who have completed course 123C. (Former course 123C.) Offered in alternate years.

124. Religion in Society and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Discussion of anthropological theories of religion with emphasis on non-literate societies. Survey of shamanism, magic and witchcraft, ritual and symbols, and religious movements. Extensive discussion of ethnographic examples and analysis of social functions of religious institutions. GE credit: SocSci, Div, Wrt.—III. Srinivas

125A. Structuralism and Symbolism (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Survey of anthropological approaches to understanding the logic of structuralism and symbolism in cultural analysis. Focus on how structural and symbolic interpretations relate to cultural and linguistic universals and to the philosophical basis of relativism in the social sciences. (Former course 125.) GE credit: SocSci, Div.—III. Rouse

125B. Postmodernism(s) and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. The U.S.–European postmodern condition. "Modernity" as an incomplete project for subordinated groups. The economic, social, technological and political conditions leading to postmodern aesthetics, in comparison with postcolonialism, feminism and minority discourse. GE credit: SocSci, Div, Wrt.

126A. Anthropology of Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Theories of development and current critiques. Colonial legacies and post-colonial realities. Roles of the state and NGOs, population migrations, changing gender identities, cash-earning strategies, and sustainability issues. Stresses importance of cultural understandings in development initiatives. Case studies emphasizing non-industrial societies. Not open for credit to students who have completed course 126. (Former course 126.) GE credit: SocSci, Div, Wrt.—I. Boyd

126B. Women and Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Current Third World and Western development issues concerning women in agriculture, industry, international division of labor, political movements, revolutions, politics of health, education, family and reproduction. Impact of colonialism, capitalism, the world system, and international feminism on women and development. Not open for credit to students who have completed course 131. (Former course 131.) Offered in alternate years. GE credit: SocSci, Div, Wrt.—II. Sawyer

127. Urban Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Survey of approaches to urban living: political structures, organization of labor, class relations, world views. The evolution of urban life and its contemporary dilemmas. Cross-cultural comparisons discussed through case studies. GE credit: SocSci, Div, Wrt.—III. Zhang

128A. Kinship and Social Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Comparative examination of personal kinship, descent, marriage, household and family organizations; the theories that account for variation, and recent advances in the treatment of these data. Not open for credit to students who have completed course 128. (Former course 128.) GE credit: SocSci, Div, Wrt.—I. Winterhalder

128B. Self, Identity, and Family (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Exploration of self, identity, and family systems cross-culturally. Impact of class, gender, race, ethnicity, ruralization, urbanization, and globalization on notions of selfhood in different social/cultural systems. Not open for credit to students who have completed course 129. (Former course 129.) Offered in alternate years. GE credit: SocSci, Div, Wrt.—I.

130A. Cultural Dimensions of Globalization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. The cultural dimensions of recent economic and political developments frequently termed "globalization." Offered in alternate years. GE Credit: SocSci, Wrt.—I. Rouse

130BN. Migration and the Politics of Place and Identity (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor. Internal and international migration from an anthropological perspective, including causes, processes, and political, economic, and cultural effects of spatial mobility and displacement. Emphasizes the interplay of identity, place, and power in diverse cultural and historical contexts. Not open for credit to students who have completed course 123D. (Former course 123D.) GE credit: SocSci, Wrt.—II.

130C. Latino Migration to the United States (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. The experiences of people involved in migration between Latin America and the United States; most significant factors shaping those experiences. Offered in alternate years. GE Credit: SocSci, Wrt.

132. Ethnohistory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 and one other course in either history or anthropology. Course focuses on method and interpretation involved in reconstructing the history and cultural experience of those "people without history" who left no documentary record (pre-literate societies, slaves, peasants). Emphasizes cross-cultural comparison and complementary methods (archaeology, demography, oral history, travel accounts). GE credit: SocSci, Wrt.

135. Peasant Society and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Comparative study of peasant communities, utilizing historical and ethnographic sources; analysis of urban-rural relations; problems of economic development and culture change. GE credit: SocSci, Div, Wrt.—C. Smith

136. Ethnographic Film (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Overview of the use of film in anthropology and its advantages and limitations in comparison to written ethnographic descriptions. Essential features of ethnographic films. Film production in anthropological research and problems encountered in producing films in the field. GE credit: SocSci, Wrt.—III.

138. Ethnographic Research Methods in Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 2 and 137. Basic concepts in and approaches to ethnographic field research. Problem formulation, research design, qualitative and quantitative data collection procedures, and techniques for organizing, retrieving, and analyzing information. Ethnographic description and constructed inference. Students will organize and conduct individual research projects. GE credit: SocSci.

139AN. Race, Class, Gender Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Comparative analysis of class/race/gender inequality, concentrating on the ways in which beliefs about descent, "blood," and biological difference interact with property and marital systems to affect the distribution of power in society. Not open for credit to students who have completed course 139. (Former course 139.) GE credit: SocSci, Div, Wrt.—II. C. Smith

139BN. Gender and Sexuality (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Gender and sexuality in foraging bands, horticultural and pastoral tribes, agricultural and industrial states. Debates on cultural evolution and distribution of gender hierarchies. Impact of politics, economics, religion, social practices, women's movements on gender and sexuality. Culture, nature, and sexuality. Not open for credit to students who have completed course 130. (Former course 130.) Offered in alternate years. GE credit: SocSci, Div, Wrt.—II. Joseph

140A. Cultures and Societies of West and Central Africa (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Ethnographic survey of West Africa and Congo Basin with analyses of representative societies which illustrate problems of general theoretical concern. Major consideration will be the continuities and discontinuities between periods prior to European contact and the present. GE credit: SocSci, Div, Wrt.

140B. Cultures and Societies of East and South Africa (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Ethnographic survey of Eastern and Southern Africa with analyses of selected societies which illustrate problems of interest to anthropologists. Major consideration will be given to continuities and discontinuities between periods prior to European contact and the present. GE credit: SocSci, Div, Wrt.—I. Donham

141A. Indians of North America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Introductory survey of the Indians of North America: origins, languages, civilizations, and history. GE credit: SocSci, Div, Wrt.

141B. Ethnography of California and the Great Basin (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Description and analysis of the native peoples of California and the Great Basin, and their lifeways at the time of European contact. (Former course 141C.) GE credit: SocSci, Div, Wrt.

142. Peoples of the Middle East (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Peoples of the Middle East (including North Africa). Discussions of class relations, kinship organization, sex/gender systems, religious beliefs and behavior, ethnic relations, political systems. Impact of world systems, political and religious movements and social change. (Former course 136.) GE credit: SocSci, Div, Wrt.

143A. Ethnology of Southeast Asia (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Patterns of culture and social organization from prehistory to the present, in the context of historical, ecological, economic, and political settings. Emphasis on the relation of ethnic minorities to national states. Offered in alternate years. GE credit: SocSci, Div, Wrt.

143B. Philippine Societies and Culture (4)
Laboratory/discussion—4 hours. Prerequisite: course 2. Introduction to the ethnology of the Philippines. Nature and distribution of ethnic groups, social organizations, cultural patterns and social issues.

Emphasis on ethnic minorities, rural populations, effects of modernization, and relation of the state to local groups. GE credit: SocSci, Div, Wrt.

144. Contemporary Societies and Cultures of Latin America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Introduction to contemporary social structure of Latin America. Origins, maintenance and changes in inequality: economic responses to poverty, sociocultural responses to discrimination, and political responses to powerlessness. GE credit: SocSci, Div, Wrt.—II. de la Cadena

146. Peoples and Politics of Mexico and Central America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Politics and culture in Mexico and Central America from the time of Independence to the present. Non-indigenous as well as indigenous people. Regional focus will vary. GE credit: SocSci, Div, Wrt.—I.

147. Peoples of the Pacific (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Ethnographic survey of aboriginal cultures of Oceania. Comparison of origins, prehistory, and traditional social organization of peoples of Polynesia, Micronesia, and Melanesia. Consideration of recent changes associated with colonialism and national independence. GE credit: SocSci, Div, Wrt.—III. Boyd

148A. Culture and Political Economy in Contemporary China (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Examination of contemporary Chinese culture and political economy through reading ethnographic studies on recent transformations in rural and urban Chinese society. Special attention to state power, popular culture, spatial mobility, city space, and gender. Offered in alternate years. GE credit: SocSci, Div, Wrt.—I. Zhang

148AS. Culture and Political Economy in Contemporary China (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Examination of contemporary central aspects of Chinese culture and political economy through reading ethnographic studies on recent transformations in rural and urban areas. Special attention to state power, privatization, popular culture, migration, consumption, village life, city space, class, and gender relations. Taught in China. GE credit: SocSci, Div, Wrt.—Zhang

148B. Family, Gender, and Population in Contemporary China (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Analysis of family process, gender relations, and population dynamics in relation to state power in China since 1949. GE credit: SocSci, Div, Wrt.

148C. Ethnic Diversity of China (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Analysis of China's ethnic diversity through time and space. Interethnic relations in changing state systems examined among Han majority subethnic groups (e.g., Cantonese, Hakka) and borderlands minorities (e.g., Hmong, Tibetan). Emphasizes intersections of gender and class with race/ethnicity/nationality. GE credit: SocSci, Div, Wrt.

149A. Traditional Japanese Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Patterns of culture and social organization from prehistoric to early twentieth-century Japan. Origins, prehistory, and traditional religious and political systems, marriage and kinship, language and culture. Changes and continuities in traditional and contemporary Japanese culture are addressed. GE credit: SocSci, Div, Wrt.

149B. Contemporary Japanese Society (4)
Lecture—3 hours; discussion—1 hour. Introduction to contemporary Japanese social structure, social organization, and patterns of culture. Analysis of rural-urban cultural continuities and contrasts, class relations, political and economic systems, kinship, sex/gender systems, contemporary religious beliefs and behavior, conflict, consensus, and cultural stereotypes. Offered in alternate years. GE credit: SocSci, Div, Wrt.—II. J. Shibamoto Smith

(c) Biological Anthropology

151. Primate Evolution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Biological Sciences 1B. Origin and relationships of the prosimians, monkeys, and apes. GE credit: SciEng, Wrt.—III. McHenry

152. Human Evolution (5)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1 or Biological Sciences 1B. Nature and results of the evolutionary processes involved in the formation and differentiation of humankind. GE credit: SciEng, Wrt.—II. McHenry

153. Human Biological Variation (5)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1 or Biological Sciences 1B. Origin, adaptive significance and methods of analysis of genetic differences among human populations. Special attention given to racial differences such as those in blood groups, plasma proteins, red cell enzymes, physiology, morphology, pigmentation and dermatoglyphics. GE credit: SciEng, Wrt.—II. D.G. Smith

154A. The Evolution of Primate Behavior (5)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1. Examines ecological diversity and evolution of social systems of prosimians, monkeys, and apes, placing the social behavior of the primates in the context of appropriate ecological and evolutionary theory. GE credit: SciEng, Wrt.—I. Harcourt

154B. Behavior and Ecology of Primates (3)
Lecture—2 hours; term paper. Prerequisite: course 154A, Statistics 13 or the equivalent, or consent of instructor. Continuation of course 154A. Scientific methods of studying, describing, and analyzing the behavior and ecology of primates. Quantitative analysis of data. Offered in alternate years. GE credit: Wrt.—III. Isbell

154BL. Laboratory in Primate Behavior and Ecology (2)
Laboratory—6 hours. Prerequisite: course 154B (may be taken concurrently), Statistics 13 or the equivalent, or consent of instructor. Continuation of course 154A and 154B. Direct observation and study of captive primates in social groups at the California Regional Primate Research Center. Not open for credit to students who have completed course 154B prior to fall 2003. Offered in alternate years. (P/NP grading only.)—III. Isbell

155. Comparative Primate Anatomy (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: Biological Sciences 1B. The functional anatomy of monkeys, apes, and man. Emphasis on the anatomical evidence for human evolution. GE credit: SciEng, Wrt.—III.

156. Human Osteology (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 1 or the equivalent. Introductory study of the human skeleton, including bone growth, pathology, radiology, evolution, dentition, and variations in race, sex, and age. GE credit: SciEng.—III. McHenry

157. Anthropological Genetics (3)
Lecture—3 hours. Prerequisite: course 1 or Biological Sciences 1A, and Genetics 100, 103, 105, or 106. Processes of micro-evolution responsible for biological differences among human populations. Special attention will be given to the adaptive significance of genetic variation in blood group antigens, serum proteins and red cell enzymes. GE credit: SciEng.—III. D.G. Smith

157L. Laboratory in Anthropological Genetics (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 1 or Biological Sciences 1A, and either Genetics 100 or enrollment in course 157 (concurrently or following). Methods for identifying genetic variation in human blood group antigens, serum proteins and red cell enzymes (hemaglutination), general electrophoresis on starch, cellulose acetate and polyacrylamide, immunodiffusion and immunoelectrophoresis on agarase. (P/NP grading only.) GE credit with concurrent enrollment in course 157: Wrt.

158. The Evolution of Females and Males: Biological Perspective (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Current theoretical frameworks for explaining the evolution of sex differences and for understanding the interrelationship between biological processes and cultural construction of gender roles. GE credit: SciEng, Div, Wrt.—I.

159. Molecular Anthropology of Native America (4)
Seminar—3 hours; term paper. Prerequisite: course 1 or Biological Sciences 1B or consent of instructor. Use of DNA and other genetic polymorphisms to test hypotheses regarding genetic relationships among different Native American tribal groups and about prehistoric population replacements and migrations to and within the Americas. Integration with craniometric, archaeological, paleoenvironmental, linguistic and ethnohistorical evidence. Offered in alternate years.

(d) Archaeology and Prehistory

170. Archeological Theory and Method (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1 and 3. Introduction to history and development of archeological theory and method, with particular emphasis on the basic dependence of the latter on the former. Stress is on historical development of archaeology in the New World. GE credit: SocSci, Div, Wrt.—II. Bettinger

171. Geoarcheology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3. Theories, methods, and techniques for studying the geomorphic context of archeological sites. Particular attention to sediment and soil attributes and analyses for understanding important local landform features and developmental histories of archeological sites. Offered in alternate years. GE credit: SocSci, Wrt.

172. New World Prehistory: The First Arrivals (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or consent of instructor. Survey of data relating to the peopling of the New World. Cultural adaptation and development of early inhabitants of North and South America. Offered in alternate years. GE credit: SocSci, Div, Wrt.

173. New World Prehistory: Archaic Adaptations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or consent of instructor; course 170 recommended. Introduction to and survey of prehistoric hunting and gathering adaptations across North America with particular emphasis on the East, Southeast, Midwest, Plains, Southwest, and Northwest. Offered in alternate years. GE credit: SocSci, Div, Wrt.—I.

176. Prehistory of California and the Great Basin (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or consent of instructor. Description and analysis of the prehistoric peoples of California and the Great Basin from earliest times to European contact. GE credit: SocSci, Div, Wrt.

178. Hunter-Gatherers (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Study and interpretation of the ancient and modern lifeway in which peoples support themselves with primitive technologies and without benefit of domesticated plants and animals. Offered in alternate years. GE credit: SocSci, Div, Wrt.—III. Bettinger

179. Ethnoarchaeology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3. Relationships between behavior and its archeological consequences. Ethnography by archeologists examines residence patterning, site-formation processes, hunting/foraging behavior and other artifact creating activities and how these con-

tribute to modern archeological thinking. GE credit: SocSci, Div, Wrt.

180. Zooarcheology (4)
Lecture—2 hours; discussion/laboratory—3 hours. Prerequisite: course 1 and 3 or consent of instructor. Theories and methods for studying animal skeletal remains from archaeological sites. Identification and quantification of zooarchaeological material, cultural and natural processes affecting animal bones pre and postburial, and use of faunal remains for determining past human diets and past environments. Offered in alternate years—I. Darwent

181. Field Course in Archeological Method (9)
Lecture—6 hours; daily field investigation. Prerequisite: course 3. On-site course in archeological methods and techniques held at a field location in the western United States, generally California or Nevada. Introduces basic methods of archeological survey, mapping, and excavation. GE credit: SciEng.—summer.

183. Laboratory in Archeological Analysis (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 181 or consent of instructor. Museum preparation, advanced field investigation, and guidance in preparation of museum material for publication. May be repeated for credit with consent of instructor. Limited enrollment. GE credit: SciEng, Wrt

184. Prehistoric Technology: The Material Aspects of Prehistoric Adaptation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or 3. Examination of the role of lithic, ceramic, textile and wooden implements as elements in prehistoric survival and development. Emphasis is descriptive, but the significance of material resources as factors in prehistoric adaptation, settlement patterns, and culture change are discussed. GE credit: SocSci.—II. Eerkens

(e) Special Study Courses

191. Topics in Anthropology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: junior or senior standing in anthropology. Intensive treatment of a special anthropological topic or problem. May be repeated once for credit when topic differs.—I. D. Boyd

192. Internship in Anthropology (1-12)
Internship—3-36 hours. Prerequisite: Upper division standing; consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Anthropology under the supervision of a member of the faculty. Limited to Anthropology majors. May be repeated for a total of 12 units including 192 courses taken in other departments. (P/NP grading only.)

194H. Special Study for Honors Students (1-5)
Prerequisite: open only to majors of senior standing who qualify for honors program. Independent study of an anthropological problem involving the writing of an honors thesis. May be repeated for a total of 12 units. (P/NP grading only.)

197T. Tutoring in Anthropology (1-5)
Tutorial—1-5 hours. Prerequisite: upper division standing with major in Anthropology and consent of Department Chairperson. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

201. History of Anthropological Theory (4)
Lecture—2 hours; discussion—1 hour; term paper. Historical development of the various fields of anthropology with emphasis upon their interrelationships.—I. Zhang

202. History and Theory of Biological Anthropology (4)
Seminar—3 hours; term paper. History of thought in biological anthropology and analysis of major theoretical problems in the field. Suggested for all first-year graduate students lacking intensive preparation in biological anthropology.—II. McElreath

203. History and Theory of Archaeology (3)
Seminar—3 hours. History of thought in archaeology and analysis of research methods.—I. Bettinger

204. Contemporary Issues in Anthropological Theory (4)
Seminar—3 hours; term paper. Prerequisite: course 2, 137 or consent of instructor. Advanced consideration of fundamental issues in anthropological theory. Emphasis on critical examination of major contemporary debates between proponents of competing theories.—II. de la Cadena

205. History and Theory in Anthropological Linguistics (4)
Seminar—3 hours; term paper. History of thought in anthropological linguistics. Consideration of the historical development of fundamental ideas in anthropological linguistics, of major theoretical issues, and of research methodology.—III. Klima

206. Research Design and Method in Social Anthropology (5)
Seminar—4 hours; individual student-instructor session (in-depth work on proposal writing). Prerequisite: consent of instructor. Formulation of research problems and preparation of research proposals; relationships between theory and method, funding, pre-fieldwork preparations, entering the community, field research techniques, and problems of ethics; intensive work on proposal writing. May be repeated once for credit. Limited enrollment.—III. Sawyer

207. Ethnographic Writing (4)
Seminar—3 hours; term paper. Prerequisite: courses 137, 201, or the equivalent. Relationship between conducting participant observation of others and writing it up, emphasizing the processual rift between the reality of fieldwork and its written representation. Study of various literary genres and textual strategies used in cultural anthropology. May be repeated for credit.

210. Aspects of Culture Structure (4)
Seminar—3 hours; term paper. Analysis of various phases of culture, such as religion, economics, law, and folklore. May be repeated for credit when topic differs.—I, II, III. Donham, Rouse, Yengoyan, Srinivas, C. Smith

211. Advanced Topics in Cultural Ecology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Environmental Science and Policy/Anthropology 133, graduate standing in Anthropology or Ecology. Topics of current analytical and methodological importance in cultural ecology. Examination of general issues in cultural ecology through study of human response to and influence on climate. (Same course as Ecology 211.)

212. Political Ecology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Interdisciplinary seminar evaluating contributions from ecological anthropology, political economy, cultural constructivism, postmodernism, and feminism towards development of theories of political ecology. Historical relationships between local/global power structures, environmental degradation, and resistance movements. Case studies of desertification, deforestation, mining, conservation, development. Offered in alternate years.—III. Boyd

216. Problems in Archeological Method (4)
Seminar—3 hours; term paper. Techniques for analyzing archeological data; application to various prehistoric cultures. May be repeated for credit with consent of instructor.—II. Darwent

218. Topics in North American Prehistory (4)
Seminar—3 hours; term paper. Advanced study on current problems in North American prehistory and archaeology. May be repeated for credit only if material is unique for that student, and with consent of instructor.

220. Field Course in Linguistics (4)
Seminar—2 hours; laboratory—2 hours. Prerequisite: courses 110, 111. Techniques of eliciting, recording, and analyzing; work with a native speaker.

221. Rural Transformation in Postcolonial Societies (4)
Seminar—3 hours; term paper. Prerequisite: courses 223, 265, or consent of instructor. Problems of rural transformation arising out of political and economic interaction between national elites and rural regional and local populations under varying conditions of induced change in postcolonial societies. Attention will be given to the implications of this interaction for rapid economic growth. May be repeated for credit.—Orlove

222. Cities and Citizenship (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. The nature of modern cities, urban socio-economic life, and urban culture and politics from an anthropological perspective.

223. Economic Anthropology (4)
Seminar—3 hours; term paper. Prerequisite: course 122 or consent of instructor. Selected current methodological and theoretical problems in the analysis of nonindustrial economic systems.

224. Problems in Comparative Religion (4)
Seminar—3 hours; term paper. Advanced study of current problems in the anthropological study of religion.

225. State and Nation in the Modern World (4)
Seminar—3 hours; term paper. A presentation of current anthropological theories of the origins and nature of the modern nation-state in both the First and Third Worlds, with special reference to state ideology (nationalism) and forms of control. Offered in alternate years.

226. Consciousness and Resistance (4)
Seminar—3 hours; term paper. Prerequisite: completion of first-year graduate work or consent of instructor. Consideration of approaches to the study of social inequality, and responses of subordinated groups. Emphasis on situating approaches to contemporary social theory, concrete research problems, and political strategies. Topics: formation of consciousness and identity; collective action, accommodation to frontal resistance.

227. Behavioral Ecology and Anthropology (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. An exploration of the links between behavioral ecology and the study of human cultural variation, focusing on social organization, marriage, reproduction, inheritance and subsistence in traditional and historical populations. May be repeated once for credit. Offered in alternate years.

228. Culture and Power (4)
Seminar—3 hours; extensive writing. Prerequisite: graduate standing or consent of instructor. Exploration of one of the core paradigms within contemporary anthropological inquiry, "culture and power." Focus on how distinct theoretical perspectives - Marxism, post-Marxism, structuralism, post-structuralism, and feminism - have examined the mutually constitutive nature of culture and power.

229. Topics in Gender, Identity, and Selfhood (4)
Seminar—3 hours; term paper. Intersections of gender, identity, and selfhood cross-culturally and historically. How the self is feminized and masculinized, and interfaces with sexual, race, class, work, national, minority, and majority identities under different historical, cultural, and social structural conditions. May be repeated for credit when topic differs.—II. Joseph

230. Family Systems and Reproduction: Theory and Comparisons (4)
Lecture—1.5 hours; seminar—1.5 hours; term paper. Prerequisite: graduate standing in one of the social sciences including History. Comparative examination of family systems in historical context and of reproductive behaviors and strategizing. A major theme is how family-system norms specify the relative desirability of differently configured offspring sets.

Cases are drawn from Western Europe and South and East Asia.

232. Political Movements (4)
Seminar—3 hours; term paper. Prerequisite: completion of first-year graduate work recommended. An interdisciplinary approach to political movements of pro-test, reform, and revolution emphasizing historical comparison and evaluation of major theoretical approaches including world systems, resource mobilization, state and culture, rational choice, moral economy, social class and gender.

239. Problems in African Society and Culture (4)
Seminar—3 hours; term paper. Diachronic analyses of traditional institutions in sub-Saharan Africa.

241. Topics in North American Ethnology (4)
Seminar—3 hours; term paper. Advanced study on current problems in North American ethnography and culture history. May be repeated for credit with consent of instructor.

245. Ethnology of Northern and Central Asia (4)
Seminar—3 hours; term paper. Prerequisite: a reading knowledge of German, Russian, Chinese, or Japanese. Lectures on the culture aboriginally found north of the Caucasus-Korea line. Supervised study of the primary and secondary sources. Work with informants when available.

246. Ethnology of Europe (4)
Seminar—3 hours; term paper. Prerequisite: reading knowledge of a European language other than English. Supervised study of the primary and secondary sources dealing with the ethnography and ethnology of the peoples of Europe. Emphasis upon folk, peasant, and minority groups.

248. Topics in Chinese Culture and Society (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing in the social sciences, history, or the humanities. Selected topics in the anthropology of Chinese society. Focus on one or more of the following topics: state-society dynamics, family and gender, city formation and urban life, social movement, labor politics, and religion and ideology in Chinese society. May be repeated for credit when topic differs.

250. Behavioral Ecology of Primates (4)
Seminar—3 hours; term paper. Prerequisite: course 154A (may be taken concurrently) or the equivalent, graduate standing. Concepts, issues, and hypotheses in primate behavioral ecology, with emphasis on the social and ecological determinants and consequences of variation in social organization for individuals.—I. Isbell

252. Human Evolution Seminar (4)
Seminar—3 hours; term paper. Prerequisite: course 152 or the equivalent; consent of instructor. Study of selected topics in human evolutionary studies. Each year course will focus on one or more of the following: molecular evolution, primate evolutionary biology, Tertiary hominoids, Australopithecus, Homo erectus, archaic Homo sapiens, brain evolution. May be repeated for credit.

253. Seminar in Human Biology (4)
Seminar—3 hours; term paper. Prerequisite: course 153, 157, or consent of instructor. Study of selected topics in human biology. May be repeated for credit when topics vary.—III. D.G. Smith

254. Current Issues in Primate Sociobiology (4)
Seminar—3 hours; term paper. Prerequisite: course 154B or the equivalent. Analysis of primate behavior, with particular emphasis on preparation for field studies. May be repeated for credit when topic differs.—II. Rodman

256. Primate Conservation Biology (4)
Seminar—3 hours; term paper. Prerequisite: course 154, graduate standing or upper division undergraduate with consent of instructor. Application of understanding of primate biology to conservation of primates and their habitat. Topics include evolutionary anthropology, behavioral ecology, biogeography, macroecology, population biology, and socio-ecology of primates. May be repeated once for credit if term paper differs. (S/U grading only.)

261. Modeling the Evolution of Social Behavior (4)
Lecture—3 hours; extensive problem solving. Prerequisite: Mathematics 16C or the equivalent or consent of instructor. Tools and topics in modeling the evolution of social behavior in humans and other animals. Game theory, basic population genetics, animal conflict, altruism, reciprocity, signaling, and group selection. Offered in alternate years.—II. McElreath

262. Evolution and Human Behavior (4)
Discussion—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Exploration of the links between behavioral ecological theory and human cultural variation, focusing on reproduction, marriage, parental investment and family structure; implications of evolutionary theory for social organization in human communities, historical and contemporary. Offered in alternate years.—III. Borgerhoff Mulder

263. Human Applications of Foraging Theory (4)
Discussion—3 hours; laboratory—3 hours, Foraging theory models and their use in ethnographic and archaeological analyses of human behavior, with a focus on hunter-gathers and resource selection, patch use, population and habitat, central places, sharing, stochastic processes, population dynamics, and conservation behavior. Not open for credit to students who have completed course 258.—I. (I.) Winterhalder

265. Language, Performance, and Power (4)
Seminar—3 hours; term paper. Exploration of the intersection between linguistic and social theories in the language-state relation and the performance of identity. Ideological sources of language differentiation; nation-building and linguistic difference. Political economic, sociolinguistic, and ethnographic approaches to understanding linguistic inequality. (Same course as Linguistics 265.) Offered in alternate years.—III. J. Shibamoto Smith

270. Anthropology Colloquium Seminar (1)
Seminar—1 hour. Reports and discussions of recent advances in the four subfields of anthropology. To be presented by guest speakers. May be repeated twice for credit. (S/U grading only.)—I, II, III. Darwent

280. Current Anthropology Journal Editorial Workshop (4)
Workshop—1 hour; independent study—3 hours. Students must enroll for all three quarters. Reading and offering workshop critiques of manuscripts submitted for publication, and reading and discussion of other relevant work in anthropology and human ecology. Track and edit published comments and authors' replies that accompany major features. Participation in the development of new sections for the electronic edition of the journal, including a "news and views" section and a debate section. (Same course as Ecology 280.) May be repeated for 12 units of credit with consent of instructor. (S/U grading only.)—I, II, III. Orlove

292. Seminar in Linguistic Anthropology (4)
Seminar—3 hours; term paper. Selected topics in linguistic anthropology. May be repeated for credit when topic differs.

298. Group Study (1-4)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

299D. Dissertation Research (1-12)
(S/U grading only.)

Professional Course

390. Teaching Anthropology (4)
Seminar—3 hours; practice—1 hour. Prerequisite: graduate standing in Anthropology or closely related discipline. Intellectual and practical elements of college teaching in the field of Anthropology, from curriculum design and the syllabus through grading and course evaluations, including classroom and information technology methods, and problems and rewards of teaching in higher education. Offered in alternate years.—I. Winterhalder

Applied Behavioral Sciences

See Community and Regional Development

Applied Biological Systems Technology

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Biological and Agricultural Engineering.

Minor Program. The Department of Biological and Agricultural Engineering offers a minor in Applied Biological Systems Technology for non-engineering students interested in becoming familiar with engineering terminology and procedures. Course work provides knowledge of material properties, design procedures, fabrication principles, and hardware practices.

Minor Program Requirements:

	UNITS
Applied Biological Systems Technology	**20**
Choose one course from Applied Biological Systems Technology 15, 16, or 17	2
Applied Biological Systems Technology 170	3
Select at least nine units from Applied Biological Systems Technology 101, 110L, 121, 142, 145, 147, 161, 163, 165, 175	9
Select the remaining units from Agricultural Management and Rangeland Resources 110A; Animal Science 118, 119, 143, 146; Environmental Horticulture 125; Food Science and Technology 102A, 110A, 110B; Hydrologic Science 110; Plant Biology 172, 172L, 196; Viticulture and Enology 140	6

Minor Advisor. J.W. Rumsey.

Courses in Applied Biological Systems Technology (ABT)

Lower Division Courses

15. Wood Properties and Fabrication (2)
Lecture—1 hour; laboratory—3 hours. Physical principles and properties of wood as related to strength, design procedures, and selection and use of woodworking equipment. Experience in working with wood. (P/NP grading only.)—III. (III.) Grismer

16. Metal Properties and Fabrication (2)
Lecture—1 hour; laboratory—3 hours. Study of metal properties and of techniques for fabricating in metal. Physical principles, design considerations, effects of techniques on quality and appearance, and evaluation procedures. Experience in working with metal. (P/NP grading only.)—I. (I.) J. Rumsey

17. Plastic Properties and Fabrication (2)
Lecture—1 hour; laboratory—3 hours. Study of the properties of plastic materials and the fundamentals of fabrication techniques. Experience in working with common plastics, with applications to biological systems. (P/NP grading only.)—III. (III.) Jenkins

49. Field Equipment Operation (2)
Lecture—1 hour; laboratory—3 hours. Operation, adjustment, and troubleshooting of farm tractors and field equipment. Principles of operation, equipment terminology and uses of tilling, cultivating, thinning,

and planting equipment. Typical sequences in cropping practices. (P/NP grading only.)—I, III. (I, III.) J. Rumsey

52. Field Equipment Welding (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 16 or consent of instructor. Intermediate welding to include hardfacing and inert gas welding. Class projects on repair and fabrication by welding. Troubleshooting and major repair of field equipment. (P/NP grading only.)—II. (II.) J. Rumsey

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)
(P/NP grading only.)

Upper Division Courses

101. Engine Technology (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: upper division standing or consent of instructor. Principles of 2-stroke cycle, 4-stroke cycle gasoline and 4-stroke cycle diesel engine construction and operation. Engine systems, performance, troubleshooting, and overhaul.—II. (II.) J. Rumsey

110L. Experiments in Food Engineering (2)
Laboratory—6 hours. Prerequisite: Food Science and Technology 110B (may be taken concurrently). Use of temperature sensors; measurement of thermal conductivity and heat transfer in foods; refrigeration, freezing, concentration and dehydration of foods.—II. (II.) Singh

121. Animal Housing and Environment Management (2)
Lecture—2 hours. Prerequisite: Animal Science 1 or 2. Optimal structures and environments for animal growth and comfort; heat and moisture transfer principles; heating, cooling, ventilating principles and equipment; animal housing design; environmental regulations and waste management practices. Offered in alternate years.—(II.) Zhang

142. Equipment and Technology for Small Farms (2)
Lecture—1 hour; laboratory—3 hours. Types and characteristics of agricultural equipment and technologies appropriate for small commercial farming. Adjustment and calibration of equipment. Selection of and budgeting for equipment. (Same course as International Agricultural Development 142.)—III. (III.) J. Rumsey

145. Field Equipment Technology (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: upper division standing and Physics 1A or 5A. Function, construction, and operating principles of field equipment for harvesting fruit, nut, vegetable, and field crops. Principles of operation and construction of hydraulic systems. Function and application of pumps, motors, and valves for controlling field equipment.—III. (III.) J. Rumsey

147. Field Equipment Management (2)
Lecture—2 hours. Prerequisite: course 49 (may be taken concurrently) or consent of instructor. Fundamentals of field machinery management to include machinery capacity, selection from capacity and economic standpoints, scheduling, acquisition options, and trade-in considerations. Estimation of operating costs of field machinery.—I, II, III. (I, II, III.) J. Rumsey

161. Water Quality Management for Aquaculture (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1B, Mathematics 16B, Chemistry 2B. Basic principles of water chemistry and water treatment processes as they relate to aquacultural systems. Offered in alternate years.—(II.) Piedrahita

163. Aquaculture Systems Engineering (3)
Lecture—3 hours. Prerequisite: course 161. Design of aquacultural systems: design methodology, principles of fluid mechanics, site selection and facility planning, management operations, computer modeling. Offered in alternate years.—(III.) Piedrahita

165. Irrigation Practices for an Urban Environment (2)
Lecture—2 hours. Prerequisite: Physics 1A or 5A. Basic design, installation, and operation principles of irrigation systems for turf and landscape: golf courses, parks, highways, public buildings, etc. Emphasis on hardware association with sprinkler and drip/trickle systems.—III. (III.) Hills

170. Design in Biological Systems Technology (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Physics 1A or 5A and course 15, 16, or 17. Introduction and application of design procedures and tools. Techniques are presented for solving design problems and selecting appropriate materials. Catalog and handbook utilization, government safety regulations, and environmental considerations are discussed.—II. (II.) J. Rumsey

175. Introduction to Precision Agriculture (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Agricultural Systems and Environment 21 or the equivalent computer experience. Concepts of precision agriculture. Variability in yield, yield monitors and mapping, remote sensing, variability in plant and soil conditions, global positioning system (GPS), geographic information system (GIS), sensors and actuators, map controlled variable rate application (VRT), socio-economic aspects of precision agriculture.—I. (I.) Upadhyaya

180. Introduction to Geographic Information Systems (4)
Lecture—3 hours; laboratory/discussion—3 hours. Prerequisite: Agricultural Management and Rangeland Resources 21 or equivalent familiarity with computers, Agricultural Management and Rangeland Resources 120 or the equivalent, Mathematics 16A. Management and analysis of georeferenced data. Spatial database management and modeling. Applications to agriculture, biological resource management and social sciences. Cartographic modeling. Vector and raster-based geographic information systems. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 132. (Same course as Agricultural Management and Rangeland Resources 180.)—II. (I.) Plant

182. Environmental Analysis using GIS (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 180 or equivalent GIS experience and skills; general biology and/or ecology courses recommended. Ecosystem and landscape modeling with emphasis on hydrology and solute transport. Spatial analysis of environmental risk analysis including ecological risk assessment, natural resource management. Spatial database structures, scripting, data models, and error analysis in GIS. Offered in alternate years.—III. Zhang

185. Concepts and Methods in Geographic Information Systems (4)
Lecture/laboratory—8 hours. Prerequisite: course 180 or Agricultural Management and Rangeland Resources 180 or Landscape Architecture 50 or consent of instructor. Major concepts and methods in representation and analysis of data in geographic information systems (GIS). Methods to create spatial data sets from analog and digital data sources such as aerial photography and maps; data structures, data management, database design, georeferencing, georectification, surface models, analysis, and visualization of spatial data. (Same course as Landscape Architecture 185.)—II. (II.) Greco, Plant

190C. Research Conference for Advanced Undergraduates (1)
Discussion—1 hour. Prerequisite: consent of instructor. Research conferences for specialized study in applied biological systems technology. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship in Applied Biological Systems Technology (1-5)
Internship—3-15 hours. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised internship in applied biological systems technology. May be repeated for credit. (P/NP grading only.)

197T. Tutoring in Applied Biological Systems Technology (1-5)
Tutorial. Tutoring individual students, leading small voluntary discussion groups, or assisting the instructor in laboratories affiliated with one of the department's regular courses. May be repeated for credit if topic differs. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

233. Pest Control Practices (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: graduate standing or consent of instructor. Practical and theoretical considerations of pest control systems and techniques. Design, selection, and use of mechanical systems for field, orchard, greenhouse, and vector control use. Biological, legal, and environmental considerations in pest control and pesticide application.—(II.) Giles

290C. Graduate Research Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress, and techniques in applied biological systems technology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Professional Course

317. Teaching Agricultural Mechanics (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: a course in physics; 6 units related to agricultural mechanics; enrolled in Agricultural Education Teacher Credential Program. Preparation of the teacher to plan, organize, and conduct an agricultural mechanics program in secondary schools. Development of and presentation of lesson plans and teaching aids. Review of subject matter in metal fabrication, power and machinery and agricultural structures areas.—II. (II.) J. Rumsey

Applied Computing and Information Systems

(College of Agricultural and Environmental Sciences)

This minor is for students interested in applying modern computer technology to management problems in agriculture, resource management, and other areas. Course work provides knowledge of the use of information technology and the methodology of applied quantitative and systems analysis. The minor is offered by the Department of Agronomy and Range Science.

Minor Program Requirements:

	UNITS
Applied Computing and Information Systems	**18**
Two or three of the following courses: Agricultural Management and Rangeland Resources 120, 121, Animal Science 128, Computer Science Engineering 167. (The third course may be taken in substitution for a course from either of the elective groups.)	
Remainder of the units to be made up of courses in one or both of the following groups	6-12

Computer applications, computer assisted analysis in data manipulation: Agricultural and Resource Economics 106, 155, Agricultural Management and Rangeland Resources 180, Applied Biological Systems Technology 180, 181, 182, Community and Regional Development 160, Economics 102, Computer Science Engineering 124, Hydrologic Science 182, International Agricultural Development 170, Statistics 141

Communication and business organization: Agricultural and Resource Economics 112, Community and Regional Development 168, Communication 103, 130, 134, 135, 136, International Agricultural Development 111

Minor Adviser. T.C. Foin *(Agronomy and Range Science),* T.F. Famula *(Animal Science).*

Advising Center is located in 1220A Plant and Environmental Sciences (530-752-1715).

Applied Mathematics (A Graduate Group)

Group Office, 566 Kerr Hall (530-752-8131); gradc@math.ucdavis.edu

http://math.ucdavis.edu

Faculty. The Group includes approximately 65 faculty members, of whom about one-third are in the Department of Mathematics. Membership comprises chemists, biologists, physicists, geologists, statisticians, computer scientists, and engineers. Research interests include biology, atmospheric sciences, mechanics, solid and fluid dynamics, optimization and control, theoretical chemistry, computer and engineering sciences, mathematical physics, signal and image processing, harmonic analysis, numerical analysis and nonlinear partial differential equations. A complete list of faculty and their research areas are available on our Web page.

Graduate Study. Students prepare for careers where mathematics is applied to problems in the physical and life sciences, engineering, and management. The degree requirements consist of rigorous training in applied mathematics, including course work and a research dissertation under the direction of a member of the Graduate Group in Applied Mathematics. The M.S. degree provides preparation for further study in applied mathematics or an application area, or for a career in industry or public service. The Ph.D. degree provides preparation for a career in research and/or teaching, or in industrial or national research laboratories. For further information, please contact the Graduate Coordinator at gradc@math.ucdavis.edu or (530) 752-8131.

New applicants are admitted to the fall quarter only.

Preparation. The program admits qualified students with a bachelor's degree in mathematics, physics, chemistry, engineering, economics, the life sciences and related fields. General and advanced mathematics GRE scores are required, and applicants should display evidence of strong quantitative skills. Undergraduate courses should include calculus (including vector calculus), linear algebra, and ordinary differential equations. Advanced calculus (introduction to real analysis) is strongly recommended. Additional background in probability, partial differential equations, and/or numerical analysis is a plus.

Graduate Advisers. Contact the graduate coordinator at gradc@math.ucdavis.edu; (530) 752-8131.

Applied Physics

See Physics

Aquaculture

See Animal Biology; Animal Science; Applied Biological Systems Technology; and Wildlife, Fish, and Conservation Biology

Art History

(College of Letters and Science)

Jeffrey Ruda, Ph.D., Program Director

Department Office, 101 Art Building (530-752-0105)

http://arthistory.ucdavis.edu

Faculty

Katharine Burnett, Ph.D., Assistant Professor
Douglas Kahn, Ph.D., Professor
Dianne Sachko Macleod, Ph.D., Professor
Lynn Roller, Ph.D., Professor *(Classics, Art History)*
Jeffrey Ruda, Ph.D., Professor
Simon Sadler, Ph.D., Assistant Professor
Blake Stimson, Ph.D., Assistant Professor
Diana Strazdes, Ph.D., Assistant Professor

Emeriti Faculty

Mary H. Fong, Ph.D., Professor Emerita
Robert J. Grigg, Ph.D., Professor Emeritus
Seymour Howard, Ph.D., Professor Emeritus

The Major Program

Art History studies the changing visual expression of values, beliefs and experiences across diverse cultures and over time. It provides training in historical, social and aesthetic understanding, critical thinking, scholarly research, and lucid, thoughtful analysis and writing. More than any other discipline art history sharpens its students' visual acuity and deepens their visual literacy. In so doing, it prepares them to face the increasingly complex visual world we find ourselves in today.

The Program. The major begins with a series of courses that surveys major landmarks in the history of visual culture, art and architecture in Asia, Europe, and the United States. More advanced lecture courses and proseminars focus on particularly important periods and issues. Students are encouraged to personalize their training with internships, independent study, and focused upper-division study. Top students considering graduate study are encouraged to engage in more advance study in the Honors program.

Career Options. A major in Art History develops critical thinking and the integration of research, interpretation and understanding. It provides an excellent liberal arts basis for professions as far ranging as advertising, law, medicine, politics and business. The major prepares students for advanced study in Art History, Architecture, Museum Studies and Cultural Studies. It also serves as the foundation for careers in teaching, arts, administration, museums, galleries, historic preservation, art libraries, publishing, journalism, advertising, art conservation, and art investment. As the world becomes increasingly flooded with images, the critical visual literacy gained through the study of art history becomes more important for a wide variety of careers.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**20**
Art History 1A, 1B, 1C, and 1D (Art History 25 may be substituted for one of the above)	16
One Art Studio course	4
Depth Subject Matter	**40**
One course in each of the following areas:	16
(a) Ancient Mediterranean: Art History 172A, 172B, 173, 175; Classics 171, 174	
(b) Asian: Art History 163A, 163B, 163D, 164	
(c) European and American before 1865: Art History 178A, 178B, 178C, 179B, 182, 183A, 188D	
(d) European and American since 1865: Art History 183B, 183C, 185, 186, 188E, 189	
One additional non-Western area may be substituted for any of these four areas, with consent of the major adviser.	
Art History 190A-H	4
Five additional upper division Art History courses	20
Students may choose any other five upper division Art History courses or may wish to focus on one of the following areas of emphasis:	
(a) Comparative Visual Cultures: choose one additional course in each of the four subfields plus one upper division elective.	
(b) Architectural History: choose at least three upper division courses from Art History 154C, 173, 175, 188A, or 188B, plus up to two upper division electives not used in satisfaction of other major requirements.	
(c) Museums, Collecting, and Patronage: Art History 182, and 188G, plus two upper division electives not used in satisfaction of other major requirements. Art History 401 and 402 strongly recommended.	
Appropriate *course substitutions may be made with the prior consent of the major adviser.*	
Total Units for the Major	**60**

Minor Program Requirements:

	UNITS
Art History	**20**
One course each in three of the following four areas	12
(a) Ancient Mediterranean: Art History 172A, 172B, 173, 175; Classics 171, 174	
(b) Asian: Art History 163A, 163B, 163D, 164	
(c) European and American before 1865: Art History 178A, 178B, 178C, 179B, 182, 183A, 188D	
(d) European and American since 1865: Art History 183B, 183C, 185, 186, 188E, 189	
Two additional Art History courses; Art History 190A-H strongly recommended	8
One lower division course may be substituted for upper-division study in any of these areas. Other appropriate substitutions may be made for the listed course options above with the prior consent of the major adviser.	

Honors Program. The Honors Program is encouraged for Art History majors who are considering attending graduate school. To be eligible for the program, a student must have a grade point average of 3.7 in the major or consent of the major adviser. In addition to meeting the standard major requirements, the honors student completes at least one

quarter of language in German or Chinese, one undergraduate proseminar (course 190), and writes an honors thesis (course 194H). Students participating in this Program are candidates for Departmental recommendation for graduation with High or Highest Honors. See the Academic Information chapter, Letters and Science honors section, of this catalog and consult the department for more information.

Teaching Credential Subject Representative. Department Chairperson. See also the Teacher Education Program.

Graduate Study. The Program in Art History offers studies leading to the Master of Arts degree in History of Art as preparation for further graduate study or professional work. Further information may be obtained from the Graduate Staff Adviser at (530) 752-0616 or consulting the *Graduate Announcement.*

Courses in Art History (AHI)

Lower Division Courses

1A. Ancient Mediterranean Art (4)
Lecture—3 hours; discussion—1 hour. Introduction to the art and architecture of the ancient Mediterranean world, including Mesopotamia, Egypt, Greece, and Rome. GE credit: ArtHum.—I. Roller

1B. Medieval and Renaissance Art (4)
Lecture—3 hours; discussion—1 hour. Christian, Barbarian, Moslem, and Classical traditions in European Art from the fourth through the sixteenth centuries. GE credit: ArtHum.—II. (II.) Ruda

1C. Baroque to Modern Art (4)
Lecture—3 hours; lecture/discussion—1 hour. Survey of developments in western art and visual culture from 1600–present. Major artists and movements, theories of visuality, focused study on changing interpretations of class, gender, sexuality, and ethnicity from the Baroque period through modernism, to the present. May be repeated for credit. GE credit: ArtHum, Div.—III. (III.) Macleod, Strazdes

1D. Arts of Asia (4)
Lecture—3 hours; discussion—1 hour. Introduction to major forms and trends in the arts and material culture of Asia from the Neolithic to the contemporary emphasizing the visual manifestation of secular and religious ideas and ideals. GE credit: ArtHum, Div.—I. (I.) Burnett

1DV. Arts of Asia (Web) (4)
Online lecture—3 hours; discussion—1 hour. Introduction to major forms and trends in the arts and material culture of Asia from the Neolithic to the contemporary emphasizing the visual manifestation of secular and religious ideas and ideals. Not open for credit to students who have completed course 1D. GE credit: ArtHum, Div.—I, II. Burnett

5. Introduction to Visual Culture (4)
Lecture—2 hours; film viewing—2 hours; discussion—1 hour. Development of visual literacy for an increasingly visual world. Critical analyses focus on a wide variety of visual media—art, television, film, advertising, the Internet—intended for a diverse spectrum of audiences. GE credit: ArtHum, Div, Wrt.—I. Stimson

10. Twenty Monuments (4)
Lecture—3 hours; film viewing—1.5 hours; lecture/discussion—0.5 hour. Art history through focused analyses of about 20 world-historical monuments and artistic ideas by all members of the Art History faculty. Slide lectures are complemented by a weekly program of influential films raising issues and controversies. GE credit: ArtHum.

25. Introduction to Architectural History (4)
Lecture—3 hours; discussion—1 hour. Formal and social history of architecture, examining design principles, major traditions, and concepts of architectural history with a focus on issues in Western architecture. Emphasis on nineteenth and twentieth centuries. GE credit: ArtHum.

25G. Writing: Introduction to Architectural History (1)
Discussion—1 hour. Prerequisite: course 25 concurrently. Small group discussions and preparation of short papers for course 25. GE credit with concurrent enrollment in course 25: Wrt.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Restricted to lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

110. Cultural History of Museums and Art Exhibitions (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1A or 1B or 1C or 1D. Evolution of museums in the western world from the "cabinet of curiosities" of sixteenth-century Europe to the modern "art center." The changing motives behind collecting, exhibiting, and interpretation of objects. Attention to museums' historical legacies and their continuing philosophical dilemmas. Offered in alternate years. GE credit: ArtHum, Wrt.—I. Strazdes

150. Arts of Subsaharan Africa (4)
Lecture—3 hours; term paper or gallery studies and review. Traditional arts and crafts of subsaharan Africa; particular attention to the relationships between sculpture and culture in West and Central Africa. GE credit: ArtHum, Div.

151. Arts of the Indians of the Americas (4)
Lecture—3 hours; term paper or gallery studies and review. Development of art in North America, emphasizing ancient Mexico. South American relationships and parallels. Recent and contemporary Indian arts and crafts from Alaska to Chile. GE credit: ArtHum, Div.

152. Arts of Oceania and Prehistoric Europe (4)
Lecture—3 hours; term paper. Traditional arts of aboriginal Australia, Melanesia, Polynesia, and Micronesia, as seen in their cultural contexts. Prehistoric art of Europe and the Near East. GE credit: ArtHum, Div.

153. Art, Storytelling and Cultural Identity in the Pacific (4)
Lecture/discussion—3 hours; term paper. Representation of the cultural identities of indigenous and migrant groups of the Pacific in visual arts and storytelling. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

163A. Chinese Art (4)
Lecture—3 hours; term paper or gallery studies and review. A survey from the beginning to the twelfth century focusing on the major art forms that are traditionally known as well as newly discovered through archaeology in China. GE credit: ArtHum, Div, Wrt.—(II.) Burnett

163B. Chinese Painting (4)
Lecture—3 hours; term paper or gallery studies and review. The unique form of ink painting, with or without colors, depicting human and animal figures, flowers-and-birds, and landscape—the favorite and enduring theme of the Chinese scholar-painter. GE credit: ArtHum, Div, Wrt.—Burnett

163C. Painting in the People's Republic of China (4)
Lecture—3 hours; term paper. Prerequisite: course 1D or upper division standing. Analysis of the interaction between art and politics in the emergence of China into the modern world. Integration of Western influence, implementation of Mao Zedong's thought on art, and the formation of contemporary Chinese painting. GE credit: ArtHum, Div, Wrt.—Burnett

163D. Visual Arts of Early Modern China (4)
Lecture—3 hours; term paper. Prerequisite: course 163B or consent of instructor. Variable topics in Chinese art history during the 17th-19th centuries, considering artists' statements (visual and textual) within their historical contexts, asking what was at stake in the creation of new art forms. May be repeated for credit with consent of instructor. GE credit: ArtHum, Wrt, Div.—II. Burnett

164. The Arts of Japan (4)
Lecture—3 hours; term paper and/or gallery studies and review (determined by instructor each quarter course offered). Study of the significant achievements in architecture, painting, sculpture, and decorative arts from prehistoric age to nineteenth century. GE credit: ArtHum, Div, Wrt.—III.

168. Great Cities (4)
Lecture—3 hours; term paper. Transformation in architecture and urban form in Paris, London, and Vienna in the context of varying social, political, and economic systems as well as very different cultural traditions, concentrating on the years 1830-1914. Offered in alternate years. GE credit: ArtHum, Wrt.

172A. Early Greek Art and Architecture (4)
Lecture—3 hours; term paper. Examination of the origin and development of the major monuments of Greek art and architecture from the eighth century to the mid-fifth century B.C. Not open for credit to students who have completed course 154A. (Same course as Classics 172A.) Offered in alternate years. GE credit: ArtHum, Wrt.—II. Roller

172B. Later Greek Art and Architecture (4)
Lecture—3 hours; term paper. Study of the art and architecture of later Classical and Hellenistic Greece, from the mid-fifth century to the first century B.C. Not open for credit to students who have completed course 154B. (Same course as Classics 172B.) Offered in alternate years. GE credit: ArtHum, Wrt.—II. Roller

173. Roman Art and Architecture (4)
Lecture—3 hours; term paper. The art and architecture of Rome and the Roman Empire, from the founding of Rome through the fourth century C.E. Not open for credit to students who have completed course 155. (Same course as Classics 173.) Offered in alternate years. GE credit: ArtHum, Wrt.—III. Roller

175. Architecture and Urbanism in Mediterranean Antiquity (4)
Lecture—3 hours; extensive writing. Prerequisite: a lower division Classics course (except 30, 31); course 1A recommended. Architecture and urban development in the ancient Near East, Greece, and Rome. Special emphasis on the social structure of the ancient city as expressed in its architecture, and on the interaction between local traditions and the impact of Greco-Roman urbanism. (Same course as Classics 175.) Offered in alternate years. GE Credit: ArtHum, Div, Wrt.—(II.) Roller

176A. Art of the Middle Ages: Early Christian and Byzantine Art (4)
Lecture—3 hours; term paper or gallery studies and review. Painting, sculpture and architecture of the early Christian era and Byzantine Empire: through the later Roman Empire in the West and to the final capture of Constantinople in the East. GE credit: ArtHum, Wrt.

176B. Art of the Middle Ages: Early Medieval and Romanesque Art (4)
Lecture—3 hours; term paper or gallery studies and review. Painting, sculpture and architecture of western Europe in the early medieval era: from the rise of the barbarian kingdoms through the twelfth century. GE credit: ArtHum, Wrt.

176C. Art of the Middle Ages: Gothic (4)
Lecture—3 hours; term paper or gallery studies and review. Painting, sculpture and architecture in northern Europe from the twelfth through the fifteenth centuries.

177A. Northern European Art (4)
Lecture—3 hours; term paper or gallery studies and review. Painting and sculpture of the fifteenth century in Austria, Germany, France and the Lowlands, including such artists as Jan van Eyck and Hieronymus Bosch. GE credit: ArtHum, Wrt.

177B. Northern European Art (4)
Lecture—3 hours; term paper or gallery studies and review. Painting and sculpture of the sixteenth century in Germany, France and the Lowlands, including

such artists as Albrecht Dürer and Pieter Bruegel. GE credit: ArtHum, Wrt.

178A. Italian Renaissance Art (4)
Lecture—3 hours; term paper or gallery studies and review. Giotto and the origins of the Renaissance; painting and sculpture in Italy from Nicola Pisano through Lorenzo Monaco, with emphasis on Duccio, Giotto, and other leading artists of the early fourteenth century. GE credit: ArtHum, Wrt.—Ruda

178B. Italian Renaissance Art (4)
Lecture—3 hours; term paper or gallery studies and review. Early Renaissance in Florence; fifteenth-century artists from Donatello and Masaccio through Botticelli, in their artistic and cultural setting. GE credit: ArtHum, Wrt.—Ruda

178C. Italian Renaissance Art (4)
Lecture—3 hours; term paper or gallery studies and review. The High Renaissance: Leonardo, Michelangelo, Raphael, and Titian in their artistic and cultural settings—Florence, Rome, and Venice in the early sixteenth century. GE credit: ArtHum, Wrt.—I. (III.) Ruda

179B. Baroque Art (4)
Lecture—3 hours; term paper or gallery studies and review. Seventeenth-century painting, including such artists as Caravaggio, Rubens, Rembrandt, and Velázquez. Offered in alternate years. GE credit: ArtHum, Wrt.—(I.) Ruda

182. British Art and Culture, 1750–1900 (4)
Lecture—3 hours; term paper. Prerequisite: course 1C recommended. British painting in relation to the position of women in society and the rise of the middle-class art market. Topics include Hogarth and popular culture, Queen Victoria and the female gaze, and Pre-Raphaelite artists and collectors. Not offered every year. GE credit: ArtHum, Wrt.—III. Macleod

183A. Art in the Age of Revolution, 1750–1850 (4)
Lecture—3 hours; term paper. Prerequisite: course 1C recommended. Emergence of modernism in Europe from the late 18th century to the middle of the 19th century. Major artistic events viewed against a revolutionary backdrop of changing attitudes toward identity, race, and gender. Not offered every year. GE credit: ArtHum.—II. Macleod

183B. Impressionism and Post-Impressionism: Manet to 1900 (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1C recommended. Innovations of Impressionists, Post-Impressionists, and Symbolists in relation to social changes. Assessment of role of dealers and critics, myth of the artist-genius, and gender relations in French art and culture of the late 1800s. GE credit: ArtHum, Div, Wrt.—II. (II.) Macleod

183C. Modernism in France, 1880–1940 (4)
Lecture—10 hours; discussion—3 hours; fieldwork—11 hours. Course will take place as a 3-week summer course in France. A survey of gender and patronage in the development of modern art in France. Post-Impressionism, Fauvism, Cubism, and Surrealism are considered in relation to the intervention of dealers and women collectors in the formulation of modernism. GE credit: ArtHum, Div, Wrt.—summer (summer) Macleod

183D. Modern Sculpture (4)
Lecture—3 hours; term paper or gallery studies and review. Sculpture from Neo-Classicism to the present.

184. Twentieth Century Architecture (4)
Lecture—3 hours; term paper. Prerequisite: course 25 recommended. Major movements in architecture of the twentieth century in Europe and America. Formal innovations are examined within the social, political, and economic circumstances in which they emerged. GE credit: ArtHum, Wrt.— II.

185. Avant-Gardism and its Aftermath, 1917-1960 (4)
Lecture/discussion—4 hours. Prerequisite: one course in art history, or upper division standing and a major or minor in the arts or humanities recommended. Social, cultural, aesthetic, and theoretical development for artists and their audiences in the context of larger issues like the Mexican, Russian and German revolutions, WWI, the Depression, WWII, etc., and a critical-theoretical inquiry into questions of modernism, modernity, and avant-gardism. Offered in alternate years. GE Credit: ArtHum, Div, Wrt.—Stimson

186. Art After Modernism, 1948–Present (4)
Lecture/discussion—4 hours. Prerequisite: one course in art history, or upper division standing and a major or minor in the arts or humanities recommended. Social, cultural, aesthetic, and theoretical developments for artists and their audiences in the context of such larger issues as McCarthyism, the New Left, free love, feminism, Reaganomics, globalization, etc., and a critical-theoretical inquiry into questions of neoavantgardism, postmodernism, and postmodernity. Offered in alternate years. Not open for credit to students who have completed course 183E. GE credit: ArtHum, Div, Wrt.—I. Stimson

188A. The American Home (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 188B or any lower division course in Art History or Design; not open to freshmen. American domestic architecture and its responsiveness to changes in daily life from Colonial times to the present. Vernacular developments, effects of different socioeconomic conditions, and women's role in shaping the home receive special attention. GE credit: ArtHum, Div, Wrt.—Strazdes

188B. Architecture of the United States (4)
Lecture—3 hours; discussion—1 hour. Major movements from colonial times to the present. The role of buildings in a changing society, the interplay of styles with technologies of construction, the relationship between American and European developments, and developments of the architectural profession. GE credit: ArtHum, Wrt.—I. Strazdes

188D. American Painting and Sculpture to the Civil War (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one lower division Art History course or junior standing. Major movements in American painting and sculpture to 1865. Colonial portraiture, development of history painting, rise of genre painting, and the Hudson River School of landscape painting. Emphasis on European cultural currents and their effects. GE credit: ArtHum, Wrt.—(II.) Strazdes

188E. American Painting and Sculpture from the Civil War to World War II (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one lower division course in Art History or junior standing. Major developments in American painting and sculpture from 1865 to 1940. The American adaptations of Barbizon painting, French Impressionism, late 19th-century American Realism, the Ashcan School, Modernist Ideologies, Regionalism. GE credit: ArtHum, Wrt.—III. Strazdes

189. Photography in History (4)
Lecture/discussion—4 hours. Prerequisite: one course in art history, or upper division standing and a major or minor in the arts or humanities recommended. Social, cultural, aesthetic and technical developments in the history of photography including patronage and reception, commercial, scientific, political and artistic applications, and a critical-theoretical inquiry into photography's impact on the social category "art" and the history of subjectivity. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—III. (I.) Stimson

190. Undergraduate Seminar (4)
Lecture—3 hours; term paper. Prerequisite: consent of instructor. Intended primarily for senior and junior students in the history of art. Assigned readings, discussions, and a substantial paper in a particular area of art history will introduce the student to methodology and techniques of art historical research. May be repeated once for credit. Limited enrollment.—I, II, III. (I, II, III.) Stimson

190A-H. Undergraduate Proseminar in Art History (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Study of a broad problem or theoretical issue. Intensive reading, discussion, research, writing. Topics **(A)** Mediterranean Antiquity, **(B)** Medieval, **(C)** Renaissance, **(D)** American Art, **(E)** Gendering of Culture, **(F)** Chinese Art and Material Culture, **(G)** Japanese Art and Material Culture, **(H)** Late Modern Art and Theory. May be repeated once for credit when topic differs.—I, II, III. (I, II, III.)

192. Internship (2–12)
Internship—term paper or catalogue. Supervised program of internships at professional art institutions such as museums, galleries, and art archives including collections of slides and photographs. May be repeated once for credit. (P/NP grading only.)

194H. Special Study for Honor Students (4)
Independent study—12 hours. Prerequisite: course 190 or the equivalent, as determined by the major adviser. Open only to students in the Art History Honors Program. Independent study of an art historical problem culminating in the writing of an honors thesis under the supervision of a faculty guidance committee.

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

200A. Visual Theory and Interpretive Methods (4)
Discussion—3 hours; extensive writing. Close study of selected recent developments in interpretive methodology used by art historians and other analysts of visual culture and the place of those developments within art history's history and in the larger field of social, cultural and historical analysis. May be repeated once for credit.—I. (I.) Macleod, Stimson

200B. Research and Writing Methods in Art History (4)
Discussion—3 hours; term paper. Restricted to graduate students in art history. Development of the research, writing, and editing skills necessary for producing publishable work. Focus on reference tools used by art historians and the mechanics of scholarship, from question framing and organization of ideas to writing clear, effective prose.—II. (II.) Burnett, Ruda, Strazdes

200C. Thesis Writing Colloquium (4)
Discussion—3 hours; term paper. Prerequisite: course 200B concurrently. Restricted to graduate students in art history. Structured, supportive environment for second-year art history graduate students writing masters' theses. Students produce substantive sections of their theses, contributing them to the group writing and editing exercises. May be repeated twice for credit. (S/U grading only.)—II. (II.) Burnett, Ruda, Strazdes

250. Problems in Art Historical Research (4)
Seminar—3 hours; term paper. Major topics in art historical research, emphasizing special methods of investigation, and of historical and critical analysis. May be repeated for credit.—II. Stimson

251. Seminar in Tribal Arts (4)
Seminar—3 hours; term paper. Selected topics in the art and aesthetics of small scale societies. May be repeated for credit when topic differs and with consent of instructor.

254. Seminar in Classical Art (4)
Seminar—3 hours; term paper. Selected areas of special study in classical art of the Greek and Roman tradition. Course may be repeated for credit with consent of instructor.

263. Seminar in Chinese Art (4)
Seminar—3 hours; paper. Selected areas of special study in Chinese Art. May be repeated for credit with consent of instructor.—II. Burnett

276. Seminar in Medieval Art (4)
Seminar—3 hours; term paper. Selected areas of special study in medieval art from Early Christian to late Gothic. May be repeated for credit with consent of instructor.

278. Seminar in Italian Renaissance Art (4)
Seminar—3 hours; term paper. Selected areas of special study in Italian art from the fourteenth to the sixteenth century. May be repeated for credit with consent of instructor.—III. Ruda

283. Seminar in Visual Culture and Gender (4)
Seminar—3 hours; term paper. Selected areas of special study in the relationship between visual culture and gender in Europe and America from 1750 to present. May be repeated for credit with consent of instructor. Offered in alternate years.—I. Macleod

288. Seminar in European and American Architecture (4)
Seminar—3 hours; term paper. Exploration of selected topics in European and American architectural history with concentration on the Modern Period. May be repeated for credit with consent of instructor.—(II.) Strazdes

290. Special Topics in Art History (4)
Seminar—3 hours; term paper. Special research seminar in the theory or methods of Art History, or in a period of Art History. Topic will vary depending on the interests of the instructor or students. May be repeated for credit when topic differs and with consent of instructor. Not offered every year.—I, II, III.

298. Directed Group Study (1-5)
(S/U grading only.)

299. Individual Study (1-6)
(S/U grading only.)

Professional Course

390. Introduction to Teaching Art History for Teaching Assistants (1)
Discussion—1 hour. Designed for teaching assistants with emphasis on problems and procedures encountered by teachers of undergraduate art history. (S/U grading only.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Professional Courses

401. Museum Training: Curatorial Principles (4)
Seminar—3 hours. Approved for graduate degree credit. Study of private and public collections. Museum personalities. Appraisal of works of art; ethics of appraisal. Auction and sales: methods and catalogues. Registration. Technical problems of the museum. Connoisseurship. Collateral reading. Visits to museums. Seminar with assigned papers.—II.

402. Museum Training: Exhibition Methods (4)
Seminar—3 hours; exhibition. Approved for graduate degree credit. History of exhibition methods in private and public collections. Comparisons of different types of museums and their exhibition problems. Lighting and techniques of display with emphasis on actual design. Experimentation with unusual presentation forms.—(II.)

Note: Various of the above courses are not offered each year; please check the quarterly *Class Schedule and Registration Guide.*

Art Studio

(College of Letters and Science)

Gina Werfel, M.F.A., Chairperson of the Department

Department Office, 101 Art Building (530-752-0105)

http://art.ucdavis.edu

Faculty

Tom Bills, M.F.A., Professor
Hannah Collins, Acting Professor
William Henderson, M.F.A., Professor
Lynn Hershman, M.A., Professor
Robin Hill, B.F.A., Assistant Professor
David Hollowell, M.F.A., Professor
Malaquias Montoya, B.F.A., Professor *(Chicano/a Studies, Art Studio)*
Hearne Pardee, M.F.A., Assistant Professor
Lucy Puls, M.F.A., Professor
Annabeth Rosen, M.F.A., Associate Professor

Emeriti Faculty

Conrad Atkinson, R.A.S. (honors), Professor Emeritus
Roy DeForest, M.A., Professor Emeritus
Harvey Himelfarb, M.A., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
Roland C. Petersen, M.A., Professor Emeritus
Cornelia Schulz, M.F.A., Professor Emerita, *Academic Senate Distinguished Teaching Award*
Wayne Thiebaud, M.A., hon. D.F.A. (C.C.A.C., D.C.) Professor Emeritus, *UC Davis Prize for Teaching and Scholarly Achievement*

The Major Program

The studio art major provides the knowledge and experience necessary for a broad understanding of practice and interpretation of the visual arts.

The Program. For the beginning student, the major offers an introduction to visual methodologies through drawing, sculpture, and art history. Students may then advance to upper division coursework and specialization in drawing, painting, sculpture, printmaking, ceramics, photography, video production, electronic arts, as well as theory and criticism in upper division work.

Portfolios. Portfolios are not required for admission to the major. However, admitted students, once enrolled, should keep a continuing portfolio of their art work, which can be evaluated at such times as when the student is requesting independent study courses and scheduling an exhibition in the student gallery.

Career Alternatives. The studio art graduate is prepared for graduate work in the visual arts or continuing development as a professional artist or art teacher. Students who have career aspirations in the commercial aspects of the visual arts can acquire a broad general education and a creative foundation in the art studio major, establishing a basis for further specialization in commercial art.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**20**
Three courses from Art Studio 2, 3, 4, 5, 16; see prerequisites required for upper division courses	12
Two courses from Art History 1A, 1B, 1C, 1D, Art Studio 30	8
Depth Subject Matter	**44**
Eight courses, under three different instructors, chosen from Art Studio 101, 102, 103, 104, 110, 111, 113, 114, 115, 116, 117, 120, 125, 126, 127, 128, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 171	24
Three upper division courses from Art History 150, 151, 152, 153, 154A, 154B, 155, 163A, 163B, 163C, 164, 168, 176A, 176B, 176C, 177A, 177B, 179B, 182, 183A, 183B, 183C, 183D, 183E, 184, 188D, 188E	12
Total Units for the Major	**64**

Recommended

(a) Students interested in drawing and painting should take Art Studio 2, 3, 4, or 7 (course 5 is recommended);
(b) Students interested in sculpture should take Art Studio 2, 3, 5 (course 4 is recommended); and
(c) Students preparing for graduate work in any of the environmental design professions should take Art Studio 2, 5, 16.

Major Advisers. Information on the current Academic Advisors can be obtained by contacting the Undergraduate Staff Advisor at (530) 752-0105.

Minor Program Requirements:

	UNITS
Art Studio	**20**
Upper division art studio courses chosen in consultation with a faculty adviser (one lower division substitute course permissible)	20

Prerequisite courses must be taken prior to enrollment in upper division courses. Independent study courses are not applicable.

Teaching Credential Subject Representative. Department Chairperson. See also the Teacher Education Program.

Graduate Study. The Department of Art offers programs of study and research leading to the M.F.A. degree in the practice of art. Detailed information may be obtained from the Graduate Staff Adviser at (530) 752-0616.

Courses in Art Studio (ART)

Lower Division Courses

2. Drawing I (4)
Studio—6 hours. Form and composition in black and white.—I, II, III. (I, II, III) Henderson

3. Drawing II (4)
Studio—6 hours. Prerequisite: course 2. Form and composition in color.—II. (II.) Henderson

4. Life Drawing (4)
Studio—6 hours. Prerequisite: course 2. Form in composition using the human figure as subject.—I, II, III. (I, II, III.) Hollowell, Pardee

5. Sculpture (4)
Studio—6 hours. Form in space using plaster and other media.—I, II, III. (I, II, III.) Bills, Hill, Puls

7. Beginning Painting (4)
Studio—6 hours; independent study—3 hours. Introduction of a variety of techniques and concepts as related to the practice of painting, to establish a solid base which can be expanded on in upper division painting.—I. II. (II.) Hollowell, Pardee

10. Introduction to Art Appreciation (3)
Lecture—3 hours. The understanding and appreciation of painting, sculpture, architecture and industrial art. Illustrated lectures. Intended for non-majors. GE credit: ArtHum.

16. Descriptive Drawing (4)
Studio—6 hours. Objective drawing and rendering; representations of space.—(I.)

30. Introduction to Contemporary Visual Culture (4)
Lecture—3 hours; discussion/laboratory—1 hour. Establishing visual literacy across the media of fine art, photography, advertising, television and film; media culture; focus on critical decoding of contemporary visual culture. GE credit: ArtHum, Div, Wrt.—II. (I.) Bizri, Pardee

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Restricted to lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

Preenrollment in upper division courses is restricted to art majors. Art minors may obtain permission to preenroll by contacting the Undergraduate Staff Adviser in the Art office.

101. Painting: Materials and Carriers (4)
Studio—6 hours. Prerequisite: courses 2, 3, 4, 5, or consent of instructor. Experimentation in media and their supports.—I, II, III. (I, II, III.)

102. Painting (4)
Studio—6 hours. Prerequisite: course 101 or consent of instructor. Advanced painting in various media including oil and polymers. May be repeated once for credit with consent of instructor.—II. (I, III.) Henderson

103. Advanced Drawing (4)
Studio—6 hours. Prerequisite: course 2, 3, 4, 16, or consent of instructor. Advanced drawing, composition and form in black and white and color. May be repeated once for credit with consent of instructor.—I, III. (II.)

104. Figure Drawing and Painting (4)
Studio—6 hours. Prerequisite: courses 4 and 101, or consent of instructor. Advanced figure drawing and painting using the human figure as subject. May be repeated once for credit with consent of instructor.—II. (II.) Hollowell

110. Photography I (4)
Studio—6 hours. Prerequisite: courses 2, 3, 4, or consent of instructor. Photography as an art form. Experiments with camera and light sensitive materials.—I, II, III. (I, II, III.) Collins

111. Photography II (4)
Studio—6 hours. Prerequisite: course 110 or consent of instructor. Art of camera and light sensitive materials: tonal control, multiple exposure, synthetic negatives, etc. May be repeated once for credit with consent of instructor.—I, II. (II.) Collins

113. Interdisciplinarity (4)
Studio—6 hours. Prerequisite: one course in Art History or Art Studio. Focus on the uses of two or more art forms to make a unique art work; also, ideas of collaboration and reconfigured and integrated forms as new methods of expression that do not solely depend on unique authorship.—III. (II, III.) Bizri

114. Identity and Technology (4)
Studio—6 hours. Prerequisite: one course in Art History or Art Studio. The notion of "self," "portraiture" and "identity" as it is defined in an electronic world in which media alters perceptions of belief as individuals and society. Hands-on projects plus theoretical analysis of media.—II. (II.) Bizri

116. Video Practice and Theory (4)
Studio—6 hours. Prerequisite: 12 units of lower division art studio classes. Production techniques of video, including shooting, editing, lighting, sound and effects. A conceptual framework for video-art techniques.—III. (II.) Bizri

117. Experimental Documentary (4)
Studio—6 hours. Prerequisite: upper division standing. Study of the documentary form with particular attention to hybrid forms of film, video and computer genres. May be repeated once for credit with consent of instructor when topic differs.—III. (III.) Bizri

121. Reinterpreting Landscape (4)
Studio—6 hours; lecture/discussion—2 hours. Prerequisite: course 2 or Nature and Culture 100 or consent of instructor. Interpretation of landscape through painting, drawing and related media, with emphasis on the integration of historical, cultural, natural and artistic contexts. Course includes field work culminating in an independent project. Not offered every year.—III. Pardee

125. Printmaking: Relief (4)
Studio—6 hours. Prerequisite: courses 2, 3, 4, 5, or consent of instructor. Woodcut, linocut, metal-plate relief and experimental uses of other materials.

126. Printmaking: Intaglio (4)
Studio—6 hours. Prerequisite: courses 2, 3, 4, 5, or consent of instructor. Metal plate etching, aquatint, hard- and soft-ground, burin engraving and related methods. May be repeated once for credit with consent of instructor.—I, III. (II.)

127. Printmaking: Lithography (4)
Studio—6 hours. Prerequisite: courses 2, 3, 4, 5, or consent of instructor. Stone and metal-plate lithography and other planographic methods. May be repeated once for credit with consent of instructor.—II. (I.)

128. Printmaking: Serigraphy (4)
Studio—6 hours. Prerequisite: courses 2, 3, 4, 5, or consent of instructor. Silk screen and related stencil methods. May be repeated once for credit with consent of instructor.

129. Intermedia Printmaking (4)
Studio—8 hours; independent study—1 hour. Prerequisite: course 125, 126, 127, or 128. Development of intermedia printmaking; advanced modes in each of relief/serigraphy/intaglio/surface, as well as adding serigraphy and digitized imagery. Student will produce prints in several methods including multiplate prints. Offered in alternate years.—III. (III.)

132A. The Tradition of Modernism (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: one of course 30, or Art History 183A, 183B, 183C or 184. The emergence of modernism in painting and sculpture, from the early twentieth century to the 1940s. Critical examination of the emergence of modernism, the ideologies it supported, and the exclusions it practiced. Offered in alternate years. GE credit: ArtHum, Wrt.

132B. The Theory of Modernism (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 132A. Re-examination of materials of Modernist art through a set of critical analytical tools which will help in understanding what cultural and ideological beliefs these art forms sustained. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

141. Sculpture: Material Explorations (4)
Studio—6 hours. Prerequisite: course 5. Primary application and exploration of a single sculptural material. Examination of its properties, qualities and characteristics for three-dimensional expression. May be repeated twice for credit in different subject area with consent of instructor.—I. (I.) Puls, Bills, Hill

142. Sculpture: Ceramics I (4)
Studio—6 hours. Prerequisite: course 2, 3, 4 and 5, or consent of instructor. Introduction to ceramic forms and processes.—I, II. (I.) Rosen

143. Sculpture: Ceramics II (4)
Studio—6 hours. Prerequisite: course 142 or consent of instructor. Introduction to color, as well as glazing and use of kiln. May be repeated once for credit with consent of instructor.—II. (II.) Rosen

144. Sculpture: Figure Modeling (4)
Studio—6 hours. Prerequisite: courses 2, 3, 4, 5, or consent of instructor. Sculpture in various media using the human figure as subject. May be repeated once for credit with consent of instructor.

145. Sculpture: Concepts (4)
Studio—6 hours. Prerequisite: course 5 or consent of instructor. Investigation through the creation of sculpture of the relationship of idea to form and material. May be repeated once for credit in different subject area with consent of instructor.—I, III. (III.) Puls, Bills, Hill

146. Sculpture: Ceramics III (4)
Studio—6 hours. Prerequisite: course 141, 143, 144, or 145. Advanced form and color. Clay sculpture in relief and round. May be repeated once for credit with consent of instructor.—III. (III.) Rosen

147. Theory and Criticism of Photography (4)
Lecture—3 hours; term paper. Prerequisite: course 2 or 5 and one art lecture course. Development of camera vision, ideas, and aesthetics and their relationship to the fine arts from 1839 to the present. GE credit: ArtHum, Wrt.

148. Theory and Criticism: Painting and Sculpture (4)
Lecture—3 hours; term paper. Prerequisite: course 2 or 5, and one art lecture course. Study of forms and symbols in historic and contemporary masterpieces. GE credit: ArtHum, Wrt.—(I.) Thiebaud

149. Introduction to Critical Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: two of Art History 1B, 1C, or 183F. An overview of 20th century critical theories of culture and their relation to visual art and mass media culture. GE credit: ArtHum, Div, Wrt.

150. Theory and Criticism of Electronic Media (4)
Lecture—3 hours; term paper. Prerequisite: course 116 or 117. The history of electronic media, stressing both critique, application and relationship to art practice. Analysis of the conceptual biases of electronic media as an artistic mode of expression. GE credit: ArtHum, Wrt.—II. (I.) Hershman

171. Mexican and Chicano Mural Workshop (4)
Studio—8 hours; independent study—1 hour. Prerequisite: Chicana/o Studies 70 and/or written consent of instructor. The Mural: a collective art process that empowers students and people through design and execution of mural paintings in the tradition of the Mexican Mural Movement; introduces materials and techniques. May be repeated once for credit. (Same course as Chicana/o Studies 171.)—III. (III.) Montoya

192. Internship (2-12)
Internship. Supervised program of internships in artists' studios and at professional art institutions such as museums, galleries, and art archives including collections of slides and photographs. May be repeated for credit for a total of 12 units. (P/NP grading only.)

193. Seminar in Art Practice (4)
Discussion/laboratory—8 hours; variable—4 hours. Prerequisite: courses 2 and 3; upper division standing: taking or having taken courses in upper division drawing, painting, and sculpture. Work (painting, sculpture, drawing, etc.) done for group discussion and criticism, as well as group discussion of contemporary topics in the visual arts. May be repeated once for credit.

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

290. Seminar (4)
Seminar—3 hours. Original works produced for group discussion and criticism; associated topics of a contemporary and historical nature. May be repeated for credit.—I, II, III. (I, II, III.)

291. Seminar: Critical Evaluation (1)
Seminar—1 hour. May be repeated for credit. (S/U grading only.)—II. (II.)

292. Seminar: Comprehensive Qualifying (1)
Seminar—1 hour. Further critical evaluation of the student's work to determine his eligibility to begin the Comprehensive Project. May be repeated for credit. (S/U grading only.)—(I.)

299. Individual Study (1-6)
(S/U grading only.)

299D. Comprehensive Project (9)
An original body of work accompanied by a catalog summarizing the student's aesthetic position. May be repeated for credit. (S/U grading only.)—III. (III.)

Professional Courses

401. Museum Training: Curatorial Principles
Seminar—3 hours; papers. Approved for graduate degree credit. Study of private and public collections. Museum personalities. Appraisal of works of art; ethics of appraisal. Auction and sales: methods and catalogues. Registration. Technical problems of the museum. Connoisseurship. Collateral reading. Visits to museums. Offered in alternate years.—(III.)

402. Museum Training: Exhibition Methods (4)
Seminar—3 hours; exhibition. Approved for graduate degree credit. History of exhibition methods in private and public collections. Comparisons of different types of museums and their exhibition problems. Lighting and techniques of display with emphasis on actual design. Experimentation with unusual presentation forms. Offered in alternate years.—(II.)

Note: Various of the above courses are not offered each year; please check the quarterly *Class Schedule and Registration Guide.*

Asian American Studies

(College of Letters and Science)

Wendy Ho, Ph.D., Program Director

Program Office, 3102 Hart Hall (530-752-3625)

http://asa.ucdavis.edu

Committee in Charge

Darrell Y. Hamamoto, Ph.D. *(Asian American Studies)*
Bill Ong Hing, J.D. *(School of Law, Asian American Studies)*
Wendy Ho, Ph.D. *(Asian American Studies, Women and Gender Studies)*
Richard S. Kim, Ph.D. *(Asian American Studies)*
Sunaina Maira, Ed.D. *(Asian American Studies)*
Susette Min, Ph.D. *(Art History, Asian American Studies,)*
Rhacel S. Parreñas, Ph.D. *(Asian American Studies)*
Karen Shimakawa, Ph.D., J.D. *(English, Asian American Studies)*
Stanley Sue, Ph.D. *(Psychology, Psychiatry, Asian American Studies)*
Caroline Kieu Linh Valverde, Ph.D. *(Asian American Studies)*
Nolan Zane, Ph.D. *(Psychology, Asian American Studies)*

Faculty

Darrell Y. Hamamoto, Ph.D., Professor
Bill Ong Hing, J.D., Professor
Wendy Ho, Ph.D., Associate Professor
Richard S. Kim, Ph.D., Assistant Professor
Sunaina Maira, Ed.D., Associate Professor
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Karen Shimakawa, Ph.D., J.D., Associate Professor
Stanley Sue, Ph.D., Professor
Caroline Kieu Linh Valverde, Ph.D., Assistant Professor
Nolan Zane, Ph.D., Professor

Emeriti Faculty

Isao Fujimoto, M.A., Senior Lecturer Emeritus

The Major Program

The Asian American Studies Program offers an interdisciplinary major that examines the experiences of various Asian American groups in the United States. Pertinent to these experiences are the historical, cultural, legal, political, social-psychological, class, and gender contexts for Asian Americans.

The Program. Majors take a prescribed set of lower division and upper division courses in Asian American Studies. Other courses in the major provide the opportunity to develop a knowledge of Asian Americans from either a humanities or social science perspective. For the humanities emphasis, students take courses in an Asian language. They can then opt for a track on literature/culture or history/culture in upper division courses. For the social science emphasis, courses in the social science methodology are required at the lower division level. While Asian language courses are not required for the social science emphasis, students are strongly encouraged to take such courses because of their pertinence to the major, and because the College has a foreign language requirement. At the upper division level, majors with a social science emphasis can opt for an anthropological or sociological/psychological track.

Career Alternatives. Asian American Studies prepares students for a variety of careers. Given the multicultural nature of society and the increasing relations with different societies, many occupations seek individuals with background and expertise in ethnic relations and cultural issues. Graduates often enter the fields of teaching, research, government service, law, social services, etc., as well as graduate schools for advanced degrees in various disciplines.

A.B. Major Requirements:

Humanities Emphasis

UNITS

Preparatory Subject Matter 34
Asian American Studies 1, 2, 20 11
One Asian language: Cantonese 1, 2, 3; Chinese 1, 2, 3; Japanese 1, 2, 3; or equivalent Asian language..... 15
At least two lower division courses from the following departments or programs: African American and African Studies, Chicana/o Studies, Native American Studies, Women and Gender Studies (all lower division courses of at least 4 units are acceptable except those numbered 92, 97T, 98, and 99) 8

Depth Subject Matter..... 44-47
At least seven upper division Asian American Studies courses (excluding 197T, 198, 199) and not more than 6 units of internships..... 28-30
Select four courses from one of the following tracks..... 16-17

Literature/Culture Track
Comparative Literature 153; Dramatic Art 154, 155; English 178, 179, 185A, 185B

History/Culture Track
Dramatic Art 154, 155; History 191F, 194C, 196B, 173, 178

Total Units for the Major 78-81

Social Science Emphasis

UNITS

Preparatory Subject Matter 32
Asian American Studies 1, 2 8
Select four courses from the following: Anthropology 2, 4, 20; Communication 1, 3; Human Development 30; Psychology 41; Sociology 46A, 46B; Statistics 13 (at least two of the courses must be methodological/statistical in nature and selected from Anthropology 2; Psychology 41; Sociology 46A, 46B, or Statistics 13) 16
At least two lower division courses from the following departments or programs: African American and African Studies, Chicana/o Studies, Native American Studies, Women and Gender Studies (all lower division courses of at least 4 units are acceptable except those numbered 92, 97T, 98, and 99) 8

Depth Subject Matter..... 44-46
At least seven upper division Asian American Studies courses (excluding 197T, 198, 199) and not more than 6 units of internships..... 28-30
Select four courses from one of the following tracks..... 16

Anthropology Track
Anthropology 123BN, 132, 133, 134, 138, 139AN, 143B, 147

Sociology/Psychology Track
Human Development 103; Psychology 142; Sociology 125, 128, 129, 130, 172

Total Units for the Major 76-78

Major Adviser. W. Ho, waho@ucdavis.edu, 752-3625.

Minor Program Requirements:

UNITS

Asian American Studies 20
Five courses from Asian American Studies 100, 110, 111, 112, 120, 130, 136, 140, 150, 150B, 150C, 150D, 155, 192, 198, and 199 (no more than 4 units of 192, 198, and 199 may be counted toward this total)

Minor Adviser. Consult Program Office.

American History and Institutions. This university requirement can be satisfied by one of the following courses in Asian American Studies: 1, 2. (See also under University Requirements.)

Related Courses. For courses in Asian languages, see Cantonese and Chinese and Japanese (under East Asian Languages and Cultures). For other Asian courses, see East Asian Languages and Culture and East Asian Studies.

Courses in Asian American Studies (ASA)

Direct questions pertaining to the following courses to the instructor or to Asian American Studies Program, 3102 Hart Hall (530-752-3625).

Lower Division Courses

1. Historical Experience of Asian Americans (4)
Lecture—3 hours; discussion—1 hour. Introduction to Asian American Studies through an overview of the history of Asians in America from the 1840s to the present within the context of the development of the United States. GE credit: SocSci, Div, Wrt.—I, II.

2. Contemporary Issues of Asian Americans (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Introduction to Asian American Studies through the critical analysis of the impact of race, racism, ethnicity, imperialism, militarism, and immigration since post-World War II on Asian Americans. Topics may include sexuality, criminality, class, hate crimes, and inter-ethnic relations. GE credit: SocSci, Div, Wrt.—I, II, III.

3. Social and Psychological Perspectives of Asian Americans (4)
Lecture—3 hours; discussion—1 hour. Major psychosocial issues of Asian Americans. Theories and empirical research that address cultural values, behavioral norms, ethnic stereotypes, racism, acculturation, ethnic identity development, family communication, stressors and social support systems, academic achievement, interpersonal effectiveness, and psychopathology. GE credit: SocSci, Div.—I, III. Zane, Sue

92. Internship (1-3)
Internship—3-9 hours. Prerequisite: enrollment dependent on availability of intern positions and consent of instructor. Supervised internship in community and institutional settings related to Asian American concerns. (P/NP grading only.)

98. Directed Group Study (1-5)
Primarily intended for lower division students. (P/NP grading only)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

100. Asian American Communities (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2, or 3, or consent of instructor. Survey and analysis of Asian American communities within both historical and contemporary contexts. Presentation of the analytical skills, theories, and concepts needed to describe, explain, and understand the diversity of Asian American communities within the larger, dominant society. GE credit: SocSci, Div.—II. (II.) Hamamoto, Kim

110. Theoretical Perspectives in Asian American Studies (4)
Lecture/discussion—4 hours. Prerequisite: course 1 or 2; upper division standing. Theories of race and ethnic relations as tools for understanding the Asian American experience with the society as the unit of analysis. GE credit: SocSci, Div.—I. Hamamoto, Kim, Parrenas

111. Ethnicity, Culture, and the Self (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, 2, or 3. Cultural and social psychological influences on Asian Americans with the individual as the major unit of analysis. GE credit: SocSci, Div.—II, III. (II, III.) Sue, Zane

112. Asian American Women (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2, or 3, or consent of instructor. Experiences of Asian American women from major ethnic subgroups comparatively examined in their social, economic and historical contexts using theoretical perspectives from social sciences, humanities/arts: identity, racialization, immigration, gender, sexuality, labor, socialization, cultural expression, social movements and feminist theorizing. GE credit: ArtHum or SocSci, Div.—I. Ho

120. Multiracial Asian Pacific American Issues (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2, or 3, or consent of instructor. Introduction to the experiences of biracial and multiracial Asian Pacific people in the U.S., concentrating on theories of race, racial identity formation, culture, media, and anti-racist struggles. Critical approaches to the analysis of popular media and academic representations. Offered in alternate years. GE credit: Div.—I. Valverde

130. Asian American Literature (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2 or 3 or consent of instructor. Works of Asian American literature by writers from the major ethnic subgroups, examined in their social, economic and historical contexts. Intertextual analysis of their thematic and formal elements to form an understanding of Asian American literary traditions. GE credit: ArtHum, Div.—Ho

136. Asian American Performance (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2, 3, or consent of instructor. Performance work by, for, and/or about Asian Pacific Americans including dramatic literature, performance art, dance, and film. Ethnicity, gender and sexuality, class and age as they intersect with Asian Pacific American identities in and through dramatic performance. Offered in alternate years.—(II.) Shimakawa

140. Asian Americans and the Media (4)
Lecture—3 hours; term paper. Prerequisite: course 1. Exploration of how racial identity, class politics, and gender issues are mediated through Asian American figures in print, radio, television, film and new media. GE credit: SocSci, Div, Wrt.—II. Hamamoto, Maira

150. Filipino American Experience (4)
Lecture/discussion—4 hours. Prerequisite: course 1 or 2. Examination of the relationship between the Filipino-American community, the Philippine home community and the larger American society through a critical evaluation of the historical and contemporary conditions, problems and prospects of Filipinos in the U.S.—III. Parrenas

150B. Japanese American Experience (4)
Lecture—3 hours; term paper. Prerequisite: course 1 and upper division standing or consent of instructor. Analytical approaches to understanding Japanese American history, culture and society. Offered in alternate years. GE credit: SocSci, Div, Wrt.—II. Hamamoto

150C. Chinese American Experience (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2, or 3, or consent of instructor. Survey of the historical and contemporary experiences of Chinese in the United States, starting with the gold rush era and concluding with the present-day phenomenon of Chinese transnational movement to the United States and its diasporic significance. Offered in alternate years. GE credit: SocSci, Div.—II. Hing, Ho

150D. Korean American Experience (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2, or 3 or consent of instructor. Interdisciplinary survey of the historical and contemporary experiences of Koreans in the United States from the late nineteenth century to the present. Offered in alternate years. GE credit: SocSci, Div.—III. Kim

155. Asian American Legal History (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2, or 3 or consent of instructor. Legal history of Asian Americans, from the mid-19th century to present. Laws and administrative policies affecting Asian American communities, including those governing immigration, social and economic participation, WWII internment, and affirmative action.—II. (II.) Hing, Shimakawa

192. Internship (1-5)
Internship—3-15 hours. Prerequisite: enrollment dependent on availability of intern position with priority to Asian American Studies minors. Supervised internship in community and institutional settings related to Asian American concerns. (P/NP grading only.)

197T. Tutoring in Asian American Studies (1-5)
Tutoring—1-5 hours. Prerequisite: upper division standing and completion of appropriate course with distinction; consent of instructor. Tutoring in lower division Asian American Studies courses in small group discussion. Weekly meetings with instructor. May be repeated for credit once for a given course and also for a different course. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily intended for upper division students. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Courses in Cantonese (CAN)

Lower Division Courses

1-2-3. Elementary Cantonese (5-5-5)
Lecture—3 hours; recitation—3 hours. Introduction to Cantonese grammar and development of conversational skills in a cultural context. Approximately 250 Chinese characters will be introduced during Cantonese 2 and 3. (Not open to native speakers.)—Chung

4-5-6. Intermediate Cantonese (3-3-3)
Lecture—2 hours; recitation—2 hours. Prerequisite: course 1-2-3 or the equivalent. Development of conversational skills in a cultural context. Community-oriented language materials in health care, social service, and bilingual education will be introduced.—Chung

Asian Studies

See Asian American Studies; East Asian Languages and Cultures; and East Asian Studies

Astronomy

See Physics

Atmospheric Science

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Land, Air and Water Resources.

The Major Program

Atmospheric science is the study of the layer of air that surrounds the planet. It includes all weather phenomena, such as frontal systems and clouds, as well as severe weather events such as hurricanes and tornadoes. Concerns regarding the effects of human activity on the quality of the air we breathe, and on possible global warming are also central to this field of study.

The Program. Modern meteorology is a quantitative science that is becoming increasingly computer oriented. In addition to the study of daily weather events, the program deals with fundamental physical processes that involve the general circulation of the atmosphere; mass and energy transfers at the planetary surface and within the atmosphere; solar and terrestrial radiation; atmospheric interaction with the biosphere; climate variations; air pollution meteorology; and developments in modern meteorological instrumentation. As well as providing a broad background in meteorology, the major includes an informal minor area to be chosen from mathematics, computer science, environmental studies, resource management or a physical or biological science.

Internships and Career Alternatives. Atmospheric science students have participated in internships with the California Air Resources Board, various county Air Pollution Control Districts, and the National Weather Service. Numerous career opportunities exist in the federal and state governments, research and development in the private sector, and education. Examples of career areas are weather forecasting, agricultural meteorology, air-pollution forecasting and control, weather modification, hurricane and severe weather forecasting and research, weather satellite meteorology, environmental consulting, and weather research. About half of our graduates continue their education by seeking the M.S. or Ph.D. degree in atmospheric science.

B.S. Major Requirements:

	UNITS
English Composition Requirement	**3-11**
See College requirement	0-8
English 19, 104E, Communication 1, or Dramatic Art 10	3
Preparatory Subject Matter	**59**
Biological Sciences 1C	4
Chemistry 2A, 2B	10
Computer Science Engineering 30 or course selected with adviser's approval	4
Mathematics 21A, 21B, 21C, 21D, 22A, 22B	22
Atmospheric Science 60	4
Physics 9A, 9B, 9C	12
Statistics 13	3
Breadth/General Education	**28**
Satisfaction of General Education requirement; additional units in social sciences and humanities to total 28 units.	
Depth Subject Matter	**36**
Atmospheric Science 110, 111, 111L, 120, 121A, 121B, 124, 128	28
Upper division Atmospheric Science courses selected with adviser's approval, not including courses 192 and 199	4
Engineering 6, Atmospheric Science 150, Civil and Environmental Engineering 119A or course selected with adviser's approval	4
Restricted Electives	**15**
Coordinated group of courses (minor area) to be chosen with adviser's approval from mathematics, computer science, environmental studies, resource management, or a physical or biological science (at least 10 upper division units)	15
Unrestricted Electives	**31-39**
Total Units for the Degree	**180**

Major Adviser. B.C. Weare.

Advising Center for the major, as well as for graduate studies, is located in 1152 Plant and Environmental Sciences Building in the Land, Air and Water Resources Teaching Center (530-752-1669; lawradvising@ucdavis.edu).

Minor Program Requirements:

Minor Program. The minor in Atmospheric Science provides a broad treatment of weather and climate, with the option to focus on such topics as climate change, meteorological instrumentation, and satellite remote sensing. Students undertaking the minor should have completed minimum preparatory course work in calculus and physics (Mathematics 16A-16B, Physics 5A or 7A). Some upper division courses in Atmospheric Science have the Mathematics 21 and 22 series and the Physics 9 series as prerequisites.

	UNITS
Atmospheric Science	**20-24**
Atmospheric Science 60, 110	8
Four courses selected with the approval of the minor program adviser from upper division Atmospheric Science courses (excluding 192 or 199) or Environmental and Resource Sciences 131	12-16

Minor Adviser. B.C. Weare.

Graduate Study. You can specialize in particular areas of atmospheric science through graduate study and research leading to the M.S. and Ph.D. degrees. For details, see under the Graduate Group in Atmospheric Science. See also the Graduate Studies section in this catalog.

Related Courses. See Environmental Science and Policy 150A; Physics 104A, 104B; Environmental and Resource Sciences 131.

Courses in Atmospheric Science (ATM)

Questions pertaining to the following courses should be directed to the instructor or to the Land, Air and Water Resources Teaching Center, 148 Hoagland Hall (530-752-1669).

Lower Division Courses

5. Global Climate (3)
Lecture—2 hours; discussion—1 hour. Scientific methods and principles used to observe and analyze the physical processes underlying the climate system. Application of principles emphasizing seasonal, regional and global climates. Analysis of global climate changes. GE credit: SciEng.—II. Weare

6. Fundamentals of Atmospheric Pollution (3)
Lecture—3 hours. Effects of human emissions on the atmosphere: smog, ozone pollution, and ozone depletion; indoor air pollution; global warming; acid rain. Impacts of these problems on the earth, ecosystems, and humans. Strategies to reduce atmospheric pollution. GE credit: SciEng.—I. Anastasio

10. Severe and Unusual Weather (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: high school physics. Introduction to physical principles of severe and unusual weather: flood, blizzards, thunderstorms, lightning, tornadoes, and hurricanes. Emphasis on scientific perspective and human context. Not open to students who have received credit for course 100. (Former course 100.) GE credit: SciEng, Wrt.—III. (III.) Reck

30. Issues in Atmospheric Science (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: high school physics. Introduction to selected topics in atmospheric science, such as: meteorological aspects of air pollution, use of computer models in weather forecasting, theories of global climate change, impact of satellites on meteorology, and modern meteorological instrumentation. (P/NP grading only.)—II. (II.) Anastasio

60. Atmospheric Physics and Dynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A and Physics 5A or 7A. Composition and thermal structure of the atmosphere. Radiation and the heat budget of the earth and its atmosphere. Cloud formation and precipitation processes. The atmosphere in motion, thunderstorms and other severe weather phenomena.—I. (I.) Chen

92. Atmospheric Science Internship (1-12)
Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Internship off and on campus in atmospheric science. Internship supervised by a member of the faculty. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

110. Weather Observation and Analysis (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 60. Acquisition, distribution and analysis of meteorological data. Vertical sounding analysis, stability indices, probability of local severe weather, weather map analysis. Use of National Weather Service analyses and forecast products. Laboratory makes use of computer-generated analyses.—II. (II.) Chen

111. Weather Analysis and Prediction (3)
Lecture—3 hours. Prerequisite: courses 110, 121B, 111L (concurrently), knowledge of a programming language. Tools for analyzing observed properties of mid-latitude weather systems. The analysis-forecast system, including various weather forecast models. General structure and properties of mid-latitude weather systems.—II. Grotjahn

111L. Weather Analysis and Prediction Laboratory (2)
Laboratory—2 hours; Online lecture—4 hours. Prerequisite: course 111 (concurrently). Subjective and objective analysis of weather data. Web-based learning of the analysis-forecast system and various weather forecasting situations. Weather map interpretation and forecast discussions. (P/NP grading only.)—II. Grotjahn

112. Weather Forecasting Practice (2)
Discussion—2 hours; laboratory—1 hour. Prerequisite: course 110. Formal practice in preparing local weather forecasts. Analysis of current weather conditions and recent model performance. Verification and discussion of prior forecast. Interpretation of current forecast model guidance. Posting of forecast. May be repeated for credit up to three times. (P/NP grading only.)—I. (I.) Grotjahn

115. Hydroclimatology (3)
Lecture—3 hours. Prerequisite: course 60. Examination of climate as the forcing function for the hydrologic system. Emphasis on seasonal variations in the relationship between precipitation and evapotranspiration for meso-scale areas. Watershed modeling of floods and drought for evaluating the effects of climatic fluctuations.—III. (III.)

116. Climate Change (3)
Lecture—3 hours. Prerequisite: course 60. Climate trends and patterns spanning the recent past and the future. Emphasis on natural processes that produce climate variations and human influence on these processes. Evidence of climate change and the role of global climate models in understanding climate variability.—II. (II.)

120. Atmospheric Thermodynamics and Cloud Physics (4)
Lecture—3 hours, extensive problem solving. Prerequisite: Mathematics 21C, Physics 9B, course 60 (may be taken concurrently). Atmospheric composition and structure, thermodynamics of atmospheric gases, thermal properties of dry and moist air, atmospheric stability; cloud nucleation, cloud growth by condensation and collision, cloud models.—I. (I.) Weare

121A. Atmospheric Dynamics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 120, Mathematics 21D, Physics 9B. Fundamental forces of atmospheric flow; noninertial reference frames; development of the equations of motion for rotating stratified atmospheres; isobaric and natural coordinate systems; geostrophic flow; thermal wind; circulation and vorticity.—II. (II.) Nathan

121B. Atmospheric Dynamics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 121A. Dynamics of fluid motion in geophysical systems; quasi-geostrophic theory; fundamentals of wave propagation in fluids; Rossby waves; gravity waves; fundamentals of hydrodynamic instability; two-level model; baroclinic instability and cyclogenesis.—III. (III.) Nathan

124. Meteorological Instruments and Observations (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 60; Physics 5C. Modern meteorological instruments and their use in meteorological observations and measurements. Both standard and micrometeorological instruments are included.—I. (I.) Paw U

128. Radiation and Satellite Meteorology (4)
Lecture/discussion—3 hours; discussion/laboratory—2 hours. Prerequisite: course 60, Physics 9B, Mathematics 22B, 21D. Concepts of atmospheric radiation and the use of satellites in remote sensing. Emphasis on the modification of solar and infrared radiation by the atmosphere. Estimation from satellite data of atmospheric variables such as temperatures and cloudiness.—II. (II.) Reck

133. Biometeorology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in a biological discipline and Mathematics 16B or consent of instructor. Atmospheric and biological interactions. Physical and biological basis for water vapor, carbon dioxide and energy exchanges with the atmosphere associated with plants and animals, including humans. Microclimate of plant canopies and microclimatic modification such as frost protection and windbreaks.—II. Paw U, Snyder

149. Air Pollution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D, 22B, Chemistry 2B, Atmospheric Science 121A or Engineering 103. Physical and technical aspects of air pollution. Emphasis on geophysical processes and air pollution meteorology as well as physical and chemical properties of pollutants. (Same course as Civil and Environmental Engineering 149.)—I. Chang

150. Introduction to Computer Methods in Physical Sciences (4)
Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: Engineering 5 or the equivalent, Mathematics 22B and a course in fluid dynamics (course 121A, Physics 104A, or Engineering 103A) or consent of instructor. Computational techniques used in physical sciences. Integral and differential equation numerical solution: mainly finite differencing and spectral (Fourier transform) methods. Includes introduction to C. Specific applications drawn from meteorology. Students write one C and several FORTRAN programs. Offered in alternate years.—II. Grotjahn

158. Boundary-Layer Meteorology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 121A. Growth, development and structure of the atmospheric layer directly influenced by the underlying surface and extending to a maximum of about two kilometers under convective conditions. Turbulent diffusion in the boundary layer. The microclimate at and near the ground surface.—III. (III.) Faloona

160. Introduction to Atmospheric Chemistry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 2B. Quantitative examination of current local, regional and global problems in atmospheric chemistry (including photochemical smog, acid deposition, climate change, and stratospheric ozone depletion) using fundamental concepts from chemistry. Basic chemical modeling of atmospheric reaction systems.—II. (II.) Anastasio

192. Atmospheric Science Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Internship off and on campus in atmospheric science. Internship supervised by a member of the faculty. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: three upper division units in Atmospheric Science. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: three upper division units in Atmospheric Science and at least an overall B average. (P/NP grading only.)

Graduate Courses

215. Advanced Hydroclimatology (3)
Lecture—3 hours. Prerequisite: course 115. Theoretical and applied aspects of energy and mass fluxes linking the earth's surface, atmosphere, and hydrologic system. Emphasis on regional scale analysis and modeling, spatial data representation, and climate change influences on precipitation and its hydroclimatic expression. Offered in alternate years.—(III.)

221. Advanced Atmospheric Dynamics (3)
Lecture—3 hours. Prerequisite: course 121B. Conditions for instability in stratified atmospheres; baroclinic instability; forced topographic Rossby Waves; wave-mean flow interaction theory; tropical dynamics; stratospheric dynamics.—II. (II.) Nathan

223. Advanced Boundary-Layer Meteorology (3)
Lecture—3 hours. Prerequisite: course 230. Characteristics of the atmospheric boundary layer under convective and nocturnal conditions. Heat budget at the surface and boundary layer forcing. Similarity theory and scaling of the boundary layer. Measurement and simulation techniques. Offered in alternate years.—(III.) Wexler

230. Atmospheric Turbulence (3)
Lecture—3 hours. Prerequisite. course 121B or 158. Dynamics and energetics of turbulence in the atmosphere including vorticity dynamics. Statistical description of turbulence; Eulerian and Lagrangian scales, spectral analysis, conditional sampling techniques. Turbulent diffusion; the closure problem, gradient-diffusion and second-order methods. Offered in alternate years.—III.

231. Advanced Air Pollution Meteorology (3)
Lecture—3 hours. Prerequisites: Course 149A, 160 and one course in fluid dynamics. Processes determining transport and diffusion of primary and secondary pollutants. Models of chemical transformation, of the atmospheric boundary layer and of mesoscale wind fields, as applicable to pollutant dispersion problems. Offered in alternate years.—(I.)

233. Advanced Biometeorology (3)
Lecture/discussion—3 hours. Prerequisite: course 133 or consent of instructor. Current topics in biometeorology. Physical and biological basis for water vapor, other gases, and energy exchange with the atmosphere. Topics include modeling and measuring turbulent transport from plant canopies, surface temperatures and energy budgets, bio-aerosol physics and aerobiology. Offered in alternate years.—II. Paw U

240. General Circulation of the Atmosphere (4)
Lecture/discussion—4 hours. Prerequisite: course 121B. Large-scale, observed atmospheric properties. Radiation, momentum, and energy balances derived and compared with observations. Lectures and homework synthesize observations and theories, then apply them to understand the large-scale circulations. Offered in alternate years—(II.) Grotjahn

241. Climate Dynamics (3)
Lecture/discussion—3 hours. Prerequisite: course 121B. Dynamics of large-scale climatic variations over time periods from weeks to centuries. Description of the appropriate methods of analysis of atmospheric and oceanic observations. Conservation of mass, energy and momentum. Introduction to the range of climate simulations.—I. (I.) Weare

250. Meso-Scale Meteorology (3)
Lecture—3 hours. Prerequisite: graduate standing, course 150, a course in partial differential equations; or consent of instructor. The study of weather phenomena with horizontal spatial dimensions between 2.5 and 2500 kilometers. Methods of observational study and numerical modeling of the structure and temporal behavior of these weather systems. Offered in alternate years.—I. Chen

255. Numerical Modeling of the Atmosphere (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 121B and Engineering 5; course 150 recommended. Principles of numerical modeling of the dynamic, thermodynamic and physical processes of the atmosphere. Hands-on experiments on model development using the shallow water equations and the primitive equations. Operational forecast models. Offered in alternate years.—I. Chen

260. Atmospheric Chemistry (3)
Lecture—3 hours. Prerequisite: course 160. Chemistry and photochemistry in tropospheric condensed phases (fog, cloud, and rain drops and aerosol particles). Gas-drop and gas-particle partitioning of compounds and effects of reactions in condensed phases on the fates and transformations of tropospheric chemical species. Offered in alternate years.—(III.) Anastasio

270A-G. Topics in Atmospheric Science (1-3)
Discussion—1-3 hours. Applications and concepts in **(A)** Meteorological Statistics; **(B)** Computer Modeling of the Atmosphere; **(C)** Design of Experiments and Field Studies in Meteorology; **(D)** Solar and Infrared Radiation in the Atmosphere; **(E)** Aerosol and Cloud Physics; **(F)** Atmospheric Chemistry; **(G)** General Meteorology.—I, II, III. (I, II, III.)

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing in Atmospheric Science or related field. Current developments in selected areas of atmospheric research. Topics will vary according to student and faculty interests. (S/U grading only.)—I, II, III. (I, II, III.)

291A-F. Research Conference in Atmospheric Science (1-3)
Lecture/discussion—1-3 hours. Prerequisite: consent of instructor. Review and discussion of current literature and research in: **(A)** Air Quality Meteorology; **(B)** Biometeorology; **(C)** Boundary Layer Meteorology; **(D)** Climate Dynamics; **(E)** General Meteorology; **(F)** Atmospheric Chemistry. May be repeated up to a total of 6 units per segment. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Courses

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Atmospheric Science (A Graduate Group)

Terry R. Nathan, Ph.D., Chairperson of the Group (530-752-1609)

Group Office, 151 Hoagland Hall (530-752-1406)

http://lawr.ucdavis.edu/gradprg.htm

Faculty

Cort Anastasio, Ph.D., Assistant Professor
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John Carroll, Ph.D., Professor
Daniel P.Y. Chang, Ph.D., Professor
Judith Charles, Ph.D., Assistant Professor
Robert Flocchini, Ph.D., Professor
Richard Grotjahn, Ph.D., Professor
Britt Holmen, Ph.D., Assistant Adjunct Professor
Theodore Hsiao, Ph.D., Professor
Levent Kavvas, Ph.D., Professor
Michael J. Kleeman, Ph.D., Assistant Professor
Terry Nathan, Ph.D., Professor
Debbie Niemeier, Ph.D., Associate Professor
Kyaw Tha Paw U, Ph.D., Professor
Roger Shaw, Ph.D., Professor
Marlyn Shelton, Ph.D., Professor
Richard Snyder, Ph.D., Specialist in Cooperative Extension
Susan Ustin, Ph.D., Associate Professor
Bryan Weare, Ph.D., Professor
Bruce White, Ph.D., Professor

Emeriti Faculty

Thomas A. Cahill, Ph.D., Professor Emeritus

Graduate Study. The Graduate Group in Atmospheric Science offers both the M.S. and Ph.D. degree programs. A student may place emphasis on graduate work in one or more of the following fields: air quality meteorology, atmospheric chemistry, biometeorology, micrometeorology, numerical weather prediction, remote sensing, climate dynamics, large scale dynamics, and mesoscale meteorology. The diverse and extensive backgrounds of the faculty allow opportunities for interdisciplinary training and research.

Preparation. The Group encourages applications from all interested students with backgrounds in the physical or natural sciences. Basic qualifications for students entering the Atmospheric Science graduate program include mathematics to the level of vector calculus and differential equations, and one year of college-level physics. Flexibility may be allowed for students with high academic potential, but it is expected that deficiencies in preparatory material and in key undergraduate atmospheric science courses be completed within the first year of graduate study.

Graduate Adviser. K.T. Paw U *(Land, Air and Water Resources, 752-1510).*

Graduate Admissions Officer. M.L. Shelton *(Land, Air and Water Resources, 752-6344).*

Avian Medicine

See Medicine and Epidemiology

Avian Sciences

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Animal Science.

The Major Program

Avian Sciences is the study of birds and the ways in which they relate to and are useful to humans. The major combines the study of avian wildlife and their environments, production and marketing of domestic birds and eggs, caged exotic bird management, and basic and applied laboratory research on birds with a broad introduction to biological science.

The Program. The flexibility of the program and the close personal interaction between students, faculty, and specialists in the field give students a large role in selecting and designing their own course work. Students may specialize in a bachelor's program that qualifies them for a particular career or they may choose a program to meet other broader intellectual and cultural interests.

Internships and Career Alternatives. Independent study, undergraduate research, and internships are emphasized in the Avian Sciences program. Birds for laboratory or special study are housed within the main building as well as at the research farm and the experimental aviary. An Avian Sciences major has a variety of career options: health-oriented research, teaching biology, gamebird production, domestic and foreign agricultural extension and advisory services, governmental agencies, or the domestic or exotic bird industries. A recent survey has shown

that the majority of Avian Sciences graduates enter graduate school or are employed by the domestic bird industry. The remainder of the graduates were evenly distributed in the categories of professional schools, avian biology agencies, educational fields, and individual jobs indirectly associated with birds.

B.S. Major Requirements:

UNITS

English Composition Requirement..... 0-8
See College requirement

Preparatory Subject Matter 61-73
At least 3 units from Avian Sciences 11, 13, 14L, 15L, 16L 3-5
Biological Sciences 1A, 1B, 1C..... 15
Chemistry 2A, 2B, 2C, 8A, 8B 21
Agricultural Management and Rangeland Resources 21 or Computer Science Engineering 15 3-4
Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C 9-12
Physics 1A-1B or 7A-7B-7C 6-12
One course from Statistics 13, 100, or Agricultural Management and Rangeland Resources 120 4

Breadth Subject Matter 24
See General Education requirement

Depth Subject Matter..... 26
Animal Biology 102 and 103 or Biological Sciences 102, 103 and Nutrition 123, 123L 10
Biological Sciences 101 4
Avian Sciences 103, 150..... 4
Neurobiology, Physiology, and Behavior 101 5
Laboratory units in above listed subjects .. 3
(Recommended courses include Animal Genetics 101; Animal Science 136, 137; Avian Sciences 160; Molecular and Cellular Biology 120L, 150L, 160L; or Neurobiology, Physiology, and Behavior 101L.)

Restricted Electives 28
Specialized courses related to avian species to supplement or expand depth subject matter courses. Courses must be approved by an adviser.

Unrestricted Electives..... 21-41

Total Units for the Degree..... 180

Major Adviser. F. Bradley.

Advising Center for the major is located in 1202 Meyer Hall (530-754-7915).

Minor Program Requirements:

UNITS

Avian Sciences 18
Choose one from Avian Sciences 11, 13, 14L, 15L, 16L 2-3
Choose remaining units from Avian Sciences 100, 103, 115, 121, 123, 149, 150, 160; Animal Science 143; Neurobiology, Physiology, and Behavior 117; Wildlife, Fish, and Conservation Biology 111, 136 15-16

Graduate Study. Further training is available through graduate or professional programs in animal physiology, genetics, nutrition, or veterinary medicine. The M.S. degree is offered in Avian Sciences. For details see under the Graduate Group in Avian Sciences. See also the Graduate Studies section in this catalog.

Related Courses. See Agricultural and Resource Economics 130; Animal Science 143; Food Science and Technology 120, 120L, 121; Molecular and Cellular Biology 150, 150L; Nutrition 123, 123L.

Advising for the major, minor, or the following courses is located in the Animal Science Advising Center, 1202 Meyer Hall (530-754-7915).

Courses in Avian Sciences (AVS)

Lower Division Courses

11. Introduction to Poultry Science (3)
Lecture—3 hours; one field trip required. The mosaic of events that have tied poultry science to other scientific disciplines and poultry to humans. Poultry science techniques and production methods from the time of domestication to the present. GE credit: SciEng, Wrt.—II. (II.) Bradley

13. Birds, Humans and the Environment (3)
Lecture—2 hours; discussion—1 hour; half-day field trip. Interrelationships of the worlds of birds and humans. Lectures, discussions, field trips and projects focus on ecology, avian evolution, physiology, reproduction, flight, behavior, folklore, identification, ecotoxicology and conservation. Current environmental issues are emphasized. GE credit: SciEng, Wrt.—I. (I.)

14L. Management of Captive Birds (2)
Fieldwork—3 hours; lecture/discussion—1 hour. Prerequisite: consent of instructor. One weekly discussion and field trip to study practical captive management (housing, feeding, equipment, marketing, diseases). Visit facilities rearing birds such as commercial parrots, hobbyist exotics, ostrich, raptors, waterfowl, game birds, poultry and pigeons.

15L. Captive Raptor Management (2)
Laboratory—3 hours; independent study—3 hours; one field trip. Hands-on experience handling birds of prey. Students are taught all of the skills required to handle and care for raptors, including their husbandry, biology, habitat requirements, cage design, veterinary care, rehabilitation methods, research potential and long-term care requirements.—I. (I.)

16LA-16LB-16LC. Raptor Migration and Population Fluctuations (2-2-2)
Fieldwork—3 hours; discussion—1 hour; one Saturday field trip. Prerequisite: consent of instructor. Identify raptors; study effects of weather, crops, agricultural practices on fluctuations in raptor species and numbers. Familiarize with literature; design a project; survey study sites; collect, computerize, analyze data; compare with previous years. Species, observations, emphasis are different each quarter.—III. (III.)

92. Internship in the Avian Sciences (1-12)
Internship—3-36 hours. Prerequisite: sophomore standing preferred; consent of instructor. Internship on and off campus in poultry, gamebirds or exotic bird production, management and research; or in a business, industry, or agency concerned with these entities. Compliance with Internship Approval form essential. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Avian Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B. Survey of avian natural history and study of the diversity, functional morphology, behavior, ecology and evolution of birds.—I. (I.) Weathers

103. Avian Development and Genetics (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A and 1B. Unique features of avian development and genetics. Development topics: gametogenesis, fertilization, pre- and post-oviposital development, morphogenesis, sex differentiation, specialized organ systems, incubation, hatching. Genetic topics: genome organization, inheritance, sex determination, avian models. Laboratory exercises: embryology, genetics, model systems.—I. (I.) Delany

115. Raptor Biology (3)
Lecture—3 hours; two Saturday field trips. Prerequisite: Biological Sciences 1A or the equivalent. Study of birds of prey: classification, distribution, habits and habitats, migration, unique anatomical and physiological adaptations, natural and captive breeding, health and diseases, environmental concerns, conservation, legal considerations, rehabilitation, and falconry.—II. (II.)

121. Avian Reproduction (2)
Lecture—2 hours. Prerequisite: Biological Sciences 1A, 1B. Breeding cycles and reproductive strategies, egg and sperm formation, incubation, sexual development, imprinting, hormonal control of reproductive behavior and song. Species coverage includes wild and companion birds. Course has a physiological orientation. Offered in alternate years.—II. Millam

123. Management of Birds (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B. Captive propagation of birds, including reproduction, genetic management, health, feeding, artificial incubation, artificial insemination, and related legal aspects, including trade and smuggling. Emphasis on exotic species and the role of captive propagation in conservation. Offered in alternate years.—(II.) Millam

149. Egg Production Management (2)
Lecture—2 hours; one Saturday field trip required. Prerequisite: course 11 or the equivalent, or consent of instructor. Management of commercial table egg flocks as related to environment, nutrition, disease control, economics, housing, equipment, egg processing and raising replacement pullets. Offered in alternate years.—III. Ernst

150. Nutrition of Birds (1)
Lecture—1 hour. Prerequisite: Animal Biology 103 (may be taken concurrently). Principles of nutrition specific to avian species, including feedstuffs, feed additives, nutrient metabolism, energy systems, and nutritional support of egg production and growth. Use of computers for feed formulation to support production. Offered in alternate years.—(III.) Klasing

160. Designing and Performing Experiments in Avian Sciences (2)
Laboratory—6 hours. Prerequisite: course 100 or Wildlife, Fish and Conservation Biology 111 or Evolution and Ecology 137 or consent of instructor. Experiments in current problems in avian biology. Introduction to experimental design. Students choose a project, design a protocol, perform an experiment and report their findings. May be repeated for credit with consent of instructor.—I, II, III. (I, II, III.)

170. Advanced Avian Biology (4)
Lecture/discussion—3 hours; project—1 hour. Prerequisite: course 100 or Evolution and Ecology 137 or Wildlife, Fish and Conservation Biology 111. Ecology, behavior, functional morphology and life-history evolution of birds. Emphasis on the importance of body size as a principle determinant of most aspects of avian performance from lifespan to reproduction and species abundance. Analytical synthesis and critical thought emphasized. Offered in alternate years.—(III.) Weathers

190. Seminar in Avian Sciences (1)
Seminar—1 hour. Prerequisite: upper division standing in Avian Sciences and consent of instructor. May be repeated three times for credit. (P/NP grading only.)—I, III. (I, III.)

192. Internship in Avian Sciences (1-12)
Internship—3-36 hours. Prerequisite: completion of a minimum of 84 units; consent of instructor. Internship on and off campus in poultry, game birds or exotic bird production, management and research; or in a business, industry, or agency concerned with these entities. Compliance with Internship Approval form essential. (P/NP grading only.)

195. Topics in Current Research (1-3)
Lecture/discussion—variable. Hours will depend on instructor with the number of units being commensurate with time in class. Prerequisite: consent of instructor. Discussion of topics of current interest in avian sciences. May be repeated three times for credit.—I, II, III. (I, II, III.)

197T. Tutoring in Avian Sciences (1-3)
Tutorial—1-3 hours. Prerequisite: Avian Sciences or related major, advanced standing, consent of

instructor. Tutoring of students in lower division avian sciences courses; weekly conference with instructors in charge of courses; written critiques of teaching procedures. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

290. Seminar (1)
Seminar—1 hour. Reports and discussions of recent advances and selected topics of current interest in avian genetics, physiology, nutrition, and poultry technology.—I, III. (I, III.)

290C. Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Major professors lead research discussions with their graduate students. Research papers are reviewed and project proposals presented and evaluated. Format will combine seminar and discussion. (S/U grading only.)—I, II, III. (I, II, III.)

297T. Supervised Teaching in Avian Sciences (1-4)
Tutoring—1-4 hours. Prerequisite: graduate standing and consent of instructor. Tutoring of students in lower, upper division, and graduate courses in Avian Sciences; weekly conference with instructor in charge of course; written critiques of teaching methods in lectures and laboratories. (S/U grading only.)

298. Group Study (1-5)
Prerequisite: consent of instructor.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Avian Sciences (A Graduate Group)

K.C. Klasing, Ph.D., Chairperson of the Group

Group Office, 1202B Meyer Hall (530-752-2382)

http://aviansciences.ucdavis.edu

Faculty

Thomas P. Adamson, Ph.D., Lecturer, *Academic Federation Excellence in Teaching Award (Neurobiology, Physiology, and Behavior)*
Dan Anderson, Ph.D., Professor *(Wildlife, Fish, and Conservation Biology)*
Everett Bandman, Ph.D., Professor *(Food Science and Technology)*
Arthur A. Bickford, V.M.D., Ph.D., Professor of Clinical Diagnostic Pathology *(California Veterinary Diagnostic Laboratory)*
Francine A. Bradley, Ph.D., Lecturer *(Animal Science)*
C. Christopher Calvert, Ph.D., Professor *(Animal Science)*
Carol J. Cardona, D.V.M., Ph.D., Assistant Professor *(Population Health and Reproduction, Veterinary Medicine)*
Mary E. Delany, Ph.D., Associate Professor *(Animal Science)*
John M. Eadie, Ph.D., Associate Professor *(Wildlife, Fish, and Conservation Biology, Animal Science)*
Ralph A. Ernst, Ph.D., Lecturer *(Animal Science)*
D. Michael Fry, Ph.D., Assistant Research Physiologist *(Animal Science)*
Thomas P. Hahn, Ph.D., Assistant Professor *(Neurobiology, Physiology, and Behavior)*
Robert J. Hansen, Ph.D., Professor *(Molecular Biosciences)*
Joan S. Jeffrey, D.V.M., Ph.D., Extension Veterinarian *(Veterinary Medicine)*
Annie J. King, Ph.D., Professor *(Animal Science)*
Kirk C. Klasing, Ph.D., Professor *(Animal Science)*
Jenella E. Loye, Ph.D., Research Associate *(Entomology)*
Joy A. Mench, Ph.D., Professor *(Animal Science)*
James R. Millam, Ph.D., Professor *(Animal Science)*
Scott O. Newman, D.V.M., Ph.D., Staff Wildlife Veterinarian *(Veterinary Medicine)*
Kathryn Radke, Ph.D., Associate Professor *(Animal Science)*
Lisa A. Tell, D.V.M., Associate Professor *(Medicine and Epidemiology)*
Patricia Wakenell, D.V.M., Ph.D., Professor *(Population, Health and Reproduction)*
Barry W. Wilson, Ph.D., Professor *(Animal Science, Environmental Toxicology)*

Emeriti Faculty

Ursula K. Abbott, Ph.D., Professor Emerita
Hans Abplanalp, Ph.D., Professor Emeritus
F. Howard Kratzer, Ph.D., Professor Emeritus
Peter Marler, Ph.D., Professor Emeritus
Frank X. Ogasawara, Ph.D., Professor Emeritus
Pran Vohra, Ph.D., Professor Emeritus

Graduate Study. The Graduate Group in Avian Sciences offers the M.S. degree program to students who wish to pursue specialized advanced work on avian species. Specializations students may choose include nutrition, physiology, reproduction, pathology, immunology, toxicology, food chemistry, management, ecology, genetics, comparative incubation, environmental physiology, and cellular and developmental studies using wild and domestic birds as experimental animals. Both master's degree plans, thesis or comprehensive examination, are available.

Preparation. Applicants should have undergraduate preparation in a field appropriate to the course of study selected, including courses in most of the following subjects: general biology, general and organic chemistry, biochemistry, avian biology, genetics, nutrition, physiology, and statistics.

Graduate Adviser. J.R. Millam *(Animal Sciences).*

Biochemistry

See Molecular and Cellular Biology; Biochemistry and Molecular Biology; Biophysics

Biochemistry and Molecular Biology (A Graduate Group)

J. Clark Lagarias, Ph.D., Chairperson of the Group

Group Office, 310 Life Sciences Addition (530-752-9091)

http://www-ggc.ucdavis.edu/ggc/bmb

Faculty

Steffen Abel, Ph.D., Associate Professor *(Vegetable Crops)*
Enoch Baldwin, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Everett Bandman, Ph.D., Professor *(Food Science and Technology)*
Kenneth A Beck, Ph.D., Assistant Professor *(Cell Biology and Human Anatomy)*
Diane Beckles, Ph.D., Assistant Professor *(Vegetable Crops)*
Alan B. Bennett, Ph.D., Professor *(Vegetable Crops)*
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Eduardo Blumwald, Ph.D., Professor *(Pomology)*
Sean Burgess, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
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Judy Callis, Ph.D., Professor *(Molecular and Cellular Biology)*
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Tsung-Yu Chen Ph.D., Assistant Professor *(Neurology)*
Hwai-Jong Cheng, Ph.D., Assistant Professor *(Neurobiology, Physiology, and Behavior)*
R. Holland Cheng, Ph.D., Professor *(Molecular and Cellular Biology)*
Ronald Y. Chuang, Ph.D., Professor *(Pharmacology and Toxicology)*
Gino A. Cortopassi, Ph.D., Professor *(Molecular Biosciences)*
John H. Crowe, Ph.D., Professor *(Molecular and Cellular Biology)*
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Marilynn E. Etzler, Ph.D., Professor *(Molecular and Cellular Biology)*
Robert H. Fairclough, Ph.D., Associate Professor *(Neurology)*
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Paul G. FitzGerald, Ph.D., Professor *(Cell Biology and Human Anatomy)*
J. David Furlow, Ph.D., Assistant Professor *(Neurobiology, Physiology, and Behavior)*
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Paul Hagerman, Ph.D., Professor *(Biological Chemistry)*
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John H. Harada, Ph.D., Professor *(Plant Biology)*
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John W.B. Hershey, Ph.D., Professor *(Biological Chemistry)*
Wolf-Dietrich Heyer, Ph.D., Professor *(Microbiology)*
Leonard M. Hjelmeland, Ph.D., Professor *(Biological Chemistry)*
Neil Hunter, Ph.D., Assistant Professor *(Microbiology)*
Kentaro Inoue, Ph.D., Assistant Professor *(Pomology)*
Thomas Jue, Ph.D., Professor *(Biological Chemistry)*
Clarence I. Kado, Ph.D., Professor *(Plant Pathology)*
Ken Kaplan, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Daniel Kliebenstein, Ph.D., Assistant Professor *(Vegetable Crops)*
Stephen C. Kowalczykowski, Ph.D., Professor *(Microbiology)*
Hsing-Jien Kung, Ph.D., Professor *(Biological Chemistry)*
J. Clark Lagarias, Ph.D., Professor *(Molecular and Cellular Biology)*
Kit S. Lam, Ph.D., Professor *(Hematology—Oncology)*
Janine LaSalle, Ph.D., Associate Professor *(Medical Microbiology and Immunology)*

Jerold A. Last, Ph.D., Professor *(Internal Medicine)*
Noelle L'Etoile, Ph.D., Assistant Professor *(Psychiatry)*
Walter Leal, Ph.D., Associate Professor *(Entomology)*
Su-Ju Lin, Ph.D., Assistant Professor *(Microbiology)*
Su Hao Lo, Ph.D., Assistant Professor *(Orthopaedic Surgery)*
Angie Louie, Ph.D., Assistant Professor *(Biomedical Engineering)*
Paul Luciw, Ph.D., Professor *(Pathology)*
Francis J. McNally, Ph.D., Associate Professor *(Molecular and Cellular Biology)*
Claude F. Meares, Ph.D., Professor *(Chemistry)*
Maria Mudryj, Ph.D., Associate Professor *(Microbiology and Immunology)*
Diana Myles, Ph.D., Professor *(Molecular and Cellular Biology)*
Thomas W. North, Ph.D., Professor *(Veterinary Medicine)*
Jodi M. Nunnari, Ph.D., Associate Professor *(Molecular and Cellular Biology)*
Rebecca Parales, Ph.D., Assistant Professor *(Microbiology)*
John A. Payne, Ph.D., Associate Professor *(Human Physiology)*
Isaac N. Pessah, Ph.D., Professor *(Molecular Biosciences)*
Jerry S. Powell, M.D., Professor *(Hematology—Oncology)*
Ted Powers, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Paul Primakoff, Ph.D., Professor *(Cell Biology and Human Anatomy)*
Martin L. Privalsky, Ph.D., Professor *(Microbiology)*
Kathryn L. Radke, Ph.D., Professor *(Animal Sciences)*
A. Hari Reddi, Ph.D., Professor *(Orthopaedic Surgery)*
Robert H. Rice, Ph.D., Professor *(Environmental Toxicology)*
Pamela C. Ronald, Ph.D., Associate Professor *(Plant Pathology)*
Lesilee Rose, Ph.D., Associate Professor *(Molecular and Cellular Biology)*
John Roth, Ph.D., Professor *(Microbiology)*
Dewey D. Ryu, Ph.D., Professor *(Biochemical Engineering)*
Earl Sawai, Ph.D., Assistant Adjunct Professor *(Pathology)*
Carl W. Schmid, Ph.D., Professor *(Molecular and Cellular Biology)*
Jonathan M. Scholey, Ph.D., Professor *(Molecular and Cellular Biology)*
Irwin H. Segel, Ph.D., Professor *(Molecular and Cellular Biology)*
Leigh D. Segel, Ph.D., Professor *(Surgery)*
Michael F. Seldin, Ph.D., Professor *(Biological Chemistry)*
Kazuhiro Shiozaki, Ph.D., Associate Professor *(Microbiology)*
Mitchell Singer, Ph.D., Associate Professor *(Microbiology)*
Gary M. Smith, Ph.D., Professor *(Food Science and Technology)*
Henning Stahlberg, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Dan Starr, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Valley J. Stewart, Ph.D., Professor *(Microbiology)*
Colleen Sweeney, Ph.D., Adjunct Professor *(Molecular and Cellular Biology)*
Fern Tablin, Ph.D., Professor *(Anatomy, Physiology and Cell Biology)*
Yoshikazu Takada, Ph.D., Professor *(Dermatology)*
Steven M. Theg, Ph.D., Professor *(Plant Biology)*
Michael D. Toney, Ph.D., Associate Professor *(Chemistry)*
James Trimmer, Ph.D., Professor *(Medical Pharmacology and Toxicology)*
John V. Voss, Ph.D., Associate Professor *(Biological Chemistry)*
P. Richard Vulliet, Ph.D., D.V.M., Professor *(Molecular Biosciences)*
Robert H. Weiss, M.D., Associate Professor *(Internal Medicine, Nephrology)*
Valerie M. Williamson, Ph.D., Professor *(Nematology)*
David Wilson, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Ronald Wisdom, M.D., Assistant Professor *(Hematology and Oncology)*
Reen Wu, Ph.D., Professor *(Internal Medicine)*
Clare Yellowley, Ph.D., Professor *(Anatomy, Physiology and Cell Biology)*
John I. Yoder, Ph.D., Professor *(Vegetable Crops)*
Glenn Young, Ph.D., Assistant Professor *(Food Science and Technology)*
Vincent A. Ziboh, Ph.D., Professor *(Dermatology)*

Graduate Study. The Graduate Group in Biochemistry and Molecular Biology offers programs of study and research leading to the M.S. and Ph.D. degrees. Strong preference is given to Ph.D. applicants. Graduate work involves a broad overview of biochemistry and molecular biology in addition to specialization in one or more areas. Examples of areas of emphasis include gene expression, molecular basis of development, protein structure, molecular virology, protein synthesis, enzymology, signal transduction, membrane transport and structural biology. For more information contact the chairperson of the group.

Graduate Advisers. R. Fairclough *(Neurology)*, R. Rice *(Environmental Toxicology)*, M. Singer *(Microbiology)*, V. Williamson *(Nematology)*.

Courses in Biochemistry and Molecular Biology (BMB)

Graduate Courses

290. Seminar (1)
Seminar—1 hour. Prerequisite: consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.)

299. Research (1-12)
(S/U grading only.)

Biological Chemistry

See Medicine, School of

Biological and Agricultural Engineering

(College of Agricultural and Environmental Sciences)
Bruce R. Hartsough, Ph.D., Chairperson of the Department
Department Office, 2030 Bainer Hall (530-752-0102)
http://www.engr.ucdavis.edu/~bae

Faculty

Michael J. Delwiche, Ph.D., Professor
Fadi A. Fathallah, Ph.D., Associate Professor
D. Ken Giles, Ph.D., Professor
Mark E. Grismer, Ph.D., Professor *(Land, Air and Water Resources)*
Bruce R. Hartsough, Ph.D., Professor
David J. Hills, Ph.D., Professor
Bryan M. Jenkins, Ph.D., Professor
John M. Krochta, Ph.D., Professor *(Food Science and Technology)*
Miguel A. Mariño, Ph.D., Professor *(Land, Air and Water Resources)*
Kathryn McCarthy, Ph.D., Professor *(Food Science and Technology)*
Michael J. McCarthy, Ph.D., Professor *(Food Science and Technology)*
John A. Miles, Ph.D., Professor
Ning Pan, Ph.D., Professor *(Textiles and Clothing)*
Raul H. Piedrahita, Ph.D., Professor
Richard E. Plant, Ph.D., Professor *(Agronomy and Range Science)*
Uriel A. Rosa, Ph.D., Assistant Professor
James W. Rumsey, M.S., Senior Lecturer
R. Paul Singh, Ph.D., Professor
David C. Slaughter, Ph.D., Professor
Shrinivasa K. Upadhyaya, Ph.D., Professor
Jean S. VanderGheynst, Ph.D., Associate Professor
Wesley W. Wallender, Ph.D., Professor *(Land, Air and Water Resources)*
Ruihong Zhang, Ph.D., Associate Professor

Emeriti Faculty

Norman B. Akesson, M.S., Professor Emeritus
Robert H. Burgy, M.S., Professor Emeritus
William J. Chancellor, Ph.D., Professor Emeritus
Pictiaw (Paul) Chen, Ph.D., Professor Emeritus
Robert B. Fridley, Ph.D., Professor Emeritus
Roger E. Garrett, Ph.D., Professor Emeritus
John R. Goss, M.S., Professor Emeritus
S. Milton Henderson, M.S., Sc.D., Professor Emeritus
R. Larry Merson, Ph.D., Professor Emeritus
Stanton R. Morrison, Ph.D., Professor Emeritus
Thomas R. Rumsey, Ph.D., Professor Emeritus
Verne H. Scott, Ph.D., Professor Emeritus
Henry E. Studer, M.S., Professor Emeritus
Wesley E. Yates, M.S., Professor Emeritus

Affiliated Faculty

Daniel Downey, Ph.D., Assistant Research Engineer
James M. Meyers, Ph.D., Specialist in Cooperative Extension
Zhongli Pan, Ph.D., Adjunct Assistant Professor
Herbert B. Scher, Ph.D., Research Engineer
James F. Thompson, M.S., Specialist in Cooperative Extension

Major Programs and Graduate Study. For the Bachelor of Science program, see the major in Engineering; for graduate study, see the Graduate Studies chapter in this catalog.

Minor Programs. The Department of Biological and Agricultural Engineering offers three minors through the College of Agricultural and Environmental Sciences: Applied Biological Systems Technology, Geographic Information Systems and Precision Agriculture.

The Applied Biological Systems program is for non-engineering students interested in engineering terminology and procedures. Course work provides knowledge of material properties, design procedures, fabrication principles, and hardware practices.

The minor in Geographic Information Systems is open to all majors, including those in engineering. This minor is for students interested in information processing of spatial data related to remote sensing for geographical and environmental planning and related areas.

The minor in Precision Agriculture is open to all majors, including those in engineering, and acquaints students with recent developments and their applications to agriculture, in geographic information systems, global positioning systems, and variable rate technologies.

Courses. Courses are listed under Applied Biological Systems Technology, and Engineering: Biological and Agricultural (Biological Systems Engineering).

Biological Sciences

(College of Agricultural and Environmental Sciences and College of Letters and Science)
Division Office, 202 Life Sciences Addition (530-752-0410)
http://www.dbs.ucdavis.edu

The intercollege Division of Biological Sciences coordinates campuswide programs in basic biology and administers undergraduate programs in the core disciplines of biology on behalf of the College of Agricultural and Environmental Sciences and the College of Letters and Science.

Faculty

The faculty in the division are members of the Sections of Evolution and Ecology; Microbiology; Molecular and Cellular Biology; Neurobiology, Physiology, and Behavior; Plant Biology; and the Department of Exercise Science. See each section or department, within the division, for a list of their faculty.

Majors and Sections

The division offers nine majors that focus on the core disciplines of biology and are administered by five sections that represent the major themes of modern biology: Biochemistry and Molecular Biology (Section of Molecular and Cellular Biology)

Biological Sciences (Division-wide)
Cell Biology (Section of Molecular and Cellular Biology)
Evolution and Ecology (Section of Evolution and Ecology)
Exercise Biology (Department of Exercise Science)
Genetics (Section of Molecular and Cellular Biology)
Microbiology (Section of Microbiology)
Neurobiology, Physiology, and Behavior (Section of Neurobiology, Physiology, and Behavior)
Plant Biology (Section of Plant Biology)

The Biological Sciences major, and the Bodega Marine Laboratory Program, are offered jointly by the sections of the division and are explained below. To find information on the other majors listed above, see the administering department or section.

Choice of College. The Bachelor of Arts degree is offered only by the College of Letters and Science. The Bachelor of Science degree is offered by both the College of Letters and Science and the College of Agricultural and Environmental Sciences. The major requirements are the same in each college, but there are differences in the college requirements and policies. See the Undergraduate Education chapter college sections in this catalog for more information.

Student Services. Student affairs officers at the division's Dean's Office, 202 Life Sciences Addition, and advising staff in section offices provide information and counseling on the major programs and courses offered by the division.

The Biological Sciences Major

(Sections of Evolution and Ecology; Microbiology; Molecular and Cellular Biology; Neurobiology, Physiology, and Behavior; and Plant Biology)

The Program. The Biological Sciences major is broad in concept, spanning the numerous core disciplines of biology. The Bachelor of Science program includes mathematics, general and organic chemistry, physics, and biology. While emphasizing breadth, the B.S. degree program also features an area of emphasis requirement that provides concentrated attention on one facet of biology at the upper division level. Each area of emphasis coincides with one of the sections of the division. The Bachelor of Arts program emphasizes biological diversity, evolution, and ecology, all built on a foundation of general and organic chemistry, physics and biology. Research and internships are encouraged in both programs.

Career Alternatives. Both degree programs prepare students for admission to graduate schools or professional schools, leading to either a variety of professional health careers or further study in basic and applied areas of biology. They provide suitable preparation for careers in teaching, biological and biotechnological research with various governmental agencies or private companies, government regulatory agencies, environmental consulting, biological illustration and writing, pharmaceutical sales, biological/environmental law, and biomedical engineering.

The B.A. degree program is also appropriate for students interested in teaching biology at the secondary school level and for careers that bear on the ecological problems that require the development of public policy.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 40-53
Biological Sciences 1A-1B-1C 15
Chemistry 2A-2B 10
Chemistry 8A-8B or 118A-118B-118C .. 6-12
Physics 1A-1B or 7A-7B-7C 6-12
Statistics 13, 32, 100, or 102 3-4
Recommended: Chemistry 2C and Mathematics 16A-16B.

Depth Subject Matter 38-42
Biological Sciences 101 and 102 7
Evolution: One from Evolution and Ecology 100, 140; Geology 107; or Plant Biology 116 3-5
Ecology: One from Environmental Science and Policy 100; Evolution and Ecology 101, 117; or Plant Biology 117, 147 4
Philosophy of Biological Science: One from History and Philosophy of Science 130A, 130B, 131, Nature and Culture 100, 120, 140, Philosophy 108, or Veterinary Medicine 170..... 4
Physiology: One from Environmental Horticulture 102; Entomology 101, 102; Neurobiology, Physiology, and Behavior 101; or Plant Biology 111, 112 3-5
One course each in animal, microbial and plant diversity 8-17
Animal diversity: Entomology 100, 107, 109; Evolution and Ecology 105, 112+112L, 134; Nematology 110; Wildlife, Fish, and Conservation Biology 110, 111, 120.
Microbial diversity: Microbiology 105, 162; Pathology, Microbiology and Immunology 127, 128; Plant Biology 118, 148; Plant Pathology 148; Soil Science 111.
Plant diversity: Evolution and Ecology 108, 119, 140; Plant Biology 102, 108, 116, 119, 147.
Additional upper division course work in biological sciences to achieve a total of 38 or more units (see "Approved Biology Electives" list below).
Upper division course work must include at least 2 units (6 hours per week) of laboratory and/or fieldwork.
Note: Although a course may be listed in more than one category, that course may satisfy only one requirement.

Total units for the major 78-95

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 60-70
Mathematics 16A-16B-16C or 17A-17B-17C 9-12
Chemistry 2A-2B-2C 15
Chemistry 8A-8B or 118A-118B-118C .. 6-12
Biological Sciences 1A-1B-1C 15
Statistics 13, 32, 100, or 102 3-4
Physics 7A-7B-7C 12

Depth Subject Matter 45
Biological Sciences 101, 102, 103, 104 ... 13
Field Requirement, Area of Emphasis Requirement, and additional units (if necessary) to achieve a total of 45 units or more 32
Note: Although a course may be listed in more than one category, that course may satisfy only one requirement.

Field Requirement: Breadth in biology is achieved by completing one course from each field course list (a) through (e) below. Check your area of emphasis for any specific field course requirements.

(a) Evolution: Anthropology 151, 152, 154A; Evolution and Ecology 100; Geology 107; Plant Biology 143 3-5
(b) Ecology: Anthropology 154B; Biological Sciences 122; Entomology 104, 156; Environmental Science and Policy 100, 121; Evolution and Ecology 101; Microbiology 120; Wildlife, Fish, and Conservation Biology 151..... 3-4
(c) Microbiology: Food Science and Technology 104; Microbiology 102, 140, 150, 162; Pathology, Microbiology and Immunology 127, 128; Soil Science 111.... 3-5
(d) Neurobiology, physiology, and behavior: Anthropology 154A, 154B; Entomology 102, 104; Neurobiology, Physiology, and Behavior 100, 101, 102, 141 3-5
(e) Plant biology: Environmental Horticulture 102, 105; Evolution and Ecology 108, 117, 119, 140; Plant Biology 102, 105, 108, 111, 112, 113, 116, 117, 118, 119, 143, 144, 147, 148, 176; Plant Pathology 120, 130, 148 3-5

Area of Emphasis Requirement: Depth in one area of biology is achieved by completing all requirements for one of the six areas of emphasis listed below. It will include at least 2 units (or 6 hours per week) of laboratory designated in the area of emphasis.

Evolution and Ecology emphasis 13-18
Field requirement: Students must take Evolution and Ecology 100 to satisfy Field requirement (a), and Evolution and Ecology 101 to satisfy Field requirement (b).
Evolution and Ecology 102 or 103..... 4
Biodiversity: Six or more units to include at least two units (or 6 hours per week) of laboratory from the following: Entomology 100, 100L, 107, 109; Evolution and Ecology 108, 112, 112L, 134, 134L, Geology 107, 107L; Microbiology 105; Nematology 110; Plant Biology 102, 108, 118, 147, 148; Wildlife, Fish, and Conservation Biology 110, 110L, 111, 111L, 120, 120L 6-9
Restricted electives 3-5
Select one course from: Biological Sciences 122, 122P; Entomology 103, 104, 156, 156L; Environmental Science and Policy 121, 123, 150A, 150B, 150C, 151, 151L; Evolution and Ecology 105, 117, 119, 138, 140, 141, 147, 149; Geology 107, 107L; Nematology 100; Neurobiology, Physiology, and Behavior 102; Philosophy 108; Plant Biology 116, 117, 119; Wildlife, Fish, and Conservation Biology 136.

Marine Biology emphasis 15-17
Field requirement: Students must take Evolution and Ecology 100 to satisfy Field requirement (a), and Evolution and Ecology 101 to satisfy Field requirement (b), and Neurobiology, Physiology, and Behavior 102 or 141 to satisfy Field requirement (d).
Ocean Processes: At least 3 units from Environmental Science and Policy/Geology 116+116G; Environmental Science and Policy 150A, 150B, 151+151L; Evolution and Ecology 115; Wildlife, Fish, and Conservation Biology 157 3
Marine Organismal Biology: At least 4 units from Animal Science 118, 119, 131, 136, 136A; Evolution and Ecology 112+112L; Neurobiology, Physiology, and Behavior 141+141P; Plant Biology 118; Wildlife, Fish, and Conservation Biology 120+120L, 121, 130 4
Immersion Requirement: One field/research course or course combination; requires residence at Bodega Marine Lab for spring quarter or summer session:

Biological Sciences 122+122P; Environmental Science and Policy 124; Neurobiology, Physiology, and Behavior 141+141P 8-10

Microbiology emphasis 14-19

Field requirement: Students must take Microbiology 102 to satisfy Field requirement (c).

Laboratory requirement: Students must take Microbiology 102L to satisfy the area of emphasis laboratory requirement.

Options: Complete one of the four options a-d below; or complete an individual option with approval from your faculty adviser.

(a) Microbial Physiology and Molecular Genetics option 15-17

Microbiology 102L, 140, 150 9

Select one course from Microbiology 170; Molecular and Cellular Biology 121, 161 3

Select one course from Microbiology 105, 155L, 160, 170; Pathology, Microbiology and Immunology 127 3-5

(b) Microbial Diversity and Ecology option 14-16

Microbiology 102L, 105, 120 11

Select one course from Food Science and Technology 104; Microbiology 140, 150, 162, 170; Pathology, Microbiology and Immunology 127, 128; Plant Biology 148; Plant Pathology 148; Soil Science 111 3-5

(c) Biotechnology and Applied Microbiology option 16-19

Microbiology 102L 3

Select two courses from Microbiology 140, 150, 170 6

Select one course from Food Science and Technology 102A, 104; Viticulture and Enology 186 3-4

Select one course from Microbiology 155L; Molecular and Cellular Biology 120L, 160L 4-6

(d) Medical Microbiology option 15-19

Microbiology 102L; Pathology, Microbiology and Immunology 126 6

Select one course from Medical Microbiology and Immunology 115, 116; Pathology, Microbiology and Immunology 127 3-5

Select one course from Microbiology 105, 162; Pathology, Microbiology and Immunology 128 3-5

Select one course from Microbiology 140, 150, 170 3

Molecular and Cellular Biology emphasis 12-18

One course from Molecular and Cellular Biology 121, 141, or 161 3-4

Laboratory experience: One or more laboratory courses from Biological Sciences 120P; Molecular and Cellular Biology 120L, 140L, 160L; or other laboratory course to total 3 units (or 9 hours per week) that emphasizes cellular or molecular biology with approval of your adviserl 3-6

Restricted electives 6-8

Select two or more courses from Biological Sciences 120; Molecular and Cellular Biology 122, 123, 126, 142, 143, 144, 145, 150, 162, 163, 164; Neurobiology, Physiology, and Behavior 103; Pathology, Microbiology and Immunology 126; Plant Biology 113, 126; or other courses with adviser's approval.

Neurobiology, Physiology, and Behavior emphasis 15

Select courses from at least two of the following three areas and include one laboratory from Neurobiology, Physiology, and Behavior 101L, 104L, 141P, or 160L .. 15

(1) Neurobiology: Neurobiology, Physiology, and Behavior 100, 106, 112, 124, 125, 126, 160, 160L, 161, 162, 163, 168, 169; Psychology 121, 124, 128, 129.

(2) Physiology: Anatomy, Physiology, and Cell Biology 100; Entomology 102; Exercise Biology 101, 110, 111; Neurobiology, Physiology, and Behavior 101, 101L, 103, 104L, 105, 106, 111C, 111L, 113, 114, 117, 121, 121L, 123, 127, 128, 130, 131, 139, 140, 141, 141P; Pathology, Microbiology, and Immunology 126; Wildlife, Fish, and Conservation Biology 121.

(3) Behavior: Anthropology 154A, 154B; Entomology 104; Neurobiology, Physiology, and Behavior 102, 150, 152, 159; Psychology 122, 123, 129.

Note: Neurobiology, Physiology, and Behavior 106 may be used only once to satisfy Area of Emphasis requirements.

Plant Biology emphasis 13-16

Select one course from each of the following four areas and include one laboratory course from Evolution and Ecology 108; Plant Biology 105, 108, 111L, 116, 118, 148, 161A, 161B; Plant Pathology 148; **or** two laboratory courses from Evolution and Ecology 140; Plant Biology 153, 158, 171, 172L.

(1) Anatomy and morphology: Evolution and Ecology 140; Plant Biology 105, 116, 118 4-5

(2) Physiology and development: Plant Biology 111, 112, 113; Plant Pathology 130 3

(3) Evolution and ecology: Evolution and Ecology 100, 117; Plant Biology 117, 143 3-4

(4) Applied plant biology: Agricultural Systems and Environment 110A; Plant Biology 154, 160, 171, 172, 175 ... 3-4

Total Units for the Major 105-115

Approved Biology Electives

These courses are accepted without petition for upper division units in the Biological Science major. Many other biologically related courses may be substituted with consent of your adviser.

Agricultural Management and Rangeland Resources 110A, 135

Anatomy, Physiology, and Cell Biology 100

Anthropology 151, 152, 153, 154A, 154B, 155, 156, 157

Avian Sciences 100, 150

Biological Sciences—All upper division courses

Cell Biology and Human Anatomy 101, 101L

Chemistry 107A, 107B, 108, 150

Entomology—All upper division courses

Environmental Horticulture 102, 105

Environmental Science and Policy 100, 110, 121, 123, 124, 150A, 150B, 150C, 151, 151L

Evolution and Ecology—All upper division courses

Exercise Biology 101, 110, 111, 113

Food Science and Technology 102A, 104

Geology 107, 107L, 150A, 150B, 150C

History and Philosophy of Science 130A, 130B, 131

Medical Microbiology 115, 116

Microbiology—All upper division courses

Molecular and Cellular Biology—All upper division courses

Nature and Culture 100, 120, 140

Nematology 100, 110

Neurobiology, Physiology, and Behavior—All upper division courses

Nutrition 101, 111

Pathology, Microbiology, and Immunology 101, 102, 126, 126L, 127, 128

Philosophy 108

Plant Biology—All upper division courses, except 188, 189

Plant Pathology 120, 130

Psychology 121, 122, 123, 124, 128

Soil Science 111

Veterinary Medicine 170

Viticulture and Enology 186

Wildlife, Fish, and Conservation Biology 110, 110L, 111, 111L, 120, 120L, 121, 122, 130, 136, 140, 151

Other Upper Division Courses

There is a limitation on variable-unit courses that may be counted toward the major. Of these courses, up to 4 units of 199 courses may be counted, and no units of 192 or 197T courses may be counted.

Minor Program Requirements:

UNITS

Biological Sciences 18

Complete at least 3 units from each of the five numbered groups to total at least 18 units. Appropriate alternative courses may be used with approval of an adviser.

1) Cell and Molecular Biology: Biological Sciences 101, 102; Microbiology 102 3-4

2) Animal Biology: Anthropology 151, Anatomy, Physiology, and Cell Biology 100/Neurobiology, Physiology, and Behavior 123; Entomology 100; Evolution and Ecology 105, 112+112L, 134; Nematology 100, 110; Neurobiology, Physiology, and Behavior 100, 101, 102, 117; Wildlife, Fish, and Conservation Biology 110, 111, 120 2-5

3) Microbiology: Microbiology 105, 162; Pathology, Microbiology and Immunology 128; Plant Biology/Plant Pathology 148 3-5

4) Plant Biology: Environmental Horticulture/Environmental and Resource Sciences/Plant Biology 144; Plant Biology 105, 111, 112, 116, 118, 126, 141, 171; Plant Biology/Plant Pathology 148 3-5

5) Evolution and Ecology: Anthropology 151, 152, 154; Entomology 100; Evolution and Ecology 100, 101, 108, 115, 117, 119, 138, 140, 147; Plant Biology 102, 108, 117, 119, 142, 143, 146; Plant Pathology 150; Wildlife, Fish, and Conservation Biology 151 3-5

Additional courses (if necessary) from above numbered groups to reach 18 units.

Advisers and Advising: Information on the Biological Sciences major or minor can be obtained from the Undergraduate Academic Programs Office, 202 Life Sciences Addition.

Honors and Honors Programs. Students who have met the minimum grade point average and the units-completed criteria, and who have obtained a sponsoring faculty supervisor may elect to participate in the Division of Biological Sciences Honors Program. The program entails completion of a research project and honors thesis through enrollment in course 194H.

The division additionally recommends students to the College of Letters and Science for the purpose of awarding High and Highest Honors at graduation.

Citation for Outstanding Performance. The Division of Biological Sciences confers Citations for Outstanding Performance on undergraduates majoring in Biological Sciences who have demonstrated superior academic performance and individual achievement in research. Students who wish to be considered for a citation must first meet or exceed a specified grade point average and participate in an appropriate research project.

Teaching Credential Subject Representative. Associate Director of Teacher Education (Division of Education). See also the Teacher Education Program.

Bodega Marine Laboratory Program

A full quarter of undergraduate course work in marine biology is available each spring quarter at the Bodega Marine Laboratory, located in Bodega Bay, California. Course offerings include lecture and laboratory instruction in the developmental biology and physiological adaptation of marine organisms, and population biology and ecology; a weekly colloquium; and an intensive individual research experience under the direction of laboratory faculty (Biological Sciences courses 120, 120P, 122, 122P, 123; Neurobiology, Physiology, and Behavior 141, 141P). This is a 15 unit program and course offerings and instructors may vary from year to year.

The program is residential, with students housed on the laboratory grounds. Participants are assessed a room and board fee in addition to standard campus registration fees. An application is required. Obtain forms from the Division of Biological Sciences. Applications are due before Pass 1 registration begins for spring quarter. Additional information on the Bodega Marine Laboratory Program is available from the Undergraduate Programs Office, 202 Life Sciences Addition, or directly from Bodega Marine Laboratory, 707-875-2211, P.O. Box 247, Bodega Bay, CA 94923.

Courses in Biological Sciences (BIS)

Lower Division Courses

1A. Introductory Biology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: Chemistry 2B (may be taken concurrently). Introduction to biological molecules, bioenergetics, cell structure and function, elements of molecular biology and genetics, and viruses. Interdisciplinary course for majors in the biological sciences.—I, II, III. (I, II, III.)

1B. Introductory Biology (5)
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Introduction to evolution and animal diversity, including transmission and population genetics, micro and macroevolution, systematics, classification, and a survey of major animal groups.—I, II, III. (I, II, III.) Keen, Rosenheim, Kimsey, Stamps, Ward, Grosberg, Shaffer

1C. Introductory Biology (5)
Lecture—4 hours; laboratory—3 hours. Survey of diversity within the plant, protista, and fungi kingdoms, emphasizing flowering plant structure, function, evolution, and ecology. Ecological principles, including population dynamics, life history patterns, community interactions and composition, ecosystems, and world biomes. GE credit: SciEng, Wrt.—I, II, III. (I, II, III.)

10. General Biology (4)
Lecture—3 hours; discussion—1 hour. Concepts and issues in biology. Emphasis on composition and structure of organisms; regulation and signaling; heredity, evolution and the interaction and interdependence among life forms and their environments. Significant writing is required. Designed for students not specializing in biology. Not open for credit to students who have completed course 1A or 10V. GE credit: SciEng, Wrt.—I, II, III.

10V. General Biology (4)
Online lecture—3 hours; Online discussion—1 hour. Concepts and issues in biology. Emphasis on composition and structure of organisms; regulation and signaling; heredity, evolution and the interaction and interdependence among life forms and their environments. Significant writing is required. Designed for students not specializing in biology. Not open for credit to students who have completed course 1A or 10. GE credit: SciEng, Wrt.—III.

11. Issues in the Life Sciences (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: enrollment limited to BUSP students, consent of instructor. The range of subjects and approaches in the field of biology, including both basic and applied research topics.—I. (I.)

11L. Basic Life Sciences Laboratory (2)
Laboratory—6 hours. Prerequisite: enrollment limited to BUSP students, consent of instructor. Basic laboratory skills in life sciences research, including microbiology, molecular biology, and genetics.

15. Biology of Aging (3)
Lecture—3 hours. Biological basis of the aging process. Topics include the normal aging process, developmental influence on the rate of aging, diseases of the aged, theories of aging, and mechanisms for modifying aging. Designed for students with limited biology backgrounds.—McDonald

92. Internship in Biological Sciences (1-12)
Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: lower division standing and consent of instructor. (P/NP grading only.)

Upper Division Courses

101. Genes and Gene Expression (4)
Lecture—4 hours. Prerequisite: course 1A and 1B, Chemistry 8B or 118B or 128B (may be taken concurrently). Nucleic acid structure and function; gene expression and its regulation; replication; transcription and translation; transmission genetics; molecular evolution.—I, II, III. (I, II, III.) Bowman, Dvorak, Engebrecht, Gottleib, Heyer, Hunter, Kimbrell, Quiros, Rodriguez, L. Rose, Sanders

101D. Genes and Gene Expression Discussion (1)
Discussion—1 hour. Prerequisite: course 101 concurrently. Discussion and problem solving related to fundamental principles of classical and molecular genetics as presented in course 101. (P/NP grading only.)—I, II, III. (I, II, III.)

102. Structure and Function of Biomolecules (3)
Lecture—3 hours. Prerequisite: Chemistry 8B or 118B or 128B. Structure and function of macromolecules with emphasis on proteins; enzyme kinetics; supra-molecular assemblies; membranes; cytoskeleton; cell motility and cell division.—I, II, III. (I, II, III.) Fairclough, Gasser, Hilt, Sprechman, Theg

103. Bioenergetics and Metabolism (3)
Lecture—3 hours. Prerequisite: course 102. Fundamentals of the carbon, nitrogen, and sulfur cycles in nature, including key reactions of biomolecules such as carbohydrates, amino acids, lipids, and nucleotides, and of energy production and use in different types of organisms. Principles of metabolic regulation.—I, II, III. (I, II, III.) Abel, Callis, Doi, I. Segel, L. Segel, Mitchell

104. Regulation of Cell Function (3)
Lecture—3 hours. Prerequisite: course 101, 102. Membrane receptors and signal transduction; cell trafficking; cell cycle; cell growth and division; extracellular matrix and cell-cell junctions; cell development; immune system.—I, II, III. (I, II, III.) Crowe, Etzler, Kaplan, S. Lin, Myles, Privalsky, Shiozaki, Starr

120. Developmental Biology of Marine Invertebrates (4)
Lecture—30 hours total; laboratory—30 hours total. Prerequisite: Molecular and Cellular Biology 150-150L, Biological Sciences 102 and 103; course 123 concurrently. Phylogenetic patterns of reproduction and development among the marine invertebrates. Emphasis on both modern and classical approaches to understanding gametogenesis, gamete interaction and fertilization, cleavage, cell differentiation, morphogenesis, and larval development and metamorphosis. Course offered at Bodega Marine Laboratory. (See above description for Bodega Marine Laboratory Program.)—III. (III.)

120P. Developmental Biology of Marine Invertebrates/Advanced Laboratory Topics (6)
Laboratory—150 hours total; discussion—10 hours total. Prerequisite: course 120 concurrently. Students pick a research topic for intense study. Research will be related to a topic covered in course 120 and will be conducted at the Bodega Marine Laboratory with close supervision of resident faculty. (See above description for Bodega Marine Laboratory Program.)—III. (III.)

122. Population Biology and Ecology (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: courses 1A, 1B, and 1C. Residence at Bodega Marine Laboratory required. Biological and physical processes affecting plant and animal populations in the rich array of habitats at the Bodega Marine Laboratory ecological preserve. Emphasis on field experience, with complementing lectures to address population and community processes. (See Bodega Marine Laboratory Program.)—III. (III.) Morgan

122P. Population Biology and Ecology/Advanced Laboratory Topics (5)
Laboratory—12 hours; discussion—1 hour. Prerequisite: course 122 concurrently. Residence at Bodega Marine Laboratory required. Training in scientific research, from hypothesis testing to publication, including methods of library research. Research related to topic covered in course 122. Final presentation both oral and written. (See Bodega Marine Laboratory Program.)—III. (III.) Morgan

123. Undergraduate Colloquium in Marine Science (1)
Seminar—1 hour. Prerequisite: enrolled student at the Bodega Marine Laboratory. Series of weekly seminars by recognized authorities in various disciplines of marine science from within and outside the UC system. Includes informal discussion with speaker. Course will be held at Bodega Marine Laboratory. (P/NP grading only.) (See above description for Bodega Marine Laboratory Program.)—III. (III.)

132. Introduction to Dynamic Models in Modern Biology (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: Mathematics 16C, Statistics 13, one lower division course in biology, or the equivalents. Dynamic modeling in the biological sciences, including matrix models, difference equations, differential equations, and complex dynamics. Examples include classic models in ecology, cell biology, physiology, and neuroscience. Emphasis on understanding models, their assumptions, and implications for modern biology. GE credit: Wrt.—I. (I.)

192. Internship in Biological Sciences (1-12)
Internship—3-36 hours. Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

194H. Research Honors (2)
Independent study—6 hours. Prerequisite: senior standing. Students majoring in Biological Sciences who have completed two quarters (3-5 units per quarter) of 199 and who qualify for the honors program as defined by the current catalog. Opportunity for Biological Sciences majors to pursue intensive research culminating in the writing of a senior thesis with the guidance of faculty advisers. (P/NP grading only.)

195A. Science Teaching Internship Program (4)
Lecture/discussion—2 hours; internship—6 hours. Prerequisite: upper division standing in a science major or consent of instructor. Basic teaching techniques including lesson planning, classroom management, and presentation skills. Interns spend time in K-12 science classrooms working with a master teacher observing, assisting with labs and activities, managing students, and teaching lessons. (P/NP grading only.)—I, II, III. (I, II, III.) Rost, Lusebrink

195B. Science Teaching Internship (1-5)
Internship—3-15 hours. Prerequisite: course 195A. Reinforcement of teaching techniques learned in 195A with additional classroom experiences in K-12 science classrooms working with a master teacher observing, assisting with labs and activities, managing students, and teaching lessons. May be repeated once for credit with consent of instructor. (P/NP grading only.)—I, II, III. (I, II, III.) Rost, Lusebrink

197T. Tutoring in Biological Sciences (1-5)
Discussion—2-6 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor by tutoring students in one of the Biological Sciences' regular courses. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study in Biological Sciences (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Courses

298. Group Study (1-5)
Prerequisite: consent of instructor. Division of Biological Sciences staff members may offer group study courses under this number.

Biomedical Engineering (A Graduate Group)

Michael F. Insana, Ph.D., Chairperson of the Group (530-752-0288)

Group Office, 1026 Academic Surge (530-752-2611)

http://www.bme.ucdavis.edu

Faculty

Craig K. Abbey, Ph.D., Adjunct Assistant Professor *(Biomedical Engineering)*
Ralph C. Aldredge, III, Ph.D., Associate Professor *(Mechanical and Aeronautical Engineering)*
Zhaojun Bai, Ph.D., Professor *(Computer Science)*
Abdul I. Barakat, Ph.D., Associate Professor *(Mechanical and Aeronautical Engineering)*
Stephen W. Barthold, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Ronald J. Baskin, Ph.D., Professor *(Molecular and Cellular Biology)*
Craig Benham, Ph.D., Professor *(Biomedical Engineering, Mathematics)*
John M. Boone, Ph.D., Professor *(Radiology, Biomedical Engineering)*
Michael H. Buonocore, Ph.D., M.D., Professor *(Radiology)*
Simon R. Cherry, Ph.D., Professor *(Biomedical Engineeirng)*
Anthony T. Cheung, Ph.D., Professor *(Pathology)*
Fitz-Roy E. Curry, Ph.D., Professor *(Human Physiology, Biomedical Engineering)*
Fadi A. Fathallah, Ph.D., Assistant Professor *(Biological and Agricultural Engineering)*
Katherine W. Ferrara, Ph.D., Professor *(Biomedical Engineering)*
Jeffery C. Gibeling, Ph.D., Professor *(Chemical Engineering and Materials Science)*
Daniel Gusfield, Ph.D., Professor *(Computer Science)*
David A. Hawkins, Ph.D., Professor *(Exercise Science)*
Scott J. Hazelwood, Ph.D., Assistant Professor *(Orthopaedic Research Labs)*
Mont Hubbard, Ph.D., Professor *(Mechanical and Aeronautical Engineering)*
Maury L. Hull, Ph.D., Professor *(Mechanical and Aeronautical Engineering)*
Michael F. Insana, Ph.D., Professor *(Biomedical Engineering)*
Thomas Jue, Ph.D., Professor *(Biological Chemistry)*
Ian M. Kennedy, Ph.D., Professor *(Mechanical and Aeronautical Engineering)*
Gerald Joseph Kost, Ph.D., M.D., Professor *(Pathology)*
Tonya Kuhl, Ph.D., Associate Professor *(Chemical Engineering and Materials Science, Biomedical Engineering)*
Kit S. Lam, M.D., Ph.D., Professor *(Internal Medicine)*
Marjorie L. Longo, Ph.D., Associate Professor *(Chemical Engineering and Materials Science)*
Angelique Louie, Ph.D., Assistant Professor *(Biomedical Engineering)*
R. Bruce Martin, Ph.D., Professor *(Orthopaedic Research Labs)*
Dennis L. Matthews, Ph.D., Adjunct Professor *(Applied Science)*
Claude F. Meares, Ph.D., Professor *(Chemistry)*
Alexander Mogilner, Ph.D., Professor *(Mathematics)*
Atul Parikh, Ph.D., Professor *(Applied Science)*
Robert L. Powell, Ph.D., Professor *(Chemical Engineering and Materials Science)*
Melvin R. Ramey, Ph.D., Professor *(Civil and Environmental Engineering)*
Bahram Ravani, Ph.D., Professor *(Mechanical and Aeronautical Engineering)*
A. Hari Reddi, Ph.D., Professor *(Orthopaedic Research Labs)*
Nesrin Sarigul-Klijn, Ph.D., Professor *(Mechanical and Aeronautical Engineering)*
Michael A. Savageau, Ph.D., Professor *(Biomedical Engineering)*
J. Anthony Seibert, Ph.D., Professor *(Radiology)*
James F. Shackelford, Ph.D., Professor *(Chemical Engineering and Materials Science)*
Scott I. Simon, Ph.D., Professor *(Biomedical Engineering)*
Susan M. Stover, D.V.M., Ph.D., Professor *(Anatomy, Physiology, and Cell Biology)*
Pieter Stroeve, Sc.D., Professor *(Chemical Engineering and Materials Science)*
Julie Sutcliffe-Goulden, Ph.D., Assistant Professor *(Biomedical Engineering)*
Yoshikazu Takada, M.D., Professor *(Dermatology)*
Jeffrey Walton, Ph.D., Associate Research Physicist *(NMR Facility)*
John (Jack) Werner, Ph.D., Professor *(Ophthalmology)*
Anthony S. Wexler, Ph.D., Professor *(Mechanical and Aeronautical Engineering, Civil and Environmental Engineering, Land, Air, and Water Resources)*
Keith R. Williams, Ph.D., Associate Professor *(Exercise Science)*
Jacob Willig-Onwuachi, Ph.D., Assistant Professor *(Radiology, Biomedical Engineering)*
Erik Wisner, D.V.M., Professor *(Surgical and Radiological Sciences)*
Yohei Yokobayashi, Ph.D., Assistant Professor *(Biomedical Engineering)*

Emeriti Faculty

V. Ralph Algazi, Ph.D., Professor Emeritus *(Electrical and Computer Engineering)*

Graduate Study. The Graduate Group in Biomedical Engineering offers programs of study and research leading to the M.S. and Ph.D. degrees. The programs of study prepare students for professional work in the effective integration of engineering with medical and biological sciences. Research strengths lie in the areas of imaging, sensor and MEMs systems, cellular and molecular mechanics, computational modeling, targeted therapeutics, orthopedic biomechanics, biofluids and transport, and human movement. This broad interdepartmental program is best suited for students who are capable of and comfortable with considerable independence. Each student, together with an adviser, defines a specific course of study suited to individual goals.

Preparation. The Group regards strong competence in mathematics and engineering as necessary for successful completion of study. Prior course work in these areas is emphasized in the evaluation of applications. Some undergraduate training can be acquired after admission to the Group, but it may require an additional year of study.

Courses. See Engineering: Biomedical Engineering for courses.

Biophysics (A Graduate Group)

Thomas Jue, Ph.D., Chairperson of the Group

Group Office, 310 Life Sciences Addition (530-752-9092)

http://biosci.ucdavis.edu/ggc/bph

Faculty

Enoch P. Baldwin, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Abdul I. Barakat, Ph.D., Associate Professor *(Mechanical and Aeronautical Engineering)*
Ronald J. Baskin, Ph.D., Professor *(Molecular and Cellular Biology)*
Craig J. Benham, Ph.D., Professor *(Mathematics, Biomedical Engineering)*
E. Morton Bradbury, Ph.D., Professor *(Biological Chemistry)*
R. David Britt, Ph.D., Professor *(Chemistry)*
Tsung-Yu Chen, Ph.D., Assistant Professor *(Neurology)*
R. Holland Cheng, Ph.D., Professor *(Molecular and Cellular Biology)*
Daniel L. Cox, Ph.D., Professor *(Physics)*
Stephen P. Cramer, Ph.D., Professor *(Applied Science)*
John H. Crowe, Ph.D., Professor *(Molecular and Cellular Biology)*
Thorsten Dieckmann, Ph.D., Assistant Professor *(Chemistry)*
Robert H. Fairclough, Ph.D., Associate Professor *(Neurology)*
Roland Faller, Ph.D., Assistant Professor *(Chemical Engineering and Materials Science)*
Andrew J. Fisher, Ph.D., Associate Professor *(Chemistry, Molecular and Cellular Biology)*
Alla F. Fomina, Ph.D., Assistant Professor *(Physiology and Membrane Biology)*
Ching-Yao Fong, Ph.D., Professor *(Physics)*
Jerry L. Hedrick, Ph.D., Research Professor *(Animal Science)*
Michael F. Insana, Ph.D., Professor *(Biomedical Engineering)*
Niels G. Jensen, Ph.D., Professor *(Applied Science)*
Thomas Jue, Ph.D., Professor *(Biological Chemistry)*
Stephen C. Kowalczykowski, Ph.D., Professor *(Microbiology)*
Tonya L. Kuhl, Ph.D., Associate Professor *(Chemical Engineering and Materials Science)*
Gerd N. LaMar, Ph.D., Professor *(Chemistry)*
Janine M. LaSalle, Ph.D., Associate Professor *(Microbiology and Immunology)*
Carlito B. Lebrilla, Ph.D., Professor *(Chemistry)*
Marjorie L. Longo, Ph.D., Associate Professor *(Chemical Engineering and Materials Science)*
Pamela A. Pappone, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Atul N. Parikh, Ph.D., Professor *(Applied Science)*
Carl W. Schmid, Ph.D., Professor *(Chemistry, Molecular and Cellular Biology)*
Scott I. Simon, Ph.D., Professor *(Biomedical Engineering)*
Rajiv R. Singh, Ph.D., Professor *(Physics)*
Henning Stahlberg, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Alexei Stuchebrukhov, Ph.D., Professor *(Chemistry)*
Steven M. Theg, Ph.D., Professor *(Plant Biology)*
Michael D. Toney, Ph.D., Associate Professor *(Chemistry)*
Frederic A. Troy, Ph.D., Professor *(Biological Chemistry)*
John C. Voss, Ph.D., Associate Professor *(Biological Chemistry)*

David K. Wilson, Ph.D., Associate Professor *(Molecular and Cellular Biology)*
Yin Yeh, Ph.D., Professor *(Applied Science)*

Emeriti Faculty

William H. Fink, Ph.D., Professor Emeritus

Graduate Study. The Graduate Group in Biophysics offers programs of study leading to the Ph.D. degree. Biophysics is a broad interdepartmental program that is ideal for students who are comfortable with considerable independence. The emphasis is on molecular biophysics. The curriculum consists of certain core courses in biology, chemistry, and physics, followed by specialty courses related to research interests. Specific program requirements are decided in consultation with a research supervisor and the graduate adviser.

Graduate Adviser. J.H. Crowe *(Molecular and Cellular Biology),* W.H. Fink *(Chemistry),* M.L. Longo *(Chemical Engineering and Materials Science),* S.M. Theg *(Plant Biology)*

Courses in Biophysics (BPH)

Graduate Courses

200. Current Techniques in Biophysics (2)
Lecture—2 hours. Prerequisite: graduate standing; Biological Sciences 102 or 104 or the equivalent. Current techniques in biophysics research including diffraction, magnetic resonance spectroscopy, calorimetry, optical spectroscopy, and electrophysiology. (Same course as Molecular and Cellular Biology 200C.) (S/U grading only.)—III. (III.)

200LA. Biophysics Laboratory (3)
Laboratory—18 hours. Prerequisite: course 200 (may be taken concurrently). One five-week laboratory assignment in the research laboratory of a Biophysics Graduate Group faculty member. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated for credit four times.—I, II, III. (I, II, III.)

200LB. Biophysics Laboratory (6)
Laboratory—two 18-hour rotations. Prerequisite: course 200 (may be taken concurrently). Two five-week laboratory assignments in the research laboratories of Biophysics Graduate Group faculty members. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated for credit two times.—I, II, III. (I, II, III.)

231. Biological Nuclear Magnetic Resonance (3)
Lecture—3 hours. Prerequisite: Molecular and Cellular Biology 221A or the equivalent or consent of instructor. Principles and applications of magnetic resonance in biomedicine. Fundamental concepts and the biophysical basis for magnetic resonance applications in areas of tissue characterization/imaging, metabolic regulation, and cellular bioenergetics. (Same course as Biological Chemistry 231.) Offered in alternate years.—(I.) Jue

241. Membrane Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 102, 103, 104 or consent of instructor. Advanced topics on membrane biochemistry and biophysics. Relationship of the unique properties of biomembranes to their roles in cell biology and physiology. (Same course as Molecular and Cellular Biology 241.)—III. (III.) Crowe, Longo, Voss

271. Optical Methods in Biophysics (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: Biological Sciences 102 or the equivalent, Applied Science Engineering 108B or the equivalent, and Chemistry 110A or the equivalent. Principal optical techniques used to study biological structures and their related functions. Specific optical techniques useful in the studies of protein-nucleic acid, protein-membrane and protein-protein interactions. Biomedical applications of optical techniques. (Same course as Applied Science Engineering 271.)—III. (III.) Yeh, Parikh, Balhorn, Matthews

290. Biophysics Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Presentation of current research by experts in biophysics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Conference in Biophysics (1)
Discussion—1 hour. Prerequisite: graduate standing in Biophysics and/or consent of instructor; course 299 concurrently. Presentation and discussion of faculty and graduate-student research in biophysics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Biostatistics (A Graduate Group)

Hans Mueller, M.D., Ph.D., Chairperson of the Group
Group Office, 364 Kerr Hall (530-754-7803)
http://anson.ucdavis.edu/bstat/bstatgradprogram.html

Faculty

Laurel Beckett, Ph.D., Professor *(Epidemiology and Preventive Medicine)*
Rudolph Beran, Ph.D., Professor *(Statistics)*
Prabir Burman, Ph.D., Professor *(Statistics)*
Andrew J. Clifford, Ph.D., Professor *(Nutrition)*
Christiana Drake, Ph.D., Associate Professor *(Statistics)*
Thomas R. Famula, Ph.D., Professor *(Animal Science)*
Juanjuan Fan, Ph.D., Assistant Professor *(Statistics)*
Thomas B. Farver, Ph.D., Professor *(Population Health and Reproduction)*
Ian Gardner, Ph.D., Professor *(Medicine and Epidemiology)*
Jiming Jiang, Ph.D., Associate Professor *(Statistics)*
Wesley O. Johnson, Ph.D., Professor *(Statistics)*
Philip H. Kass, Ph.D., Associate Professor *(Population Health and Reproduction)*
Richard A. Levine, Ph.D., Assistant Professor *(Statistics)*
Hongzhe Li, Ph.D., Associate Professor *(Internal Medicine)*
Yue-Pok (Ed) Mack, Ph.D., Professor *(Statistics)*
Hans-Georg Mueller, Ph.D., Professor *(Statistics)*
David M. Rocke, Ph.D., Professor *(Applied Science Engineering)*
George G. Roussas, Ph.D., Professor *(Statistics)*
Francisco J. Samaniego, Ph.D., Professor *(Statistics)*
Robert H. Shumway, Ph.D., Professor *(Statistics)*
Chih-Ling Tsai, Ph.D., Professor *(Graduate School of Management)*
Jessica M. Utts, Ph.D., Professor *(Statistics)*
Jane-Ling Wang, Ph.D., Professor *(Statistics)*

Affiliated Faculty

Rahman Azari, Ph.D., Lecturer *(Statistics)*

Graduate Study. Biostatistics is a field of science that uses quantitative methods to study life sciences related problems that arise in a broad array of fields. The program provides students with, first, solid training in the biostatistical core disciplines and theory; second, with state-of-the art knowledge and skills for biostatistical data analysis; third, substantial exposure to the biological and epidemiological sciences; and fourth, with a strong background in theoretical modeling, statistical techniques and quantitative as well as computational methods. Programs of study and research are offered leading to the M.S. and Ph.D. degrees. The program prepares students for interdisciplinary careers ranging from bioinformatics, environmental toxicology and stochastic modeling in biology and medicine to clinical trials, drug development, epidemiological and medical statistics. The program draws on the strengths of the Biostatistics faculty at UC Davis.

Preparation. Students should have one year of calculus; a course in linear algebra or one year of biological course work; facility with a programming language; and upper-division work in at least one of Mathematics, Statistics and Biology.

Graduate Advisor. R. Azari *(Statistics).*

Courses in Biostatistics (BST)

Graduate Courses

222. Biostatistics: Survival Analysis (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: Statistics 131C. Incomplete data; life tables; nonparametric methods; parametric methods; accelerated failure time models; proportional hazards models; partial likelihood; advanced topics. (Same course as Statistics 222.)—I.

223. Biostatistics: Generalized Linear Models (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: Statistics 131C. Likelihood and linear regression; generalized linear model; Binomial regression; case-control studies; dose-response and bioassay; Poisson regression; Gamma regression; quasi-likelihood models; estimating equations; multivariate GLMs. (Same course as Statistics 223.)—II.

224. Analysis of Longitudinal Data (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course/Statistics 222, 223, Statistics 232B or consent of instructor. Standard and advanced methodology, theory, algorithms, and applications relevant for analysis of repeated measurements and longitudinal data in biostatistical and statistical settings. (Same course as Statistics 224.)—III. (III.)

225. Clinical Trials (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course/Statistics 223 or consent of instructor. Basic statistical principles of clinical designs, including bias, randomization, blocking, and masking. Practical applications of widely-used designs, including dose-finding, comparative and cluster randomization designs. Advanced statistical procedures for analysis of data collected in clinical trials. (Same course as Statistics 225.) Offered in alternate years.—III.

226. Statistical Methods for Bioinformatics (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 131C or consent of instructor; data analysis experience recommended. Standard and advanced statistical methodology, theory, algorithms, and applications relevant to the analysis of –omics data. (Same course as Statistics 226.) Offered in alternate years.—II.

252. Advanced Topics in Biostatistics (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 222, 223. Biostatistical methods and models selected from the following: genetics, bioinformatics and genomics; longitudinal or functional data; clinical trials and experimental design; analysis of environmental data; dose-response, nutrition and toxicology; survival analysis; observational studies and epidemiology; computer-intensive or Bayesian methods in biostatistics. May be repeated for credit with consent of adviser when topic differs. (Same course as Statistics 252.) Offered in alternate years.—III.

290. Seminar in Biostatistics (1)
Seminar—1 hour. Seminar on advanced topics in the field of biostatistics. Presented by members of the Biostatistics Graduate Group and other guest speakers. May be repeated for up to 12 units of credit. (S/U grading only.)—I, II, III.

298. Directed Group Study (1-5)
Prerequisite: consent of instructor.

299. Special Study for Biostatistics Graduate Students (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

299D. Dissertation Research (1-12)
Prerequisite: advancement to Candidacy for Ph.D. and consent of instructor. Research in biostatistics under the supervision of major professor. (S/U grading only.)

Biotechnology

(College of Agricultural and Environmental Sciences)

Faculty. Faculty includes members of the Departments of Agronomy and Range Science; Animal Science, Environmental Horticulture; Food Science and Technology; Land, Air and Water Resources; Plant Pathology; Pomology; Vegetable Crops; Viticulture and Enology; and the Division of Biological Sciences.

The Major Program

Every living organism, from the smallest and most primitive bacteria to every plant, insect, animal or human being, contains DNA as the primary genetic material. DNA directs all cellular processes, creating the incredible variety and diversity of living organisms in the biosphere. Biotechnology focuses on the mechanics of life processes and their application. Biotechnology means "life technology" and represents an integrated, multidisciplinary field, with a profound impact today on almost every aspect of human endeavor.

The Program. In the first two years, students develop a strong and general background in biological science with an emphasis on fundamental concepts and basic principles of genetics, molecular biology and cell biology. Three options, Animal Biotechnology, Plant Biotechnology, and Fermentation/Microbial Biotechnology, provide in-depth training and specialized knowledge in an aspect of biotechnology. Each option has a strong laboratory component to reinforce the theoretical concepts. Students also do an internship in a biotechnology company or university or government laboratory.

Internships and Career Opportunities. In the last decade, more industries are turning to biotechnology to solve problems and improve products, creating a growing job market for individuals trained in biotechnology in the agricultural, food and beverage, health care, chemical, pharmaceutical and biochemical, and environmental and bioremediation industries. Graduates trained in the technologies designed for biotechnology will find their training applicable to advanced research in molecular biology, genetics, biochemistry, and the plant and animal sciences.

B.S. Major Requirements

English Composition Requirement..... 8
See College requirement.

Preparatory Subject Matter 57-64
Biological Sciences 1A-1B-1C 15
Chemistry 2A-2B-2C 15
Chemistry 8A-8B or 118A-118B-118C or 128A-128B-128C-129A 6-12
Mathematics 16A-16B 6
Physics 7A-7B 8
Statistics 13, 100, or Agricultural Management and Rangeland Resources 120 .. 4
Agricultural Management and Rangeland Resources 21, Computer Science Engineering 10 or 15 3-4

Breadth/General Education 24

Depth Subject Matter..... 26-30
Biological Sciences 101 and 104; Biological Sciences 102 or Animal Biology 102; Biological Sciences 103 or Animal Biology 103 13-15
Microbiology 102 4
Molecular and Cellular Biology 161 3
Biotechnology 171 or Plant Pathology 140 2-4
Internship or independent research, Biotechnology 189L, 192 or 199 3
Honors Undergraduate Thesis (optional)... 1

Areas of Specialization (choose one)

Fermentation/Microbiology Biotechnology Option 30-33
Microbiology 140, 150; Microbiology 102L or Food Science and Technology 104L; Molecular and Cellular Biology 160L or Plant Biology 161A; Viticulture and Enology 124 or 186 15-18
Restricted Electives 15
Select from Biotechnology 188, Chemical Engineering 161B, 161C, 161L, Chemistry 107A, 107B, Food Science and Technology 102A, 102B, 104, 104L, 110A, 110B, 123, 123L, 205, Microbiology 105, 155L, 170, Molecular and Cellular Biology 164, Viticulture and Enology 124, 124L, 126, 128, 128L, 135, 140.

Plant Biotechnology Option 28
Molecular and Cellular Biology 126, Plant Biology 152, 160, 161A, 161B..... 18
Restricted Electives 10
Select at least one course from each of the areas. Biotechnology 188 may be used in a or b.
(a) Pests, Pathogens and Production
Agricultural Management and Rangeland Resources 118, Entomology 110, Molecular and Cellular Biology 164, Nematology 100 or 110, Plant Pathology 120, Plant Biology 143, 146, 153, 154, 172
(b) Growth and Development
Plant Biology 105, 111, 112, 157, 158

Animal Biotechnology Option 29
Animal Genetics 111, Neurobiology, Physiology, and Behavior 101, Molecular and Cellular Biology 150, 150L, Veterinary Medicine 170..... 18
Restricted Electives 11
Select at least one course from each of the areas. Biotechnology 188 may be used in a or b.
(a) Animal cell biology/microbiology/immunology
Animal Genetics 101, Medical Microbiology 107, Microbiology 102L, Molecular and Cellular Biology 160L, Pathology, Microbiology, and Immunology 126, 126L, 128, Physiology 200L, Plant Biology 161A
(b) Animal reproduction and breeding
Animal Genetics 107, Animal Science 131, 140, Avian Sciences 103, 121, Evolution and Ecology 102, Molecular and Cellular Biology 164, Neurobiology, Physiology, and Behavior 121, 121L

Unrestricted Electives..... 21-37

Total Units for the Major 180

Major Adviser: J.I. Yoder *(Vegetable Crops),* 133 Asmundson Hall.

Advising Center for the major is located at 1220A Plant and Environmental Sciences.

Courses in Biotechnology (BIT)

Lower Division Courses

92. Internship in Biotechnology (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience on or off campus in subject area pertaining to biotechnology or in a business, industry or agency associated with biotechnology. Internship supervised by faculty member in the animal or plant sciences. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

171. Professionalism and Ethics in Genomics and Biotechnology (3)
Lecture—1 hour; discussion—2 hours. Prerequisite: upper division standing in a natural science major. Real and imaginary case studies to illustrate ethical issues in science. Training and practice in difficult ethical situations and evaluating personal and social consequences. Not open for credit to students who have completed course 193 or Plant Pathology 140.—I, II, III. Yoder, Bradford

188. Undergraduate Research: Proposal (3)
Lecture/discussion—3 hours. Prerequisite: upper division standing. Preparation and review of a scientific proposal. Problem definition, identification of objectives, literature survey, hypothesis generation, design of experiments, data analysis planning, proposal outline and preparation.—III. Yoder, Powell

189L. Laboratory Research in Genomics and Biotechnology (2-5)
Laboratory—3-12 hours; discussion—1 hour. Prerequisite: course 188 and consent of instructor. Formulating experimental approaches to current questions in biotechnology; performance of proposed experiments. May be repeated for credit up to 12 units. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship in Biotechnology (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience on or off campus in a subject area pertaining to biotechnology or in a business, industry or agency associated with biotechnology. Internship supervised by faculty member in the animal or plant sciences. (P/NP grading only.)

194H. Honors Thesis in Biotechnology (1-5)
Independent Study—3-15 hours. Prerequisite: senior standing in Biotechnology with 3.25 GPA or higher and completion of courses 188 and 189L. Independent study of selected topics under the direction of a member or members of the staff. Completion will involve the writing of a senior thesis. (Deferred grading only, pending completion of sequence. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Botany

See Plant Biology; and Plant Biology (A Graduate Group)

Business Management

See Managerial Economics for undergraduate study; and Management, Graduate School of

Cantonese

See Asian American Studies

Cell Biology

See Molecular and Cellular Biology

Cell and Developmental Biology (A Graduate Group)

Richard Tucker, Ph.D., Chairperson of the Group (530-752-0238)

Group Office, 310 Life Sciences Addition (530-752-9091)

http://www-ggc.ucdavis.edu/ggc/cdb

Faculty

Gary B. Anderson, Ph.D., Professor *(Animal Science)*
Peter Armstrong, Ph.D., Professor *(Molecular and Cellular Biology)*
Everett Bandman, Ph.D., Professor *(Food Science and Technology)*
Ronald Baskin, Ph.D., Professor *(Molecular and Cellular Biology)*
Kenneth A Beck, Ph.D., Assistant Professor *(Cell Biology and Human Anatomy)*
Patricia Berger, Ph.D., Professor *(Animal Science)*
E. Morton Bradbury, Ph.D., Professor *(Biological Chemistry)*
Pete M. Cala, Ph.D., Professor *(Human Physiology)*
Frederic Chedin, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Hwai-Jong Cheng, Ph.D., Assistant Professor *(Neurobiology, Physiology and Behavior)*
James S. Clegg, Ph.D., Professor *(Bodega Marine Laboratory)*
John H. Crowe, Ph.D., Professor *(Molecular and Cellular Biology)*
Elva Diaz, Ph.D., Assistant Professor *(Medical Pharmacology and Toxicology)*
Jason P. Eiserich, Ph.D., Assistant Professor *(Nephrology)*
Carol Erickson, Ph.D., Professor *(Molecular and Cellular Biology)*
Marilynn E. Etzler, Ph.D., Professor *(Molecular and Cellular Biology)*
Paul G. FitzGerald, Ph.D., Professor *(Cell Biology and Human Anatomy)*
J. David Furlow, Ph.D., Assistant Professor *(Neurobiology, Physiology, and Behavior)*
Qizhi Gong, Ph.D., Assistant Professor *(Cell Biology and Human Anatomy)*
John H. Harada, Ph.D., Professor *(Plant Biology)*
Jerry L. Hedrick, Ph.D., Professor *(Animal Science)*
Wolf-Dietrich Heyer, Ph.D., Professor *(Microbiology)*
Leonard M. Hjelmeland, Ph.D., Professor *(Biological Chemistry)*
Rivkah Isseroff, Ph.D., Professor *(Dermatology)*
Ken Kaplan, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Anne Knowlton, Ph.D., Associate Professor *(Cardiovascular Medicine)*
Artyom Kopp, Ph.D., Assistant Professor *(Center of Genetics and Development)*
Su-Ju Lin, Ph.D., Assistant Professor *(Microbiology)*
Noelle L'Etoile, Ph.D., Assistant Professor *(Psychiatry)*
Bo Liu, Ph.D., Assistant Professor *(Plant Biology)*
Su Hao Lo, Ph.D., Assistant Professor *(Ortho Research Labs, UCDMC)*
Francis J. McNally, Ph.D., Associate Professor *(Molecular and Cellular Biology)*
Stanley Meizel, Ph.D., Professor *(Cell Biology and Human Anatomy)*
Diana Myles, Ph.D., Professor *(Molecular and Cellular Biology)*
Jeanette E. Natzle, Ph.D., Associate Professor *(Molecular and Cellular Biology)*
Jodi M. Nunnari, Ph.D., Associate Professor *(Molecular and Cellular Biology)*
Martha E. O'Donnell, Ph.D., Professor *(Human Physiology)*
Charles G. Plopper, Ph.D., Professor *(Anatomy, Physiology, and Cell Biology)*
Paul Primakoff, Ph.D., Professor *(Cell Biology and Human Anatomy)*
A. Hari Reddi, Ph.D., Professor *(Ortho Research Labs, UCDMC)*
Robert H. Rice, Ph.D., Professor *(Environmental Toxicology)*
Lesilee Rose, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Jonathan M. Scholey, Ph.D., Professor *(Molecular and Cellular Biology)*
Dan Starr, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Fern Tablin, V.M.D. Ph.D., Professor *(Anatomy, Physiology, and Cell Biology)*
Alice Tarantal, Ph.D., Associate Adjunct Professor *(California National Primate Research Center)*
James S. Trimmer, Ph.D., Professor *(Medical Pharmacology and Toxicology)*
Richard P. Tucker, Ph.D., Professor *(Cell Biology and Human Anatomy)*
Judith L. Turgeon, Ph.D., Professor *(Human Physiology)*
Robert H. Weiss, M.D., Associate Professor *(Internal Medicine)*
Reen Wu, Ph.D., Professor *(Pulmonary/Critical Care Medicine)*

Graduate Study. The Graduate Group in Cell and Developmental Biology offers programs of study leading to the M.S. and Ph.D. degrees. Cell and Developmental Biology is a broad interdepartmental program. The curriculum consists of core courses in cell biology or developmental biology as well as courses jointly staffed with other graduate programs. Specific programs of study are decided upon by an advisory committee chaired by the student's research adviser, and the choice of major core courses will reflect the student's primary research interest.

Preparation. Appropriate preparation is an undergraduate degree in a biological or physical science. Preparation should include a year of calculus, physics, general chemistry and organic chemistry, and introductory courses in statistics, biochemistry, genetics and cell biology.

Graduate Advisers. F. McNally

Courses in Cell and Developmental Biology (CDB)

Graduate Courses

200. Current Techniques in Cell Biology (2)
Lecture—2 hours. Prerequisite: graduate standing; Biological Sciences 104 and Molecular and Cellular Biology 141 or the equivalent courses. Current techniques used in cell biology research including microscopy, spectroscopy, electrophysiology, immunochemistry, histology, organelle isolation, calorimetry, tissue culture and gel electrophoresis. Lectures are presented by experts on each technique, with an emphasis on pitfalls to avoid when using the technique. (Same course as Molecular and Cellular Biology 200A.) (S/U grading only.)—I. (I.)

200LA. Cell and Developmental Biology Laboratory (3)
Laboratory—18 hours. Prerequisite: course 200 (may be taken concurrently). One five-week assignment in the research laboratory of a Cell and Developmental Biology Graduate Group member. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated for credit four times.—I, II, III. (I, II, III.)

200LB. Cell and Developmental Biology Laboratory (6)
Laboratory—18 hours. Prerequisite: course 200 (may be taken concurrently). Two five-week assignments in research laboratories of Cell and Developmental Biology Graduate Group members. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated for credit.—I, II, III. (I, II, III.)

205. Topics in Cell Biology of the Cytoskeleton (2)
Lecture—0.4 hours; discussion—1 hour; seminar—0.6 hours. Prerequisite: graduate standing. Roles of individual proteins in regulating the organization and function of the actin, microtubule and intermediate filament cytoskeletal systems. Emphasis on primary literature. Topics may vary. May be repeated for credit when topic differs.—I. (I.) McNally

290. Current Topics in Cell and Developmental Biology (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Seminars presented by guest lecturers describing their research activities. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Conference in Cell and Developmental Biology (1)
Discussion—1 hour. Prerequisite: graduate standing in Cell and Developmental Biology and/or consent of instructor; course 299 concurrently. Presentation and discussion of faculty and graduate-student research in cell and developmental biology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Cell Biology and Human Anatomy

See Medicine, School of

Chemistry

(College of Letters and Science)

William M. Jackson, Ph.D., Chairperson of the Department

Neil E. Schore, Ph.D., Vice-Chairperson of the Department

Dino S. Tinti, Ph.D., Vice-Chairperson of the Department

Department Office, 108 Chemistry Building (530-752-0503/0953; Fax: 530-752-8995)

http://www.chem.ucdavis.edu

Faculty

Matthew P. Augustine, Ph.D., Associate Professor
Alan L. Balch, Ph.D., Professor
R. David Britt, Ph.D., Professor
Xi Chen, Ph.D., Assistant Professor
Thorsten Dieckmann, Ph.D., Assistant Professor
W. Ronald Fawcett, Ph.D., Professor
Andrew J. Fisher, Ph.D., Associate Professor
Jacquelyn Gervay Hague, Ph.D., Professor
Ting Guo, Ph.D., Assistant Professor
William M. Jackson, Ph.D., Professor
Susan M. Kauzlarich, Ph.D., Professor
Peter B. Kelly, Ph.D., Professor
Mark J. Kurth, Ph.D., Professor
Gerd N. LaMar, Ph.D., Professor
Donald P. Land, Ph.D., Associate Professor
Carlito B. Lebrilla, Ph.D., Professor
Gang-Yu Liu, Ph.D., Associate Professor
Mark Mascal, Ph.D., Assistant Professor
Claude F. Meares, Ph.D., Professor
Tadeusz F. Molinski, Ph.D., Professor
Krishnan P. Nambiar, Ph.D., Associate Professor
Michael H. Nantz, Ph.D., Professor
Alexandra Navrotsky, Ph.D., Professor
Cheuk-Yiu Ng, Ph.D., Professor
Marilyn Olmstead, Ph.D., Professor
Frank Osterloh, Ph.D., Assistant Professor

Timothy E. Patten, Ph.D., Assistant Professor
Philip P. Power, Ph.D., Professor
Peter A. Rock, Ph.D., Professor
Carl W. Schmid, Ph.D., Professor
Neil E. Schore, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Alexei P. Stuchebrukhov, Ph.D., Professor
Dean Tantillo, Ph.D., Assistant Professor
Dino S. Tinti, Ph.D., Professor
Michael Toney, Ph.D., Associate Professor
Nancy S. True, Ph.D., Professor
Susan C. Tucker, Ph.D., Professor
Fred E. Wood, Ph.D., Senior Lecturer

Emeriti Faculty

Thomas L. Allen, Ph.D., Professor Emeritus
William H. Fink, Ph.D., Professor
Edwin Friedrich, Ph.D., Professor Emeritus
Hakon Hope, Cand. real., Professor Emeritus
Raymond M. Keefer, Ph.D., Professor Emeritus
August H. Maki, Ph.D., Professor Emeritus
Donald A. McQuarrie, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
W. Kenneth Musker, Ph.D., Professor Emeritus
Charles P. Nash, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
James H. Swinehart, Ph.D., Professor Emeritus
David H. Volman, Ph.D., Professor Emeritus
George S. Zweifel, Sc.D., Professor Emeritus

The Major Programs

Chemistry studies the composition of matter, its structure, and the means by which it is converted from one form to another.

The Program. Two programs in chemistry are available, one leading to the Bachelor of Arts and the other to the Bachelor of Science. Students who are interested in chemistry as a profession normally elect the program leading to the B.S. degree, which is accredited by the American Chemical Society. The curriculum leading to an A.B. degree offers a less intensive program in chemistry and is appropriate for a student with a strong interest in chemistry, but who also has another goal such as professional school preparation or secondary school teaching. Students following either degree track may consider taking advantage of the Education Abroad Program. Faculty advisers can assist students in planning a curriculum while abroad that assures regular progress in the major. A minor program in Chemistry is also available.

Career Alternatives. Chemistry graduates with bachelor's degrees are employed extensively throughout the industry in production supervision, quality control, technical marketing, and other areas of applied chemistry. Some of the firms employing these graduates are in the chemical industry, biotechnology, genetic engineering, food and beverage industry, petroleum and petrochemical industry, paper and textile production and processing, pharmaceuticals, photographic industry, and the electronics, semiconductors and computer industries. The bachelor programs also provide chemistry graduates with the rigorous preparation needed for the advanced degrees required for careers in research and higher education.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**36-39**
Chemistry 2A-2B-2C or 2AH-2BH-2CH	15
Physics 7A-7B-7C	12
Mathematics 21A-21B-21C or 16A-16B-16C	9-12
Depth Subject Matter	**43**
Chemistry 110A, 110B, 110C, 105, 124A, 128A, 128B, 128C, 129A, 129B	32
At least 11 additional upper division units in chemistry (except Chemistry 107A or 107B) or related areas, including one course with formal lectures. Courses in related areas must be approved in advance by the major adviser	11
Total Units for the Major	**79-82**

B.S. Major Requirements:

	UNITS
Preparatory Subject Matter	**53**
Chemistry 2A-2B-2C or 2AH-2BH-2CH	15
Physics 9A, 9B, 9C, 9D	16
Mathematics 21A, 21B, 21C, 21D, 22A, 22B	22
Depth Subject Matter	**54**
Chemistry 110A, 110B, 110C, 105, 115, 124A, 124B or 124C, 124L, 125, 128A, 128B, 128C, 129A, 129B, 129C	47
At least 7 additional upper division units in chemistry (except Chemistry 107A, 107B), including one course with formal lectures	7
Total Units for the Major	**107**

Major Advisers. M.P. Augustine, J. Gervay Hague, M.J. Kurth, K.P. Nambiar, P. Power, N.E. Schore, D.S. Tinti, N. True, S. Tucker.

Minor Program Requirements:

	UNITS
Chemistry	**20-21**
Chemistry 105, 107A, 107B, 118A, 124A	17
At least one additional course from Chemistry 118B, 124B and 124C	3-4

Note: The minor program has prerequisites of Chemistry 2A-2B-2C, Mathematics 16A-16B-16C, and Physics 7A-7B-7C or their equivalents. Students wishing to earn a Chemistry minor should consult with a Chemistry major adviser.

Honors and Honors Program. The student must take courses 194HA, 194HB, and 194HC.

Graduate Study. The Department of Chemistry offers programs of study and research leading to the M.S. and Ph.D. degrees in Chemistry. Detailed information regarding graduate study may be obtained by writing to the Graduate Adviser, Department of Chemistry. See also the Graduate Studies chapter of this catalog.

Courses in Chemistry (CHE)

Diagnostic Examinations. To enroll in Chemistry 2A or 2AH, all students (including those with Advanced Placement examination credit or transfer units for any courses in chemistry or mathematics) must pass *both the Chemistry Diagnostic Test and the Precalculus Qualifying Examination with satisfactory scores.* Both exams are administered during Summer Advising and Orientation and during the orientation week of any quarter in which Chemistry 2A or 2AH is offered. Students who have not passed both exams will be administratively dropped from Chemistry 2A and 2AH.

If you do not achieve a satisfactory score on the Chemistry Diagnostic Test, you have two options. First, you may retake the test. The Learning Skills Center will provide you with the results of your test and details regarding self-directed study materials you may use to prepare to retake the test. The second option is to enroll in Sacramento City College's Chemistry 110C (listed in the *Class Schedule and Registration Guide* as WLD 041C before the Chemistry courses). This course is given at UC Davis during fall quarter specifically for UC Davis students who require extra preparation for Chemistry 2A. WLD 41C provides 3 units of credit toward minimum progress and verification of full-time status, but provides **no units toward graduation or grade point average.** You may not enroll in WLD 41C if you have passed the Chemistry Diagnostic Test or if you have not yet taken the Chemistry Diagnostic Test.

Lower Division Courses

2A. General Chemistry (5)
Lecture—3 hours; laboratory/discussion—4 hours. Prerequisite: High school chemistry and physics strongly recommended; satisfactory score on diagnostic examinations. Periodic table, stoichiometry, chemical equations, physical properties and kinetic theory of gases, atomic and molecular structure and chemical bonding. Laboratory experiments in stoichiometric relations, properties and collection of gases, atomic spectroscopy, and introductory quantitative analysis. Only 3 units of credit allowed to students who have completed course 9. GE credit: SciEng.—I, II. (I, II.)

2AH. Honors General Chemistry (5)
Lecture—3 hours; laboratory/discussion—4 hours. Prerequisite: High school chemistry and physics; satisfactory score on diagnostic examinations; Mathematics 21A (may be taken concurrently) or consent of instructor. Limited enrollment course with a more rigorous treatment of material covered in course 2A. Students completing course 2AH can continue with course 2BH or 2B.—I. (I.)

2B. General Chemistry (5)
Lecture—3 hours; laboratory/discussion—4 hours. Prerequisite: course 2A or 2AH. Continuation of course 2A. Condensed phases and intermolecular forces, chemical thermodynamics, chemical equilibria, acids and bases, solubility. Laboratory experiments in thermochemistry, equilibria, and quantitative analysis using volumetric methods. GE credit: SciEng.—II, III. (II, III.)

2BH. Honors General Chemistry (5)
Lecture—3 hours; laboratory/discussion—4 hours. Prerequisite: course 2A with consent of instructor or course 2AH with a grade of C or better; and Mathematics 21B (maybe taken concurrently) or consent of instructor. Limited enrollment course with a more rigorous treatment of material covered in course 2B. Students completing course 2BH can continue with course 2CH or 2C.—II. (II.)

2C. General Chemistry (5)
Lecture—3 hours; laboratory/discussion—4 hours. Prerequisite: course 2B or 2BH. Continuation of course 2B. Kinetics, electrochemistry, spectroscopy, structure and bonding in transition metal compounds, application of principles to chemical reactions. Laboratory experiments in selected analytical methods and syntheses. GE credit: SciEng.—I, III. (I, III.)

2CH. Honors General Chemistry (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: course 2B with consent of instructor or course 2BH with a grade of C or better; and Mathematics 21C (maybe taken concurrently) or consent of instructor. Limited enrollment course with a more rigorous treatment of material covered in course 2C.—III. (III.)

8A. Organic Chemistry: Brief Course (2)
Lecture—2 hours. Prerequisite: course 2B with a grade of C– or higher. With course 8B, an introduction to the nomenclature, structure, chemistry, and reaction mechanisms of organic compounds. Intended for students majoring in areas other than organic chemistry.—I, III. (I, III.)

8B. Organic Chemistry: Brief Course (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 8A or 118A. Continuation of course 8A. Laboratory concerned primarily with organic laboratory techniques and the chemistry of the common classes of organic compounds.—I, II. (I, II.)

10. Concepts of Chemistry (4)
Lecture—4 hours. A survey of basic concepts and contemporary applications of chemistry. Designed for non-science majors and not as preparation for Chemistry 2A. Course Not open for credit to students who have had Chemistry 2A; but students with credit for course 10 may take Chemistry 2A for full credit. GE credit: SciEng, Wrt.—I. (I.) Wood

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

105. Analytical and Physical Chemical Methods (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 110A (may be taken concurrently) or consent of instructor. Fundamental theory and laboratory techniques in analytical and physical chemistry. Errors and data analysis methods. Basic electrical circuits in instruments. Advanced solution equilibria. Potentiometric analysis. Chromatographic separations. UV-visible spectroscopy. Lasers.—I, III. (I, III.)

107A. Physical Chemistry for the Life Sciences (3)
Lecture—3 hours. Prerequisite: course 2C, Mathematics 16C or 21C, one year of college level physics. Physical chemistry intended for majors in the life science area. Introductory development of classical and statistical thermodynamics including equilibrium processes and solutions of both non-electrolytes and electrolytes. The thermodynamic basis of electrochemistry and membrane potentials.—I. (I.)

107B. Physical Chemistry for the Life Sciences (3)
Lecture—3 hours. Prerequisite: course 107A. Continuation of course 107A. Kinetic theory of gases and transport processes in liquids. Chemical kinetics, enzyme kinetics and theories of reaction rates. Introduction to quantum theory, atomic and molecular structure, and spectroscopy. Application to problems in the biological sciences.—II. (II.)

108. Physical Chemistry of Macromolecules (3)
Lecture—3 hours. Prerequisite: course 107B or 110C. Physical properties and characterization of macromolecules with emphasis upon those of biological interest. Structural thermodynamic, optical and transport properties of polymers in bulk and in solution. Physical characterization methods. Special topics on the properties of polyelectrolyte systems.—III. (III.)

110A. Physical Chemistry: Introduction to Quantum Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2C, Mathematics 16C or 21C; one year of college physics. Introduction to the postulates and general principles of quantum mechanics. Approximations based on variational method and time independent perturbation theory. Application to harmonic oscillator, rigid rotor, one-electron and many-electron atoms, and homo-and hetero-nuclear diatomic molecules.—I, III. (I, III.)

110B. Physical Chemistry: Properties of Atoms and Molecules (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110A. Group theory. Application of quantum mechanics to polyatomic molecules and molecular spectroscopy. Intermolecular forces and the gas, liquid and solid states. Distributions, ensembles and partition functions. Transport properties.—I, II. (I, II.)

110C. Physical Chemistry: Thermodynamics, Equilibria and Kinetics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110B. Development and application of the general principles of thermodynamics and statistical thermodynamics. Chemical kinetics, rate laws for chemical reactions and reaction mechanisms.—II, III. (II, III.)

115. Instrumental Analysis (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 105 and 110B (may be taken concurrently). Intermediate theory and laboratory techniques in analytical and physical chemistry. Advanced data analysis methods and goodness-of-fit criteria. Fourier-transform spectroscopic methods and instrumentation. Mass spectrometry. Electrochemistry. Liquid chromatography. GE credit: Wrt.—I, II. (I, II.)

118A. Organic Chemistry for Health and Life Sciences (4)
Lecture—3 hours; laboratory/discussion—1.5 hours. Prerequisite: course 2C with a grade of C– or higher. The 118A, 118B, 118C series is for students planning professional school studies in health and life sciences. A rigorous, in-depth presentation of basic principles with emphasis on stereochemistry and spectroscopy and preparations and reactions of nonaromatic hydrocarbons, haloalkanes, alcohols and ethers.—I, II. (I, II.)

118B. Organic Chemistry for Health and Life Sciences (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 118A. Continuation of course 118A, with emphasis on spectroscopy and the preparation and reactions of aromatic hydrocarbons, organometallic compounds, aldehydes and ketones.—II, III. (II, III.)

118C. Organic Chemistry for Health and Life Sciences (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 118B. Continuation of course 118B, with emphasis on the preparation, reactions and identification of carboxylic acids and their derivatives, alkyl and acyl amines, ß-dicarbonyl compounds, and various classes of naturally occurring, biologically important compounds.—I, III. (I, III.)

120. Physical Chemistry Laboratory: Advanced Methods (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite; courses 110C and 111. Design of experiments; experimental control and data acquisition using microcomputers. Laboratory emphasizes the use of microcomputers in advanced physical-chemical experiments. Offered in alternate years.—II.

121. Introduction to Molecular Structure and Spectra (4)
Lecture—4 hours. Prerequisite: course 110B. Modern theoretical and experimental methods used to study problems of molecular structure and bonding; emphasis on spectroscopic techniques.—III. (III.)

124A. Inorganic Chemistry: Fundamentals (3)
Lecture—3 hours. Prerequisite: course 2C. Symmetry, molecular geometry and structure, molecular orbital theory of bonding (polyatomic molecules and transition metals), solid state chemistry, energetics and spectroscopy of inorganic compounds.—I. (I.)

124B. Inorganic Chemistry: Main Group Elements (3)
Lecture—3 hours. Prerequisite: course 124A. Synthesis, structure and reactivity of inorganic and heteroorganic molecules containing the main group elements.—II. (II.)

124C. Inorganic Chemistry: d and f Block Elements (3)
Lecture—3 hours. Prerequisite: course 124A. Synthesis, structure and reactivity of transition metal complexes, organometallic and bioinorganic chemistry, the lanthanides and actinides.—III. (III.)

124L. Laboratory Methods in Inorganic Chemistry (2)
Laboratory—6 hours. Prerequisite: course 124B or 124C (may be taken concurrently). The preparation, purification and characterization of main group and transition metal inorganic and organometallic compounds.—III. (III.)

125. Advanced Methods in Physical Chemistry (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 110C (may be taken concurrently) and 115. Advanced theory and laboratory techniques in analytical and physical chemistry. Advanced spectroscopic methods. Thermodynamics. Kinetics. Chemical literature. Digital electronics and computer interfacing. Laboratory measurements and vacuum techniques. GE credit: Wrt.—II, III. (II, III.)

128A. Organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 2C with a grade of C or higher; chemistry majors should enroll in course 129A concurrently. Introduction to the basic concepts of organic chemistry with emphasis on stereochemistry and the chemistry of hydrocarbons. Designed primarily for majors in chemistry.—I, II. (I, II.)

128B. Organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 128A or consent of instructor, course 129A strongly recommended; chemistry majors should enroll in course 129B concurrently. Continuation of course 128A with emphasis on aromatic and aliphatic substitution reactions, elimination reactions, and the chemistry of carbonyl compounds. Introduction to the application of spectroscopic methods to organic chemistry.—II, III. (II, III.)

128C. Organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 128B, chemistry majors should enroll in course 129C concurrently. Continuation of course 128B with emphasis on enolate condensations and the chemistry of amines, phenols, and sugars; selected biologically important compounds.—I, III. (I, III.)

129A. Organic Chemistry Laboratory (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2C with a grade of C or higher; course 128A (may be taken concurrently). Introduction to laboratory techniques of organic chemistry. Emphasis is on methods used for separation and purification of organic compounds.—I, II. (I, II.)

129B. Organic Chemistry Laboratory (2)
Laboratory—6 hours. Prerequisite: courses 128B (may be taken concurrently) and 129A. Continuation of course 129A. Emphasis is on methods used for synthesis and isolation of organic compounds.—II, III. (II, III.)

129C. Organic Chemistry Laboratory (2)
Laboratory—6 hours. Prerequisite: courses 128C (may be taken concurrently) and 129B. Continuation of course 129B.—I, III. (I, III.)

131. Modern Methods of Organic Synthesis (3)
Lecture—3 hours. Prerequisite: course 128C. Introduction to modern synthetic methodology in organic chemistry with emphasis on stereoselective reactions and application to multistep syntheses of organic molecules containing multifunctionality.—II. (II.)

135. Advanced Organic Chemistry Laboratory (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: courses 115 and 129C. Separation, purification and identification of organic compounds using modern methods of synthesis and instrumentation.—III.

140. Synthetic Methods (4)
Lecture—1 hour; laboratory—9 hours. Prerequisite: courses 124A, 128C, 129C. Integrated inorganic-organic course in the preparation, purification and characterization of multifunctional organic, organo-metallic, and transition metal compounds using a wide range of methods. Offered in alternate years.—III.

150. Chemistry of Natural Products (3)
Lecture—3 hours. Prerequisite; course 128C. Chemistry of terpenes, steroids, acetogenins, and alkaloids: isolation, structure determination, biosynthesis, chemical transformations, and total synthesis. GE credit: SciEng, Wrt.—I. (I.)

192. Internship in Chemistry (1-6)
Internship—3-18 hours. Prerequisite: upper division standing; project approval by faculty sponsor prior to enrollment. Supervised internship in chemistry; re-quires a final written report. May be repeated for credit for a total of 6 units. (P/NP grading only.)

194HA-194HB-194HC. Undergraduate Honors Research (2-2-2)
Independent study—2 hours. Prerequisite: open only to chemistry majors who have completed 135 units and who qualify for the honors program. Original research under the guidance of a faculty adviser, culminating in the writing of an extensive report. (Deferred grading only, pending completion of sequence.)

195. Careers in Chemistry (1)
Seminar—2 hours. Prerequisite: junior or senior standing in Chemistry. Designed to give Chemistry undergraduate students an in-depth appreciation of career opportunities with a bachelors degree in chemistry. Professional chemists (and allied pro-

fessionals) describe research and provide career insights. (P/NP grading only.)—I.

197. Projects in Chemical Education (1-4)
Discussion and/or laboratory. Prerequisite: consent of instructor. Participation may include development of laboratory experiments, lecture demonstrations, autotutorial modules or assistance with laboratory sessions. May be repeated for credit for a total of 12 units. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor based upon adequate preparation in chemistry, mathematics and physics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor based upon adequate preparation in chemistry, mathematics, and physics. (P/NP grading only.)

Graduate Courses

201. Chemical Uses of Symmetry and Group Theory (3)
Lecture—3 hours. Prerequisite: course 124A and 110B, or consent of instructor. Symmetry elements and operations, point groups, representations of groups. Applications to molecular orbital theory, ligand field theory, molecular vibrations, and angular momentum. Crystallographic symmetry.—I. (I.)

205. Symmetry, Spectroscopy, and Structure (3)
Lecture—3 hours. Prerequisite: course 201 or the equivalent. Vibrational and rotational spectra; electronic spectra and photoelectron spectroscopy; magnetism; electron spin and nuclear quadrapole resonance spectroscopy; nuclear magnetic resonance spectroscopy; other spectroscopic methods.—II. (II.)

210A. Quantum Chemistry: Introduction and Stationary-State Properties (3)
Lecture—3 hours. Prerequisite: course 110B and 110C or consent of instructor. Stationary-state quantum chemistry: postulates of quantum mechanics, simple solutions, central field problems and angular momenta, hydrogen atom, perturbation theory, variational theory, atoms and molecules.—II. (II.)

210B. Quantum Chemistry: Time-Dependent Systems (3)
Lecture—3 hours. Prerequisite: course 210A. Matrix mechanics and time-dependent quantum chemistry: matrix formulation of quantum mechanics, Heisenberg representation, time-dependent perturbation theory, selection rules, density matrices, and miscellaneous molecular properties.—III. (III.)

210C. Quantum Chemistry: Molecular Spectroscopy (3)
Lecture—3 hours. Prerequisite: course 210B. Molecular spectroscopy: Born-Oppenheimer approximation, rotational, vibrational and electronic spectroscopy, spin systems, and molecular photophysics.—I. (I.)

211A. Advanced Physical Chemistry: Statistical Thermodynamics (3)
Lecture—3 hours. Prerequisite: consent of instructor. Principles and applications of statistical mechanics; ensemble theory; statistical thermodynamics of gases, solids, liquids, electrolyte solutions and polymers; chemical equilibrium.—I. (I.)

211B. Statistical Mechanics (3)
Lecture—3 hours. Prerequisite: course 211A. Statistical mechanics of nonequilibrium systems, including the rigorous kinetic theory of gases, continuum mechanics transport in dense fluids, stochastic processes, brownian motion and linear response theory. Offered in alternate years.—II.

212. Chemical Dynamics (3)
Lecture—3 hours. Prerequisite: consent of instructor. Introduction to modern concepts in chemical reaction dynamics for graduate students in chemistry. Emphasis will be placed on experimental techniques as well as emerging physical models for characterizing chemical reactivity at a microscopic level. Offered in alternate years.—II.

215. Theoretical and Computational Chemistry (3)
Lecture—3 hours. Prerequisite: courses 211A and 210B or consent of instructor. Mathematics of wide utility in chemistry, computational methods for guidance or alternative to experiment, and modern formulations of chemical theory. Emphasis will vary in successive years. May be repeated for credit when topic differs. Offered in alternate years.—(III.)

216. Magnetic Resonance Spectroscopy (3)
Lecture—3 hours. Prerequisite: courses 210A, 210B (may be taken concurrently). Quantum mechanics of spin and orbital angular momentum, nuclear magnetic resonance, theory of chemical shift and multiplet structures, electron spin resonance, theory of g-tensor in organic and transition ions, spin Hamiltonians, nuclear quadrupolar resonance, spin relaxation processes. Offered in alternate years.—(III.)

217. X-Ray Structure Determination (3)
Lecture—3 hours. Prerequisite: consent of instructor. Introduction to x-ray structure determination; crystals, symmetry, diffraction geometry, sample preparation and handling, diffraction apparatus and data collection, methods of structure solution and refinement, presentation of results, text, tables and graphics, crystallographic literature.—III. (III.)

218. Macromolecules: Physical Principles (3)
Lecture—3 hours. Prerequisite: courses 110A, 110B, 110C or the equivalent. Relationship of higher order macromolecular structure to subunit composition; equilibrium properties and macromolecular dynamics; physical chemical determination of macromolecular structure. Offered in alternate years.—I.

219. Spectroscopy of Organic Compounds (4)
Lecture—3 hours; laboratory—2.5 hours. Prerequisite: course 128C or the equivalent. Identification of organic compounds and investigation of stereochemical and reaction mechanism phenomena using spectroscopic methods—principally NMR, IR and MS.—I.

221A-H. Special Topics in Organic Chemistry (3)
Lecture—3 hours. Selected topics of current interest in organic chemistry. Topics will vary each time the course is offered, and in general will emphasize the research interests of the staff member giving the course.—I. (I.)

226. Principles of Transition Metal Chemistry (3)
Lecture—3 hours. Prerequisite: course 124A or the equivalent. Electronic structures, bonding, and reactivity of transition metal compounds.—I. (I.) Balch

228A. Bio-inorganic Chemistry (3)
Lecture—3 hours. Prerequisite: course 226 or consent of instructor. Defines role of inorganic chemistry in the functioning of biological systems by identifying the functions of metal ions and main group compounds in biological systems and discussing the chemistry of model and isolated biological compounds. Offered every third year.

228B. Main Group Chemistry (3)
Lecture—3 hours. Prerequisite: course 226 or consent of instructor. Synthesis, physical properties, reactions and bonding of main group compounds. Discussions of concepts of electron deficiency, hypervalency, and non-classical bonding. Chemistry of the main group elements will be treated systematically. Offered every third year.—III.

228C. Solid-State Chemistry (3)
Lecture—3 hours. Prerequisite: courses 124A, 110B, 226, or the equivalent. Design and synthesis, structure and bonding of solid-state compounds; physical properties and characterization of solids; topics of current interest such as low-dimensional materials, inorganic polymers, materials for catalysis. Offered every third year.—III.

228D. Homogeneous Catalysis (3)
Lecture—3 hours. Prerequisite: course 226. Overview of homogeneous catalysis and related methods, with emphasis on kinetics, mechanisms, and applications for organic synthesis. The related methods may include cluster, colloid, phase transfer, enzymatic, heterogeneous and polymer-supported catalysis. Offered in alternate years.—III.

231. Organic Synthesis: Methods and Strategies (3)
Lecture—3 hours. Prerequisite: course 131 or the equivalent. Provides a broadly based discussion of current strategies in synthetic organic chemistry. Focus on methods for constructing carbon frameworks, controlling relative stereochemistry, and controlling absolute stereochemistry. Retrosynthetic strategies will be discussed throughout the lectures.—III. (III.)

233. Physical-Organic Chemistry (3)
Lecture—3 hours. Prerequisite: courses 128A-128B-128C and 110A-110B-110C or the equivalent. Introduction to elementary concepts in physical-organic chemistry including the application of simple numerical techniques in characterizing and modeling organic reactions.—II. (II.)

235. Organometallic Chemistry in Organic Synthesis (3)
Lecture—3 hours. Prerequisite: course 128C. Current trends in use of organometallics for organic synthesis; preparations, properties, applications, and limitations of organometallic reagents derived from transition and/or main group metals. Offered in alternate years.—(III.)

236. Chemistry of Natural Products (3)
Lecture—3 hours. Prerequisite: course 128C or the equivalent. Advanced treatment of chemistry of naturally occurring compounds isolated from a variety of sources. Topics will include isolation, structure determination, chemical transformations, total synthesis, biological activity, and biosynthesis. Biosynthetic origin will be used as a unifying theme.—II. (II.)

237. Bio-organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 128C or the equivalent. Structure and function of biomolecules; molecular recognition; enzyme reaction mechanisms; design of suicide substrates for enzymes; enzyme engineering; design of artificial enzymes and application of enzymes in organic synthesis. Offered in alternate years.—(I.)

240. Advanced Analytical Chemistry (3)
Lecture—3 hours. Prerequisite: courses 110A and 115 or the equivalent. Numerical treatment of experimental data; thermodynamics of electrolyte and non-electrolyte solutions; complex equilibria in aqueous and non-aqueous solutions; potentiometry and specific ion electrodes; mass transfer in liquid solutions; fundamentals of separation science, including column, gas and liquid chromatography.—I. (I.)

241A. Surface Analytical Chemistry (3)
Lecture—3 hours. Prerequisite: course 110C or the equivalent. Concepts of surfaces and interfaces: physical properties, unique chemistry and electronic effects. Focus on gas-solid interfaces, with some discussion of liquid-solid interfaces. Offered in alternate years.—I.

241B. Laser and X-ray Spectroscopy (3)
Lecture—3 hours. Prerequisite: course 110B or the equivalent. Concepts and mechanisms of light-matter interactions. Chemical applications of modern spectroscopic methods, including multiphoton spectroscopy, time-resolved laser and x-ray photolysis, and phase-contrast x-ray imaging. Offered in alternate years.—I.

241C. Mass Spectrometry (3)
Lecture—3 hours. Prerequisite: course 110C and 115 or the equivalent. Mass spectrometry and related methods with emphasis on ionization methods, mass analyzers, and detectors. Related methods may include ion-molecule reactions, unimolecular dissociation of organic and bio-organic compounds, and applications in biological and environmental analysis. Offered in alternate years.—II.

241D. Electroanalytical Chemistry (3)
Lecture—3 hours. Prerequisite: course 110C and 115 or the equivalent. Electroanalytical chemistry with consideration of mass transfer and electrode kinetics for polarizable electrodes. Current-potential curves for a variety of conditions, including both

potentiostatic and galvanostatic control, and their application in chemical analysis. Offered in alternate years.—II.

241E. Microscopy and Imaging Techniques (3)
Lecture—3 hours. Prerequisite: course 110C and 115 or the equivalent. Introduction to modern microscopy and imaging techniques: scanning tunneling, atomic force, far-field optical, fluorescence, scanning near-field optical, and scanning electron microscopy. Application to nanoscience and analytical and bioanalytical chemistry. Some laboratory demonstrations. Offered in alternate years.—II.

261. Current Topics in Chemical Research (2)
Lecture—2 hours. Prerequisite: graduate standing in Chemistry or consent of instructor. Designed to help chemistry graduate students develop and maintain familiarity with the current and past literature in their immediate field of research and related areas. May be repeated for credit when topics differ.—I, II, III. (I, II, III.)

263. Introduction to Chemical Research Methodology (3)
Laboratory/discussion—9 hours. Prerequisite: course 293 and graduate student standing in Chemistry; consent of instructor. Introduction to identification, formulation, and solution of meaningful scientific problems including experimental design and/or theoretical analyses of new and prevailing techniques, theories and hypotheses. May be repeated for credit when topic differs. (S/U grading only.)—I, II, III. (I, II, III.)

264. Advanced Chemical Research Methodology (6)
Laboratory/discussion—18 hours. Prerequisite: course 263 or consent of instructor. Applications of the methodology developed in Chemistry 263 to experimental and theoretical studies. Advanced methods of interpretation of results are developed. Includes the preparation of manuscripts for publication. May be repeated for credit when topic differs. (S/U grading only.)—I, II, III. (I, II, III.)

290. Seminar (2)
Seminar—2 hours. Prerequisite: consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.)

293. Introduction to Chemistry Research (1)
Discussion—2 hours. Designed for incoming graduate students preparing for higher degrees in chemistry. Group and individual discussion of research activities in the Department and research topic selection. (S/U grading only.)—I. (I.)

295. Careers in Chemistry (1)
Seminar—2 hours. Prerequisite: graduate standing in Chemistry. Designed to give Chemistry graduate students an in-depth appreciation of career opportunities with a M.S. or Ph.D. degree in chemistry. Professional chemists (and allied professionals) give seminars describing both research and career insights. May be repeated for credit 3 times. (S/U grading only.)—I.

298. Group Study (1-5)
299. Research (1-12)
The laboratory is open to qualified graduate students who wish to pursue original investigation. Students wishing to enroll should communicate with the department well in advance of the quarter in which the work is to be undertaken. (S/U grading only.)

Professional Courses

390. Methods of Teaching Chemistry (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate student standing in Chemistry and consent of instructor. Practical experience in methods and problems of teaching chemistry. Includes analyses of texts and supporting material, discussion of teaching techniques, preparing for and conducting of discussion sessions and student laboratories. Participation in the teaching program required for Ph.D. in chemistry. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

392. Advanced Methods of Teaching Chemistry (2)
Lecture—2 hours. Prerequisite: course 390. Advanced topics in teaching chemistry. Analysis and discussion of curricular design, curricula materials, teaching methods and evaluation. For students who are planning a career in teaching chemistry. (P/NP grading only.)—III. (III.)

Chicana/Chicano Studies

(College of Letters and Science)

Adela de la Torre, Ph.D., Program Director

Program Office, 2102 Hart Hall (530-752-2421)

http://cougar.ucdavis.edu/chi

Committee in Charge

Richard Berteaux, M.S. *(Environmental Design)*
Angie C. Chabram-Dernersesian, Ph.D. *(Chicana/o Studies)*
Miroslava Chávez-García, Ph.D. *(Chicana/o Studies)*
Sergio de la Mora, Ph.D. *(Chicana/o Studies)*
Adela de la Torre, Ph.D. *(Chicana/o Studies)*
Yvette Flores-Ortiz, Ph.D. *(Chicana/o Studies)*
Kevin R. Johnson, J.D. *(School of Law)*
Malaquias Montoya, B.F.A. *(Chicana/o Studies)*
Beatriz Pesquera, Ph.D. *(Chicana/o Studies)*
Adaljiza Sosa-Riddell, Ph.D. *(Chicana/o Studies)*

Faculty

Angie C. Chabram-Dernersesian, Ph.D., Associate Professor
Miroslava Chávez-García, Ph.D., Assistant Professor
Sergio de la Mora, Ph.D., Assistant Professor
Adela de la Torre, Ph.D., Professor
Yvette Flores-Ortiz, Ph.D., Associate Professor
Malaquias Montoya, B.F.A., Professor
Beatriz Pesquera, Ph.D., Associate Professor

Emeriti Faculty

Refugio Rochin, Ph.D., Professor Emeritus
Adaljiza Sosa-Riddell, Ph.D., Senior Lecturer Emerita

The Major Program

The Chicana/Chicano Studies Program offers an interdisciplinary curriculum focusing on the Chicana/Chicano experience through an analysis of class, race, ethnicity, gender and sexuality, and cultural expression. The program offers a major leading to the Bachelor of Arts degree and a minor that can satisfy breadth requirements for the College of Letters and Science. Both the major and minor frame an analysis within the historical and contemporary experiences of Chicanas/os in the Americas. The major gives students an opportunity to specialize in one of two emphases: *Cultural Studies* or *Social/Policy Studies.* Students in the major are expected to read, write, and speak Spanish at a level suitable for future study and work in Chicana/o and Latina/o settings. There are no language requirements for the minor, and all Chicana/Chicano Studies courses are open to students in any major.

The Program. At the lower division level, the major curriculum provides an interdisciplinary overview of various topics. Students are advised to take courses that serve as prerequisites for certain upper division courses. At the upper division level, majors pursue advanced interdisciplinary course work in both the humanities/arts and the social sciences. At this level, students will find courses in Chicana/Chicano history, theory, and several courses taught from a variety of disciplinary perspectives. Majors may specialize in one of two emphases for the A.B. degree. The Cultural Studies emphasis integrates literature, culture, and artistic expression. Social/Policy Studies emphasizes social theory, research methods, area studies in community/political economy, family, societal and health issues.

Career Alternatives. The Cultural Studies emphasis prepares students for professional work in cross-cultural education, cultural/art centers, artistic expression and communications. The Social/Policy Studies emphasis orients students towards professional work in human service delivery, community development, legal services assistance, health services, social welfare and education. Both emphases in the major prepare students for advanced graduate and/or professional studies in related fields.

A.B. Major Requirements:

Cultural Studies Emphasis:

	UNITS
Preparatory Subject Matter	**16-31**
Chicana/o Studies 10, 50	8
Chicana/o Studies 21 or 30	4
One of Chicana/o Studies 60, 70, or 73	4
Spanish 1, 2, 3, or 28, 31, 32 or the equivalent	0-15
Depth Subject Matter	**40**
Chicana/o Studies 100	4
History 169A or 169B	4
Two courses from Chicana/o Studies 110, 111, 120, 122, 131, or 132	8
Comparative ethnicity/gender: two upper division courses selected from two of the following areas: African American and African Studies, Asian American Studies, Native American Studies, or Women's Studies.	8
A minimum of 16 units from the following areas:	16
Three courses from Chicana/o Studies 154, 155, 156, 171, 172	12
One course from Anthropology 113, 130, 146, Linguistics 166, 167, Native American Studies 180, Women's Studies 160, 180	4
Total Units for the Major	**56-71**

Social/Policy Studies Emphasis:

	UNITS
Preparatory Subject Matter	**20-35**
Chicana/o Studies 10, 50	8
Chicana/o Studies 21 or 30	4
One of Chicana/o Studies 60, 70, or 73	4
Sociology 46A or Psychology 41	4
Spanish 1, 2, 3, or 28, 31, 32 or the equivalent	0-15
Depth Subject Matter	**40**
Chicana/o Studies 100	4
History 169A or 169B	4
Two courses from Chicana/o Studies 154, 155, 171, or 172	8
Comparative ethnicity/gender: two upper division courses selected from two of the following areas: African American and African Studies, Asian American Studies, Native American Studies, or Women's Studies	8
A minimum of 16 units from the following areas:	16
Three courses from Chicana/o Studies 110, 111, 120, 121, 122, 130, 131, or 132	12
One course from Anthropology 130, 144, 146, Education 151, Native American Studies 120, 133, Sociology 134	4
Total Units for the Major	**60-75**

Master Adviser. M. Montoya, B. Pesquera.

Major Advisers. Humanities/Arts emphasis: A.C. Chabram-Dernersesian, M. Montoya. Social Science emphasis: Y. Flores-Ortiz, B. Pesquera.

Minor Program Requirements:

This minor provides a broad overview of the historical, social, political, economic, ideological and cultural forces that shape the Chicana/o and Latina/o experience. The minor is open to all students with or without course work in Spanish. Students should contact the master adviser for a plan approval and verification of the minor.

	UNITS
Chicana/o Studies	**24**
Chicana/o Studies 10 or 50	4

History 169A or 169B 4
Four courses from Chicana/o Studies 110, 111, 120, 121, 122, 130, 131, 132, 154, 155, 156, 171, 172 16

Minor Adviser. S. de la Mora

Courses in Chicana/o Studies (CHI)

Lower Division Courses

10. Introduction to Chicana/o Studies (4)
Lecture—3 hours; discussion—1 hour. Analysis of the situation of the Chicana/o (Mexican-American) people, emphasizing their history, literature, political movements, education and related areas. GE credit: Div, Wrt.—I, II, III. (I, III.) Pesquera, Chávez-García

21. Chicana/o and Latina/o Health Care Issues (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10. Overview of health issues of Chicanas/os and Latinas/os in the State of California; role of poverty/lack of education in limited access to health care. GE credit: Div.—I, III. (I, III.) Flores-Ortiz, de la Torre

30. United States Political Institutions and Chicanas/os (4)
Lecture/discussion—3 hours; term paper. Overview of the major political institutions and ideologies of the United States and the Chicana/o people's historical and contemporary role in, effects from, and responses to them. Theory, method and critical analysis. GE credit: Div.—II. (II.)

50. Chicana and Chicano Culture (4)
Lecture—3 hours; discussion—1 hour. Interdisciplinary survey of Chicana/o cultural representation in the 20th century. Examines Chicana/o culture within a national and transnational context. Explores how Chicano cultural forms and practices intersect with social/material forces, intellectual formations and cultural discourses. (Former course 20.) GE credit: Div.—II, III. (II, III.) Chabram-Dernersesian, de la Mora

60. Chicana and Chicano Representation in Cinema (4)
Lecture—8 hours. Introductory-level study of Chicana and Chicano representation. The depiction of Chicana and Chicano experience by Chicana/o filmmakers, as well as by non-Chicanos, including independent filmmakers and the commercial industry. Offered in alternate years.—I, III. (I, III.) de la Mora

70. Survey of Chicana/o Art (4)
Lecture—4 hours. Survey of contemporary Chicana/o art in context of the social turmoil from which it springs. Includes political use of the poster and the mural, the influence of the Mexican mural and graphic movement, and social responsibility of the artist. GE credit: Div.—I. (I.) Montoya

73. Chicana/o Art Expression Through Silk Screen (4)
Studio—8 hours; laboratory—4 hours. Introductory level studio course using silk screen and basic printing techniques to explore and develop images of Chicana/o cultural themes and expressions. Students will experiment with images and symbols from their immediate environment/culture. Integrated approach to Chicana/o philosophy of art.—I. (I.) Montoya

98. Directed Group Study (1-5)
(P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

100. Chicana/Chicano Theoretical Perspective (4)
Lecture/discussion—3 hours; term paper. Prerequisite: courses 10 and 50. Critical examination of emerging Chicana/o Studies theoretical perspectives in light of contemporary intellectual frameworks in the social sciences, arts, and humanities. Includes analysis of practices of self-representation, and socio-cultural developments in the Chicana/o community.—II. (II.) Pesquera

110. Sociology of the Chicana/o Experience (4)
Lecture/discussion—4 hours. Prerequisite: course 10 or Sociology 1. The Chicana/o experience in the American society and economy viewed from theoretical perspectives. Immigration, history of integration of Chicana/o labor into American class structure, education inequality, ethnicity, the family and Chicana/o politics. (Former course Sociology 110.) GE credit: SocSci, Div, Wrt.—I. (I.) Pesquera

111. Chicanas/Mexicanas in Contemporary Society (4)
Lecture/discussion—4 hours. Prerequisite: course 10 or 50, Women's Studies 50 or History 169B. Analysis of the role and status of Chicanas/Mexicanas in contemporary society. Special emphasis on their historical role, the political, economic and social institutions that have affected their status, and their contributions to society and their community. (Former course 102.) GE credit: ArtHum.—III. (III.) Pesquera

120. Chicana/o Psychology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21; introductory psychology course recommended. Introduction to the field of Chicana/o psychology. Analysis of socio-cultural context of Chicanas/os and Latinas/os. Special attention to issues of ethnic identity development, bilingualism, and development of self esteem. Impact of minority experience, migration, acculturation are examined. GE credit: SocSci, Div.—III. (III.) Flores-Ortiz

121. Chicana/o Community Mental Health (4)
Lecture—3 hours; term paper. Prerequisite: course 10 or 20. Mental health needs, problems, and service utilization patterns of Chicanas/os and Latinas/os will be analyzed. An analysis of social service policy, and the economic context of mental health programs. GE credit: SocSci, Div, Wrt.—II. (II.) Flores-Ortiz

122. Psychology Perspectives Chicana/o and Latina/o Family (4)
Lecture—4 hours. Prerequisite: course 10; introductory psychology course highly recommended, and/or consent of instructor. Role of migration and acculturation on family structure and functioning. From a psychological and Chicana/o Studies perspective, contemporary gender roles and variations in family structures are examined. Special topics include family violence, addiction, family resilience and coping strategies.—I. (I.) Flores-Ortiz

130. United States-Mexican Border Relations (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. Theories of U.S.-Mexican border relations, with an overview of the political, economic, and social relationships and an in-depth analysis of immigration issues, border industrialization, women's organizations, economic crises, and legal issues. GE credit: Div.—I. (I, III.) Chávez-García, de la Torre

131. Chicanas in Politics and Public Policy (4)
Lecture/discussion—4 hours. Prerequisite: course 30 or Political Science 1. Historical and political analysis of Chicana/Latina political involvement and activities in the general political system, women's movement, Chicano movement, and Chicana movement. Course also examines the public policy process and the relationship of Chicanas/Latinas to public policy formation. Offered in alternate years. GE credit: SocSci, Div.—II. (II.) Chávez-García

132. Political Economy of Chicana/o Communities (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing; lower division Chicana/o Studies course recommended. Historical and contemporary study of political and economic forces which define and influence the development of Chicana/o communities. Includes critiques of traditional and Marxian theories and concepts applicable to Chicana/o communities, case studies of Chicana/o communities, especially in California and Texas.—III. (III.)

154. The Chicana/o Novel (4)
Lecture—4 hours. Prerequisite: intermediate Spanish or consent of instructor. Introduction to the forms and themes of the Chicana/o novel with special attention to the construction of gender, nationality, sexuality, social class, and the family by contemporary Chicana/o novelists. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course Spanish 126A.) GE credit: ArtHum, Div.—III. (II.) Chabram-Dernersesian

155. Chicana/o Theater (4)
Lecture—4 hours. Prerequisite: intermediate Spanish or consent of instructor. Examination of the formal and thematic dimensions of Chicana/o theater in the contemporary period with special emphasis on El Teatro Campesino and Chicana Feminist Theater. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course Spanish 126B.)—II. (I.) Chabram-Dernersesian

156. Chicana/o Poetry (4)
Lecture—4 hours. Prerequisite: intermediate Spanish or consent of instructor. Survey of Chicana/o poetry with special emphasis on its thematic and formal dimensions. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course Spanish 126C.)—(III.) Chabram-Dernersesian

160. Mexican Film and Greater Mexican Identity (4)
Lecture/discussion—4 hours; film viewing—1 hour. Prerequisite: intermediate Spanish. Survey of the role Mexican cinema plays in consolidation and contestation of post-revolutionary Mexican state and in the formation of a greater Mexican cultural identity including Chicana/o identity. Showcases genres, periods, auteurs, movements, and emphasis on gendered and sexualized narratives. GE credit: ArtHum, Div.—II. (III.) de la Mora

165. Chicanas, Latinas and Mexicanas in Commercial Media (4)
Lecture/discussion—4 hours; laboratory—2 hours. Prerequisite: course 60 or other film or feminist theory course; conversational fluency in Spanish. The portrayal of Chicanas, Latinas and Mexicanas in commerical media. The relation between the representation of Chicana, Latina, and Mexicana women in commercial television and cinema and the role of women in Mexican and U.S. societies. Offered in alternate years.

171. Mexican and Chicano Mural Workshop (4)
Studio—8 hours; independent study—1 hour. Prerequisite: course 70 and/or written consent of instructor. The Mural: a collective art process that empowers students and people through design and execution of mural paintings in the tradition of the Mexican Mural Movement; introduces materials and techniques. May be repeated once for credit. (Same course as Art Studio 171.)—III. (III.) Montoya

172. Chicana/o Voice/Poster Silk Screen Workshop (4)
Studio—8 hours; independent study—1 hour. Prerequisite: course 70 and/or 73 and/or written consent of instructor. The poster as a voice art form used by Chicanas/os and other people of color to point to the defects of social and political existence and the possibility for change, from the Chicana/o artists' perspective. May be repeated once for credit.—II. (II.) Montoya

181. Chicanas and Latinas in the U.S.: Historical Perspectives (4)
Lecture/discussion—4 hours. Prerequisite: course 10 or Women's Studies 50. Historical issues in the lives of Chicanas, Puertoriquenas, and Cubans in the U.S. and their countries of origin. GE credit: ArtHum, Div, Wrt.—II. Chavez-Garcia

192. Internship in Chicana/o and Latina/o Community (4)
Discussion—1 hour; internship—11 hours. Prerequisite: one course from 10, 21, 50, Spanish 3, or the equivalent. Combines academic guidance with internship in community agencies serving Mexican/Latino/Chicano clients. Utilization of bilingual skills, knowledge of history, culture, economics, politics, social issues and work experience. Internship proj-

ect required. May be repeated twice to a maximum of 12 units. (P/NP grading only.)

194HA-194HB-194HC. Senior Honors Research Project (2-5)
Independent study—6-15 hours. Prerequisite: senior standing in Chicana/o Studies major. Student is required to read, research, and write Honors Thesis on Chicana/o Studies topics. (Deferred grading only, pending completion of sequence.)

198. Directed Group Study (1-5)
Prerequisite: upper division standing and consent of Program Chairperson. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing and consent of Program Chairperson. (P/NP grading only.)

Graduate Courses

230. Chicano/Latino Hispanic Politics (4)
Seminar—3 hours; term paper. Prerequisite: two undergraduate courses in Chicana/o Studies or consent of instructor. Examination of Chicano/Latino political experiences. Evaluate theories, ideology, and practice of Chicano politics. Brief history of Chicano/Latino/Hispanic political activity, comparisons among political modes, gendered politics, and understanding relationships among Chicano, Mexican, American and world politics.—III.

298. Group Study for Graduate Students (1-5)
Prerequisite: graduate standing, consent of instructor. May be repeated for credit when topic differs. (S/U grading only.)

299. Special Study for Graduate Students (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Child Development (A Graduate Group)

Lawrence V. Harper, Ph.D., Chairperson of the Group

Group Office, 1303 Hart Hall (530-752-1926)

http://childdevelopment.ucdavis.edu

Faculty

Curt R. Acredolo, Ph.D., Adjunct Associate Professor *(Human and Community Development)*
Linda P. Acredolo, Ph.D., Professor *(Psychology)*
Carolyn A. Aldwin, Ph.D., Professor *(Human and Community Development)*
Thomas F. Anders, M.D., Professor *(Psychiatry)*
Keith Barton, Ph.D., Professor *(Human and Community Development)*
Marc Braverman, Ph.D., 4-H Specialist in Cooperative Extension *(Human and Community Development)*
Carol S. Bruch, J.D., Professor Emeritus
Brenda K. Bryant, Ph.D., Professor *(Human and Community Development)*
Zhe Chen, Ph.D., Associate Professor *(Human and Community Development)*
Katherine J. Conger, Ph.D., Assistant Professor *(Human and Community Development)*
Rand Conger, Ph.D., Professor *(Human and Community Development)*
Patricia C. Gandara, Ph.D., Associate Professor *(Education)*
Xiaojia Ge, Ph.D., Associate Professor *(Human and Community Development)*
Beth Goodlin-Jones, Ph.D., Assistant Adjunct Professor *(Psychiatry)*
Robin L. Hansen, M.D., Associate Professor *(Pediatrics)*
Lawrence V. Harper, Ph.D., Professor *(Human and Community Development)*
Rosemarie H. Kraft, Ph.D., Lecturer *(Human and Community Development)*
Penelope Knapp, M.D., Professor *(Psychiatry)*
Thomas L. Morrison, Ph.D., Professor *(Psychiatry)*
Beth A. Ober, Ph.D., Professor *(Human and Community Development)*
Ernesto Pollitt, Ph.D., Professor *(Pediatrics)*
Richard Ponzio, Ph.D., 4-H Specialist in Cooperative Extension *(Human and Community Development)*
Carol J. Rodning, Ph.D., Associate Professor *(Human and Community Development)*
Stephen Russell, Ph.D., Associate Specialist in Cooperative Extension *(Human and Community Development)*
Jonathan H. Sandoval, Ph.D., Professor *(Education)*

Graduate Study. The Graduate Group in Child Development offers a multidisciplinary program leading to an M.S. degree. The program provides students with an opportunity to pursue a coordinated course of postgraduate study in the field of child development which cuts across departmental boundaries. Students may work with children and families in the community, as well as the University's Center for Child and Family Studies. Recipients of the degree gain sufficient background to engage in professions that directly (e.g., preschool, 4-H) or indirectly (e.g., social policy) involve children and families, obtain positions in teaching or research settings, or pursue further study leading to a doctorate in child development, human development, clinical psychology, or related fields.

Applicants seeking consideration for early admission and fellowships must submit applications by December 1. The final application deadline is April 1.

Graduate Adviser. Contact Group Office.

Chinese

See Asian American Studies; East Asian Languages and Cultures; and East Asian Studies

Classics

(College of Letters and Science)

Lynn E. Roller, Ph.D., Program Director

Department Office (Spanish and Classics), 616 Sproul Hall (530-752-0835)

http://classics.ucdavis.edu

Faculty

Emily Albu, Ph.D., Associate Professor
Ruth R. Caston, Assistant Professor
Lynn E. Roller, Ph.D., Professor
Seth L. Schein, Ph.D., Professor *(Comparative Literature)*
David A. Traill, Ph.D., Professor

Emeriti Faculty

Wesley E. Thompson, Ph.D., Professor Emeritus

Affiliated Faculty

Charlayne Allan, M.A., Lecturer, *Academic Federation Excellence in Teaching Award*
Patricia Bulman, Ph.D., Lecturer

The Major Program

Classical Civilization is an interdisciplinary major that examines the ancient Mediterranean cultures of Greece, Rome and the Near East, with courses offered on the languages, history, literature, religions, myths, art and archaeology of these societies, their achievements in rhetoric and philosophy, and their political and social institutions. Minor programs in Classical Civilization, Greek, and Latin, and many General Education courses are offered also.

The Program. The major has two tracks: *(1) Classical and Mediterranean Civilizations,* and *(2) Classical Languages and Literatures.* The core of both major tracks consists of two years of Latin, Greek or Hebrew, the introductory sequence on the ancient Mediterranean world (Classics 1, 2, 3), the advanced seminar (Classics 190), and a number of electives. The Classical and Mediterranean Civilization track allows students to choose their electives from a broadly balanced program in history, art and archaeology, literature, philosophy and rhetoric. The Classical Languages and Literatures track focuses more intensively on language and literature, requiring the study of two languages and allowing fewer electives. Students planning to go on to graduate work in Classics should take Track 2 and choose Latin and Greek as their languages. They are also advised to acquire a reading knowledge of French or German.

Career Opportunities. A degree in Classical Civilization represents a solid liberal arts education that provides an excellent foundation for a wide variety of careers. In the last twenty-five years, many majors have applied to Law or Medical School and practically all have been accepted. Additional career options include library and museum work, teaching, journalism, and graduate study in Classics, art, archaeology, history, literature, philosophy, and religion.

Classical Civilization

A. B. Major Requirements:

UNITS

Classical and Mediterranean Civilizations track

Preparatory Subject Matter 26-27
Latin 1-2-3, or Greek 1-2-3, or Hebrew 1-2-3 15
Two courses from Classics 1, 2, 3..... 8
One additional course from: Art History 1A; Classics courses 1 through 50 (except 30 and 31); Comparative Literature 1; Philosophy 21; Religious Studies 21, 40 3-4

Depth Subject Matter..... 40
Upper division courses in Latin, Greek or Hebrew..... 12
Classics 190..... 4
Six additional courses selected from at least three of the following groups..... 24
Of these 24 units, at least 12 must be in Latin, Greek, Hebrew, or Classics, and one course must be selected from group (c).
(a) Literature and Rhetoric:
Additional upper division courses in Latin, Greek and Hebrew; Classics 102, 110, 140, 141, 142, 143
(b) History:
History 102A, 111A, 111B, 111C; Religious Studies 102, 125
(c) Art and Archaeology:
Classics 171, 172A, 172B, 173, 174, 175
(d) Philosophy and Religion:
Classics 150; Philosophy 143, 160, 161, 162; Political Science 118A; Religious Studies 141A, 141B, 141C

Total Units for the Major 66-67

UNITS

Classical Languages and Literatures track

Preparatory Subject Matter 34
Two of the following sequences: Latin 1-2-3; Greek 1-2-3; Hebrew 1-2-3 30
Classics 1, 2, or 3..... 4

Depth Subject Matter..... 36
Six upper division courses in the two chosen languages, with at least two courses in each language 24
Classics 190..... 4

Two additional courses selected from any of the following groups 8
(a) Literature and Rhetoric:
Additional upper division courses in Latin, Greek and Hebrew; Classics 102, 110, 140, 141, 142, 143
(b) History:
History 102A, 111A, 111B, 111C; Religious Studies 102, 125
(c) Art and Archaeology:
Classics 171, 172A, 172B, 173, 174, 175
(d) Philosophy and Religion:
Classics 150; Philosophy 143, 160, 161, 162; Political Science 118A; Religious Studies 141A, 141B, 141C

Total Units for the Major 70

Major Advisers. E.M. Albu, L.E. Roller, D.A. Traill.

Minor Program Requirements:

The Department offers minors in Classical Civilization, Greek and Latin for those wishing to follow a shorter but formally recognized program of study in Classics.

	UNITS
Classical Civilization	**20**
Classics 1, 2, or 3	4
One upper division course in Latin, Greek or Hebrew	4
Two additional upper division courses in Classics, Latin, Greek or Hebrew	8
One additional upper division course selected from any of the groups (a) through (d) in the Classical Civilization major	4
	UNITS
Greek	**20**
Classics 1 or 2	4
Three upper division courses in Greek	12
One additional upper division course in Classics, Latin, Greek or Hebrew	4
	UNITS
Latin	**20**
Classics 3	4
Three upper division courses in Latin	12
One additional upper division course in Classics, Latin, Greek or Hebrew	4

Honors Program. Candidates for high or highest honors in Classical Civilization must write a senior honors thesis under the direction of a faculty member in Classics. Potential candidates for the honors program must enroll in Classics 194HA and 194HB, normally during the first two quarters of the senior year. Enrollment is limited to upper division students with a minimum of 135 units, and a 3.5 grade point average in courses in the Classical Civilization major. For further information, students should consult with the major adviser or program director. The requirements for the honors program are in addition to the regular requirements for the major in Classical Civilization.

Graduate Study. The Department offers a master's degree in Classics with emphasis on either Greek or Latin; however, admission into the graduate program has been suspended.

Prerequisite credit. Credit will not normally be given for a lower division course in Latin or Greek if it is the prerequisite of a course already successfully completed. Exceptions can be made by the Program Director only.

Courses in Classics (CLA)

Lower Division Courses

1. The Ancient Near East and Early Greece: 3000-500 B.C.E. (4)
Lecture—3 hours; term paper. Introduction to the literature, art, and social and political institutions of ancient Mesopotamia, Egypt, Palestine, and early Greece from 3000 to 500 B.C.E. GE credit: ArtHum, Wrt.—(II.) Bulman

2. Ancient Greece and the Near East: 500 to 146 B.C.E. (4)
Lecture—3 hours; term paper. Introduction to the literature, art and thought and the political and social institutions and values of Greece and its eastern Mediterranean neighbors—the Persians, Egyptians, and Judeans. GE credit: ArtHum, Wrt.—II. (II.) Traill

3. Rome and the Mediterranean: 1000 B.C.E. to 500 C.E. (4)
Lecture—3 hours; term paper. Introduction to the history, literature and art and the political and social institutions and values of Roman civilization, with emphasis on Rome's interactions with its Mediterranean neighbors—Etruscans, Carthaginians, Greeks, Egyptians, and Persians—and on the rise of Christianity. GE credit: ArtHum, Wrt.—III. (III.) Caston

10. Greek, Roman, and Near Eastern Mythology (3)
Lecture—3 hours. Examination of major myths of Greece, Rome, and the Ancient Near East; their place in the religion, literature and art of the societies that produced them; their subsequent development, influence and interpretation. GE credit: ArtHum.—I, II, III. (I, II, III.) Allan, Albu, Traill

15. Women in Classical Antiquity (4)
Lecture—3 hours; term paper. Lives and roles of women in ancient Greece and Rome. Readings from history, philosophy, medical and legal documents, literature and myth. GE credit: ArtHum, Div, Wrt.—III. (III.) Allan

20. Pompeii AD 79 (4)
Lecture—3 hours; term paper. Roman life in an urban community at the time of the eruption of Vesuvius. Slide presentations of the archeological evidence will be supplemented by selected readings from Petronius' *Satyricon* and other ancient authors. Offered in alternate years. GE credit: ArtHum, Wrt.—Traill

30. Greek and Latin Elements in English Vocabulary (3)
Lecture—3 hours. Knowledge of Latin and Greek not required. Elements of Greek and Latin vocabulary for increased understanding of English word formation and improved ability to understand and retain unfamiliar words. Emphasis on Greek and Latin elements but other languages not neglected.—III. (III.) Bulman

31. Greek and Latin Elements in Technical Vocabulary (3)
Lecture—3 hours. Knowledge of Greek and Latin not required. Elements of Greek and Latin vocabulary to increase understanding of English word formation in medical, scientific and technical terminology and improve ability to understand and retain unfamiliar terms.

50. The Rise of Science in Ancient Greece (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Mathematics 16A or the equivalent. Study of the emergence of scientific rationality in ancient Greece and its political and social context; concentration on four areas: mathematics, medicine, cosmology, and psychology. Reading from the Presocratics, Hippocrates, Plato, Aristotle, and Hellenistic philosophers. GE credit: ArtHum, Wrt.

Upper Division Courses

102. Film and the Classical World (4)
Lecture—3 hours; film viewing—2.5 hours. Prerequisite: any Classics course except 30 or 31. The Classical World as portrayed in films. Viewings and discussions of modern versions of ancient dramas, modern dramas set in the Ancient Mediterranean world, and films imbued with classical themes and allusions. Supplementary readings in ancient literature and mythology. GE credit: ArtHum, Wrt.—(II.) Albu

110. Origins of Rhetoric (4)
Lecture—3 hours; term paper. Prerequisite: one course in ancient history or consent of instructor. Issues in the development of rhetoric from its origins in ancient Greece to A.D. 430. Special attention to works of Plato, Aristotle, Cicero, and Quintilian. Role of grammar and rhetoric in schools of Roman Empire. The Christian rhetoric of Saint Augustine. Not open for credit to students who have completed Rhetoric and Communication 110 or Communication 110. (Former course Rhetoric and Communication 110.) GE credit: ArtHum, Wrt.—(III.)

140. Homer and Ancient Epic (4)
Lecture—3 hours; term paper. Prerequisite: course 4A or 10 or Comparative Literature 1. Reading of Iliad, Odyssey, and Aeneid in English. Discussion of Homer's and Vergil's techniques of composition, the beliefs and values of their respective societies and the influence of Homer on Vergil. Offered in alternate years. GE credit: ArtHum, Wrt.—(II.) Traill

141. Greek and Roman Comedy (4)
Lecture—3 hours; conference—1 hour. Readings in Aristophanes, Menander, Plautus, and Terence; lectures on the development of ancient comedy. Offered in alternate years. GE credit: ArtHum, Wrt.—Caston

142. Greek and Roman Novel (4)
Lecture—3 hours; term paper. Examination of the ancient Greek romances and their development into the grotesque realism of Petronius' Satyricon, and the religious mysticism of Apuleius' The Golden Ass. GE credit: ArtHum, Wrt.—Schein

143. Greek Tragedy (4)
Lecture—3 hours; term paper. Prerequisite: course 4A or 10. Reading in English of selected plays of Aeschylus, Sophocles and Euripides. Lectures on the development and influence of Athenian tragedy. Offered in alternate years. GE credit: ArtHum, Wrt.—(II.) Traill

150. Socrates and Classical Athens (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 4A. Study of the major sources of our knowledge of Socrates to assess his role in the politics and culture of ancient Athens; his method of teaching and its place in Western thought. GE credit: ArtHum, Wrt.

171. Mediterranean Bronze Age Archaeology (4)
Lecture—3 hours; extensive writing. Prerequisite: one of course 1, 2, 10, 15, Art History 1A, or Anthropology 3 recommended. Archaeological monuments of the ancient Near East, including Egypt and Mesopotamia, and of Greece and Crete during the Bronze Age. Special emphasis on the problems of state formation and on the co-existence and collapse of Bronze Age societies. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—Roller

172A. Early Greek Art and Architecture (4)
Lecture—3 hours; term paper. Examination of the origin and development of the major monuments of Greek art and architecture from the eighth century to the mid-fifth century B.C. Not open for credit to students who have completed Art History 154A. (Same course as Art History 172A.) Offered in alternate years. GE credit: ArtHum, Wrt.—Roller

172B. Later Greek Art and Architecture (4)
Lecture—3 hours; term paper. Study of the art and architecture of later Classical and Hellenistic Greece, from the mid-fifth century to the first century B.C. Not open for credit to students who have completed Art History 154B. (Same course as Art History 172B.) Offered in alternate years. GE credit: ArtHum, Wrt.—(II.) Roller

173. Roman Art and Architecture (4)
Lecture—3 hours; term paper. The art and architecture of Rome and the Roman Empire, from the founding of Rome through the fourth century C.E. Not open for credit to students who have completed Art History 155. (Same course as Art History 173.) Offered in alternate years. GE credit: ArtHum, Wrt.—II. Roller

174. Greek Religion and Society (4)
Lecture—3 hours; term paper. Prerequisite: a lower division Classics course, except Classics 3, 20, 30, or 31. Cults, festivals, and rituals of Greek religious practice and their relationship to Greek social and political institutions, and to Greek private life. Includes discussion of major sanctuaries at Olympia, Delphi, Athens, and others. Offered in alternate years. GE credit: ArtHum, Wrt.—Roller

175. Architecture and Urbanism in Mediterranean Antiquity (4)
Lecture—3 hours; extensive writing. Prerequisite: a lower division course (except 30, 31); Art History 1A recommended. Architecture and urban development in the ancient Near East, Greece, and Rome. Special emphasis on the social structure of the ancient city as expressed in its architecture, and on the interaction between local traditions and the impact of Greco-Roman urbanism. (Same course as Art History 175.) Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(II.) Roller

190. Senior Seminar (4)
Seminar—3 hours; term paper. Prerequisite: completion of one upper division course in Latin, Greek or Hebrew or consent of instructor. Advanced interdisciplinary study of a problem in the ancient Mediterranean world using the techniques of history, archaeology, art history and philology. May be repeated for credit with consent of instructor. GE credit: ArtHum, Wrt.—I. Roller

194HA-194HB. Special Study for Honors Students (3-3)
Discussion—1 hour; independent study; term paper. Prerequisite: admission to the honors program and consent of faculty member supervising honors thesis. Directed reading, research and writing culminating in the completion of a senior honors thesis under the direction of faculty adviser. (Deferred grading only, pending completion of sequence. P/NP grading only.)—I-II, II-III.

197TC. Community Tutoring in Classical Languages (1-5)
Tutoring—1-5 hours. Prerequisite: consent of instructor. Supervised instruction of Greek or Latin in nearby schools by qualified students in department. May be repeated for credit up to 5 units. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: upper division standing. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Courses

200A. Approaches to the Classical Past (4)
Seminar—3 hours; term paper. Prerequisite: graduate student status. First half of two quarter seminar. Survey of major areas of classical scholarship, with special emphasis on the continuing impact of Mediterranean antiquity on later literature, history, art, and culture. (Deferred grading only pending completion of sequence.) Offered in alternate years.—(II.) Trail

200B. Approaches to the Classical Past (4)
Independent study—4 hours. Prerequisite: course 200A and graduate student status. Second half of two quarter seminar. Research project on major area of Classical scholarship, with special emphasis on the continuing impact of Mediterranean antiquity on later literature, history, art, and culture. Offered in alternate years.—(III.) Trail

201. Introduction to Classical Philology (4)
Seminar—3 hours; term paper. Survey of major contemporary areas of classical scholarship with special attention devoted to current problems in literary and textual criticism.—Traill

202. Homer (4)
Seminar—3 hours; term paper. Readings in the Iliad and Odyssey: the origins and transmission of the poems.—Roller

203. Vergil (4)
Seminar—3 hours; term paper. Reading of selected books of the Bucolics, Georgics, and Aeneid. Emphasis will be placed on the study of Vergilean poetic language.—Traill

204. Greek and Roman Comedy (4)
Seminar—3 hours; term paper. Historical and critical problems in Aristophanes or New Comedy. May be repeated for credit.

205. Latin Lyric and Elegy (4)
Seminar—3 hours; term paper. Critical examination of the works of Catullus, Horace, or Propertius. May be repeated for credit.—Traill

206. Greek Historiography (4)
Seminar—3 hours; term paper. Development of historical writing in Greece. May be repeated for credit.

207. Greek Drama (4)
Seminar—3 hours; term paper. Literary and philological analysis of the plays of Euripides, Sophocles, or Aeschylus. May be repeated for credit.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Courses in Greek (GRK)

Lower Division Courses

1. Elementary Greek (5)
Lecture—5 hours. Introduction to the basic grammar and vocabulary of Classical and New Testament Greek. Development of translation skills with emphasis on Greek-English. (Students who have successfully completed Greek 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.)—I. (I.) Bulman

2. Elementary Greek (5)
Lecture—5 hours. Prerequisite: course 1. Continuation of course 1.—II. (II.) Bulman

2NT. Elementary New Testament Greek (1)
Lecture—1 hour. Prerequisite: course 2 (concurrently). Supplementary study of New Testament Greek.—II. (II.) Bulman

3. Intermediate Greek (5)
Lecture—5 hours. Prerequisite: course 2. Continuation of course 2. Selected readings from Greek authors.—III. (III.) Bulman

3NT. Elementary New Testament Greek (1)
Lecture—1 hour. Prerequisite: course 3 (concurrently). Supplementary study of New Testament Greek.—III. (III.) Bulman

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100N. Readings in Greek Prose (4)
Lecture—3 hours; recitation—1 hour. Prerequisite: course 3. Selected readings from pagan and Christian sources. May be repeated for credit with consent of instructor. GE credit: ArtHum, Wrt.—I. (I.)

101. Plato (4)
Lecture—3 hours; term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt.—(II.) Traill

102. Euripides (4)
Lecture—3 hours; term paper. Prerequisite: course 101. GE credit: ArtHum, Wrt.—III. Bulman

103A. Homer: Iliad (4)
Recitation—3 hours; term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt.—(II.) Roller

103B. Homer: Odyssey (4)
Recitation—3 hours; term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt.—(II.) Roller

104. Menander (4)
Lecture—3 hours; term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt.

105N. Attic Orators (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Selected readings from the orators of 4th and 5th century Athens. May be repeated for credit with consent of instructor. Offered in alternate years. GE credit: ArtHum, Wrt.

111. Sophocles (4)
Lecture—3 hours; term paper. Prerequisite: course 103. GE credit: ArtHum, Wrt.—(III.) Schein

112. Aristophanes (4)
Lecture—3 hours; term paper. Prerequisite: course 103. GE credit: ArtHum, Wrt.

113. Thucydides (4)
Lecture—3 hours; term paper. Prerequisite: course 103. Offered in alternate years. GE credit: ArtHum, Wrt.—Roller

114. Lyric Poetry (4)
Lecture—3 hours; term paper. Prerequisite: course 103. Offered in alternate years. GE credit: ArtHum, Wrt.

115. Aeschylus (4)
Lecture—3 hours; term paper. Prerequisite: course 103. Offered in alternate years. GE credit: ArtHum, Wrt.—Schein

116. Herodotus (4)
Lecture—3 hours; term paper. Prerequisite: course 103. Offered in alternate years. GE credit: ArtHum, Wrt.—Traill

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Courses in Latin (LAT)

Lower Division Courses

1. Elementary Latin (5)
Lecture—5 hours. Introduction to basic grammar and vocabulary and development of translation skills with emphasis on Latin to English. (Students who have successfully completed Latin 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.)—I. (I.) Allan, Bulman

2. Elementary Latin (5)
Lecture—5 hours. Prerequisite: course 1. Continuation of course 1.—II. (II.) Allan

3. Intermediate Latin (5)
Lecture—5 hours. Prerequisite: course 2. Continuation of course 2. Selected readings from Latin authors.—III. (III.) Allan

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100N. Readings in Latin Prose (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3. Review of basic forms, grammar, and vocabulary. Readings in prose authors, including Julius Caesar. Not open for credit to students who have completed course 110. GE credit: ArtHum, Wrt.—I. (I.) Caston

101. Livy (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—(III.) Traill

102. Roman Comedy (5)
Lecture—4 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—(II.) Caston

103. Vergil: Aeneid (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—II. Traill

104. Sallust (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—III. Caston

105. Catullus (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—(III.) Caston

106. Horace: Odes and Epodes (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—(III.) Albu

108. Horace: Satires and Epistles (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.

109. Roman Elegy (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—Caston

110N. Ovid (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3. Translation and discussion of selected readings from the works of Ovid. May be repeated once for credit when topic differs and with consent of instructor. Offered in alternate years. GE credit: ArtHum, Wrt.—(II.) Albu

111. Silver Age Latin (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Selections from Tacitus, Pliny, Petronius, Juvenal, Martial, and other writers of the Silver Age. Offered in alternate years. GE credit: ArtHum, Wrt.—Albu

112. Cicero: Political Writings (4)
Recitation—3 hours; term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt.—(III.) Traill

114. Cicero: Philosophical Works (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—Traill

115. Lucretius (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—(II.) Caston

116. Vergil: Eclogues and Georgics. (4)
Lecture—3 hours; term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—Caston

121. Prose Composition (5)
Lecture—4 hours; term paper.—Traill

125. Medieval Latin (4)
Lecture—3 hours; term paper. Prerequisite: course 3 and two upper division courses in Latin. Selected readings from the Vulgate and various medieval authors provide an introduction to the developments in the Latin Language and literature from the fourth to the fifteenth centuries. Offered in alternate years. GE credit: ArtHum, Wrt.—(I.) Albu

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Clinical Nutrition

(College of Agricultural and Environmental Sciences)

Faculty

See the Department of Nutrition.

The Major Program

The Clinical Nutrition major provides students with training in normal and therapeutic nutrition, biological and social sciences, food science, communication, business management and food service management. This major fulfills the academic requirements for admission into a dietetics internship or the equivalent, which must be completed before qualifying for registration as a dietitian.

The Program. The Clinical Nutrition major (formerly Dietetics) includes the same basic core of nutrition classes as the Nutrition Science major, but includes additional courses such as food service management, education, sociology, and communication skills to prepare for work with the public. Clinical Nutrition students spend the first two years completing preparatory course work in the basic biological sciences, along with several of the social sciences. In the final two years, students take courses in normal and clinical nutrition, food science, biochemistry, and management techniques.

Entering freshman or transfer students are assumed to have basic computer skills and to demonstrate mathematics competency adequate to pass the Precalculus Qualifying Examination with a minimum score of 27, or have taken calculus at a community college or other four-year institution.

Career Alternatives. The Clinical Nutrition major qualifies students to apply for the American Dietetics Association "accredited internship," enabling them to become a Registered Dietitian, the professional credential necessary to work in a clinical setting. Once dietitians are registered, they generally seek employment in administrative, therapeutic, teaching, research, or public health/public service positions in clinics, hospitals, schools, or other similar institutions. There is a growing role for dietitians working in settings outside of the traditional hospital (for example, in state and federal nutrition programs, nutrition education, Peace Corps and Cooperative Extension work). Students who complete the undergraduate preparation in clinical nutrition are also qualified to enter graduate programs in dietetics, nutrition science, public health nutrition, and food service management.

B.S. Major Requirements:

	UNITS
Written/Oral Expression	**8**
English 1 or 3	4
Communication 1	4
(Above courses simultaneously satisfy College requirement.)	
Preparatory Subject Matter	**48-49**
Biological Sciences 1A, 1B	10
Chemistry 2A, 2B, 2C, 8A, 8B	21
Economics 1A or 1B	5
Psychology 1	4
Sociology 1 or 3 or Anthropology 2	4-5
Statistics 13	4
Breadth/General Education	**6-24**
Satisfaction of General Education requirement	
Depth Subject Matter	**88**
Agricultural and Resource Economics 112	4
Community and Regional Development 173 or Education 110	4
Animal Biology 102 and 103	10
Biological Sciences 101	4
Food Science and Technology 100A, 100B, 101A, 101B, 108	15
Food Service Management 120, 120L, 122	8
Food Science and Technology 104-104L	7
Nutrition 111A and 111B, 112, 116A, 116AL, 116B 116BL, 118, 190	31
Neurobiology, Physiology, and Behavior 101, 101L	8
Additional upper division Nutrition electives	4
Unrestricted Electives	**10-31**
Total Units for the Major	**180**

Major Adviser. A.J. Clifford *(Nutrition).*

Advising Center for the major is located in 1202E Meyer Hall (530-752-2512).

Graduate Study. See the Graduate Studies chapter of this catalog.

Clinical Nutrition and Metabolism

See Internal Medicine in Medicine, School of

Clinical Psychology

See Medicine, School of

Communication

(College of Letters and Science)

Robert A. Bell, Chairperson of the Department

Department Office, 108 Sproul Hall (530-752-1222)

Faculty

Robert A. Bell, Ph.D., Professor
Charles R. Berger, Ph.D., Professor
Silvia M. Knobloch, Ph.D., Assistant Professor
Eun-Ju Lee, Ph.D., Assistant Professor
Michael T. Motley, Ph.D., Professor

Emeriti Faculty

Rina Alcalay, Ph.D., Professor Emerita
James J. Murphy, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
Ralph S. Pomeroy, Ph.D., Professor Emeritus
John L. Vohs, M.A., Senior Lecturer Emeritus

Affiliated Faculty

John Theobald, M.A., Lecturer

The Major Program

The major in communication focuses upon human symbolic behavior in interpersonal and mediated contexts.

The Program. The program of study in communication examines communication processes at several different levels of analysis. Courses dealing with communication at the individual, interpersonal, organizational and societal levels of analysis are offered. Classes addressing such topics as communication and cognition, message systems, interpersonal communication, nonverbal communication, communication and persuasion, organizational communication, mass media effects and public communication campaigns explore communication at these levels of analysis. Related social science courses are also part of the major.

Preparatory Requirements. Before declaring a major in communication, students must complete the following courses with a combined grade point average of at least 2.50 at the University of California (at least 3.00 GPA may be required for similar courses taken at community college). All courses must be taken for a letter grade.

Anthropology 4 or Linguistics 1 ..... 4 units
Psychology 1 ..... 4 units
Sociology 1 ..... 5 units
Statistics 13 ..... 4 units

Career Alternatives. Communication graduates have found careers in such fields as broadcast and print journalism, administration, sales, management, politics and government, education, social work, and public relations. A communication degree is also excellent preparation for law school or other graduate programs.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**21**
Anthropology 4 or Linguistics 1	4
Communication 1 or 3	4
Psychology 1	4
Sociology 1	5
Statistics 13	4
Depth Subject Matter	**44**
Communication 101	4
Communication 102, 134, 141	12
Select one of Communication 103 or 105 or 135	4

Select one of Communication 140 or 142 or 143 or 146 or 152 or 165 or 170..... 4
Select four of the following additional courses (the four courses must be other than those chosen to fulfill the above requirements) 20
Communication 103, 105, 130, 135, 136, 138, 140, 142, 143, 146, 152, 165, 170, 172, 180, 189A, 189B, 189C, 189D, Anthropology 117, 120, Linguistics 160, 163, 171, 173, Political Science 164, 165, Psychology 132, Sociology 126, 128, 135, 148

Total Units for the Major 65

Grading recommendation. Although not required, it is recommended that all courses offered in satisfaction of the major, except variable-unit courses, be taken for a letter grade.

Major Advisers. Faculty (contact department).

Advising Office. 107 Sproul Hall.

Minor Program Requirements:

UNITS

Communication 24
One course from Communication 1, 3 4
At least five upper division courses in communication..... 20

Graduate Study. The Department of Communication offers programs of study and re-search leading to the M.A. degree in Communication. Detailed information may be obtained from the Graduate Adviser, Department of Communication.

Graduate Adviser. C. Berger.

Courses in Communication (CMN)

Students must have satisfied the Subject A requirement before taking any course in Communication.

Lower Division Courses

1. Introduction to Public Speaking (4)
Lecture—1 hour; discussion—3 hours. Practice in the preparation and delivery of speeches based on contemporary principles and strategies of informing and persuading audiences. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.) Shubb

3. Interpersonal Communication Competence (4)
Lecture—2 hours; discussion—2 hours. Communication in interpersonal contexts. Sender, receiver, and message variables, and their interaction with communication competence. Participation in simulations and experiential exercises.—I, II, III. (I, II, III.) Duax

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

101. Communication Theories (4)
Lecture/discussion—4 hours. Examination of the forms, functions, development, and testing of theory in the social sciences. Survey and comparison of significant micro and macro theories and models of human communication. Application of theories to real world problems. Not open for credit to students who have completed course 114. GE credit: SocSci.—I, II, III. Creveling

102. Empirical Methods in Communication (4)
Lecture—4 hours. Prerequisite: course 101 or 114, Statistics 13 or the equivalent. Survey of social scientific research methods commonly employed in the communication discipline. Topics include research design, measurement, sampling, questionnaire construction, survey research, experimental research, content analysis, and interaction analysis. Not open for credit to students who have completed course 115.—I, II, III. Motley, Knobloch

103. Gender Differences in Communication (4)
Lecture—4 hours. Prerequisite: upper division standing in Communication. Examination of communication differences between men and women as sources of male/female stereotypes, misunderstandings, dilemmas, and difficulties (real and imagined). Treatment of genders as cultures. Topics include male/female differences in discursive practices and patterns, language attitudes, and relationship dynamics. GE credit: SocSci.—I, II. Creveling

105. Semantic and Pragmatic Functions of Language (4)
Lecture—4 hours. Prerequisite: course 102. The role of language in shaping attitudes and perceptions of self and others. The use and abuse of verbal symbols in communicative situations. Concepts of meaning in discourse. GE credit: SocSci.—II, III. Creveling

130. Group Communication Processes (4)
Lecture—4 hours. Examination of current theories of group formation, goals, structure, and leadership, as they relate to communication processes. GE credit: SocSci.—I, II, III.

134. Interpersonal Communication (4)
Lecture—4 hours. Prerequisite: course 1 or 3, or the equivalent. Communication between two individuals in social and task settings. One-to-one communication, verbal and nonverbal, in developing relationships. Consideration of theory and research on relevant variables such as shyness, self-disclosure, reciprocity, games, and conflict. GE credit: SocSci.—I, II, III. Berger, Motley

135. Nonverbal Communication (4)
Lecture—4 hours. Examination of the interaction between nonverbal communication and verbal communication channels in influencing outcomes in interpersonal and mass mediated communication contexts. Underlying functions served by nonverbal communication will also be considered. GE credit: SocSci, Div.—I, II, III. Berger

136. Organizational Communication (4)
Lecture—4 hours. Examines communication in various organizational situations. Focuses on the use of effective communication strategies for achieving organizational and individual goals. Emphasis is placed on identifying and amending ineffective communication within organizations. GE credit: SocSci.—I, II. Creveling

138. Communication and Cognition (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing. Relationship between communication and cognition. Models of discourse comprehension and production, the influence of language attitudes on social judgments, and the effects of information processing on decision making are explored. GE credit: SocSci.—I, II, III. Berger

140. The Media Industry (4)
Lecture/discussion—4 hours. Examines the economic, social, and political forces that shape media content. Topics include the historical evolution of the print and broadcast media; emerging technologies, including the Internet and interactive media; the globalization of the industry; patterns of media ownership. GE credit: SocSci—I, II, III. Theobald

141. Media Effects: Theory and Research (4)
Lecture/discussion—4 hours. Prerequisite: course 115 or the equivalent; course 140 recommended. Social scientific studies of the effects of mass media messages on audience members' actions, attitudes, beliefs, and emotions. Topics include the cognitive processing of media messages, television violence, political socialization, cultivation of beliefs, agenda-setting, and the impact of new technologies. GE credit: SocSci.—I, II, III. Berger

142. News Policies, Practices and Effects (4)
Lecture—4 hours. Exploration of processes and constraints in the gathering, editing, and reporting of news. Examination of studies on the effects of news, contemporary challenges to news reporting presented by new technologies, and the relationship of news to other social institutions. GE credit: SocSci.—I, II, III. Theobald

143. Analysis of Media Messages (4)
Lecture—1 hour; discussion—2 hours; term paper. Prerequisite: courses 140 and 141 recommended. Examination of alternative approaches to the analysis, interpretation, and evaluation of media messages, including those disseminated through broadcasting, print, and new technologies. Both content analytic and interpretive approaches covered. GE credit: SocSci, Wrt.—I, II, III. Theobald

146. Communication Campaigns (4)
Lecture/discussion—3 hours; term paper. Strategic uses of media and interpersonal communication channels in health, environmental advocacy, and political campaigns. Emphasis is on general principles relevant to most campaign types, including public information, social marketing, and media advocacy campaigns. Not open for credit to students who have completed course 160. GE credit: SocSci.—I, III.

152. Theories of Persuasion (4)
Lecture—4 hours. Prerequisite: course 115. Survey of communication and social psychological theories of persuasion. Examination of influence tactics and message design. Contexts of application include product advertising, propaganda campaigns, and health promotion. GE credit: SocSci.—I, II, III. Bell

165. Media and Health (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 115 or the equivalent. Content and effects of messages in news, entertainment, and advertising. Topics include health news reporting; portrayals of disease, disability, death and health-related behaviors; representations of health professionals; promotion of drugs and other health products; tobacco and alcohol advertising. GE credit: SocSci.—I, III.

170. Communication, Technology, and Society (4)
Lecture/discussion—4 hours. Prerequisite: course 114, 115, and upper division standing. Survey of how communication technologies transform our lives at the individual and society levels. Topics include human-computer interaction; the effects of communication technologies in education, health and business; and social and political implications of technological development. GE credit: SocSci.—I. II. Lee

172. Computer-Mediated Communication (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101 and 102. Uses and impacts of computer-mediated communication. Theories and research findings pertaining to how computer-mediation affects various aspects of human interaction including impression formation, development of personal relationships, group decision making, collaborative work, and community building.—II, III. Lee

180. Current Topics in Communication (4)
Seminar—4 hours. Prerequisite: upper division standing with a major in Communication or consent of instructor. Group study of a special topic in communication. May be repeated once for credit. Enrollment limited.

189A. Proseminar in Social Interaction (4)
Seminar—3 hours; term paper. Prerequisite: course 114 and 115. Reading, discussion, research, and writing on a selected topic in the specialty of social interaction. Potential topics include relationship initiation, maintenance, and deterioration; communication failure; nonverbal communication; conversational management; semantics and pragmatics of language; and family/marital communication. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci, Wrt.—III.

189B. Proseminar in Mass Communication (4)
Seminar—3 hours; term paper. Prerequisite: course 114 and 115. Reading, discussion, research, and writing on a selected topic in the specialty of mass communication. Potential topics include, agenda-setting, the cultivation of beliefs, television violence, media portrayals of underprivileged groups, mediated political discourse, interactive technologies, and international/global communications. May be

repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci, Wrt.—I. Knobloch

189C. Proseminar in Health Communication (4)
Seminar—3 hours; term paper. Prerequisite: course 114 and 115. Reading, discussion, research, and writing on a selected topic in health communication. Potential topics include health communication design and evaluation, media advocacy, physician-patient interaction, uses of communication technologies in health settings, and health-related advertising. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci, Wrt.

189D. Proseminar in Organizational Communication (4)
Seminar—3 hours; term paper. Prerequisite: course 114 and 115. Reading, discussion, research, and writing on a selected topic in the specialty of organizational communication. Potential topics include power and influence, organizational conflict and its resolution, mediation, bargaining and negotiation, superior-subordinate interaction, leadership styles, and inter-organizational communication. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci, Wrt

192. Internship in Communication (1-6)
Internship—3-18 hours. Prerequisite: communication major who has completed 20 units of upper division communication courses. Supervised work experience requiring the application of communication principles and strategies or the evaluation of communication practices in a professional setting. Relevant experiences include public relations, advertising, sales, human resources, health promotion, political campaigns, journalism, and broadcasting. May be repeated up to 6 units of credit. (P/NP grading only.)

194H. Senior Honors Thesis (4)
Seminar—1 hour; individual tutoring on research project—3 hours. Prerequisite: senior standing and approval by Honors Committee. Directed reading, research, and writing culminating in the preparation of honors thesis under direction of faculty adviser.

197T. Tutoring in Communication (2-4)
Seminar—1-2 hours; laboratory—1-2 hours. Prerequisite: upper division standing with major in Communication and consent of Department Chairperson. Tutoring in undergraduate Communication courses, including leadership of discussion groups affiliated with departmental courses. May be repeated for credit up to a total of six units. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

213. Theory Development in Communication Inquiry (4)
Seminar—4 hours. This course explores meta-theoretical approaches to developing social-scientific theories of human communication. Perspectives include covering-laws, systems, rules, axiomatic theory construction, causal modeling, scientific realism and grounded theory. Research design and measurement implications of these perspectives are examined.—Berger

214. Mass Communication Theory and Research (4)
Seminar—4 hours. Prerequisite: course 220 or the equivalent. Examines the basic theories, models, and assumptions of mass communication. Reviews the current state of this discipline and major research developments. Special emphasis on research regarding media and violence, women and minorities, political communication, and new technologies.

215. Mass Communication and Social Change (4)
Seminar—4 hours. Prerequisite: courses 220 and 214, or the equivalent. To gain an understanding of current theories and concepts in persuasion and mass communication. To explore how principles of persuasion are used in communication campaigns. To acquire skills in the planning, implementation, and evaluation of campaigns.

220. Empirical Methods in Communication (4)
Lecture—4 hours. Prerequisite: course 115 or consent of instructor. Introduction to the use of experimental and descriptive research methods in communication research. Topics include survey research, interviewing, experimental and quasi-experimental design, and statistics.—Motley

240. Advocacy in Contemporary Society (4)
Seminar—4 hours. Prerequisite: course 151 or the equivalent. Rhetorical and communication theories of argumentation and advocative stance. Analysis of the persuasive impact of argumentation occurring in current public controversies.

242. Proseminar in Symbolic Behavior (4)
Seminar—4 hours. Prerequisite: course 220. Examination of language and/or other symbolic codes in communication. Investigated phenomena may include stylistic variation, speech arts, cognitive processing, communication rules, and audience effects.—Motley

243. Persuasion Theory (4)
Lecture/seminar—4 hours. Prerequisite: course 152 or consent of instructor. Major scientific theories of persuasion. Research programs related to persuasion theories.—Bell

244. Organizational Communication (4)
Seminar—4 hours. Prerequisite: graduate standing and consent of instructor. Theory and research on communication processes in organizations.

246. Perspectives on Relational Communication (4)
Seminar—4 hours. Prerequisite: course 212. Critical survey of the current state of inquiry on communication in personal relationships, i.e., friendship, romantic, and marital relationships. Issues examined include the role of communication in constructing, maintaining, and dissolving relationships.

248. Media Criticism (4)
Seminar—4 hours. Prerequisite: a course in criticism. Examines broadcast, print, and visual media by means of rhetorical, psychological, semiological, sociological, and cultural studies and perspectives. Comparison of media and of critical theory scope in understanding media messages.

249. Interpersonal Communication Theory (4)
Lecture/seminar—4 hours. Prerequisite: course 134 and 212 or consent of instructor. Major theories of interpersonal communication and related research.—Bell

251. Special Topics in Interpersonal Communication (4)
Seminar—4 hours. Prerequisite: graduate standing and consent of instructor. Selected topics in interpersonal communication. May be repeated for credit when topic differs.—Berger

252. Special Topics in Mass Communication (4)
Seminar—4 hours. Prerequisite: graduate standing and consent of instructor. Selected topics in mass communication theory and research. May be repeated for credit when topic differs.

253. Negotiation (4)
Seminar—4 hours. Prerequisite: graduate standing and consent of instructor. Theory and research on negotiating.—Vohs

260. Communication Applications (2-4)
Discussion—1 hour; supervised field work—3-9 hours. Prerequisite: course 220. Fieldwork in communication. Organization and implementation of a re-search project for a specific application of a communication program. May be repeated once for credit. (S/U grading only.)

298. Group Study (1-5)
Lecture—3 hours. (S/U grading only.)

299. Individual Study (1-12)
(S/U grading only.)

299R. Thesis Research (1-12)
Independent study—3-36 hours. Prerequisite: graduate standing in Communication. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Community and Regional Development

(College of Agricultural and Environmental Sciences)

Faculty. See the Department of Human and Community Development.

The Major Program

The Community and Regional Development major (formerly Applied Behavioral Sciences) is concerned with the study of communities and the people in them. The program focuses on community and organizational development, the role of culture and ethnicity in shaping community life, and the ways that knowledge can be used to solve social problems and improve the quality of life.

The Program. Principal subjects of study within the major are community and organizational development, social change processes, the role of culture and ethnicity in shaping community life, community research methodologies, the impacts of innovation and technology on community development, and the effects of social, economic and political systems on communities. The major is organized to allow students to develop fields of concentration that meet their career goals.

Internships and Career Alternatives. Community and Regional Development students are required to complete an internship in their field before graduation. Internships have been arranged with local, county, and state planning units, health departments, schools, housing offices, and community education programs. Community and Regional Development graduates are prepared for occupations in community development, social research, program evaluation, organizational and educational consulting, city and regional planning, and for-profit organizations. The major also provides effective preparation for graduate or professional study in the social and behavioral sciences, or for professional degrees.

B.S. Major Requirements:

	UNITS
English Composition Requirement	**4-12**
One course from English 1, 3, 18, 19, 101, 104A, 104B, 104C, 104D, or 104E	4
Additional course from above or English 102, Comparative Literature 1, 2, 3, 4, Native American Studies 5 or Communication 1	4
Additional course from English 101, 102 104A, 104B, 104C, 104D, or 104E	4
Preparatory Subject Matter	**22-25**
Community and Regional Development 1, 2	8
Agricultural Systems and Environment 21 or Computer Science Engineering 15	3-4
Economics 1A or 1B	5
Anthropology 2 or Sociology 1	4-5
Statistics 13 or 32 or Sociology 46B	3-4
Breadth/General Education Requirement	**24**
Satisfaction of General Education requirement	
Depth Subject Matter	**40**
Two courses from Community and Regional Development 151, 151L, 160, 161, or 168	8
Two courses from Community and Regional Development 140, 142, 152, 153A or 153B	8

Community and Regional Development 154, 157, 158, or 171 4
Two courses from Community and Regional Development 164, 172, 173, 174, or 176 8
Two courses from Community and Regional Development 118, 141, 156, 162, or International Agricultural Development 103 8
Internship: Community and Regional Development 192 4

Areas of Specialization
Take 20 units from each of two options or 40 units from one option. The Areas of Specialization must include two Community and Regional Development courses. Up to 4 units of variable-unit course work may be counted toward this requirement (e.g., Community and Regional Development 192).

Community Groups Option 40
Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.
General (Community and Regional Development 151, 152, 153, 154, 157, 160, 161, 172, 176, American Studies 156, Human Development 103)
African Americans (African American and African Studies 100, 123, 130, 145A, Sociology 128, 129, 130, 134)
Asian Americans (Asian American Studies 100, 110, 111, 112, 155)
Chicanas/os (Chicana/o Studies 100, 110, 111, 120, 121, 131, 132, 140, Political Science 168)
Native Americans (Native American Studies 115, 116, 117, 118, 122, 130A, 130B, 134, 156, 181B)
Youth (American Studies 152, Human Development 100A, 100B, 101, 102, 103, 130, 131, 140, 140L, 141, 142, 151, Psychology 112, Sociology 122, 152)
Aging (Community and International Health 180, Human Development 100C, 143, 160, 162, 191, Sociology 154)
Gender (American Studies 154, Anthropology 130, Political Science 166, Psychology 114, Sociology 132, 133, 145B, Women's Studies 103, 130, 140, 187)
Specially Challenged Individuals (Education 115, Human Development 130, 131)
Class (Sociology 140, 185)

Organization and Management Option..... 40
Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.
Administration (Community and Regional Development 157, 158, 168, Agricultural Economics 100A, 171A, Computer Science Engineering 167, Economics 104, 105, 115A, Political Science 100, 105, 142, 155, 181, 182, 183)
Communication (Communication 114, 130, 134, 136, 140, 152, Community and Regional Development 173, 175, Education 120, 163)
Human Resources (Community and Regional Development 151, 160, 161, 172, 176, Economics 151B, Food Service Management 123, Psychology 143, 144, 145, 183, Sociology 120, 128, 129)
Management (Community and Regional Development 118, 140, 141, 154, 161, 162, 164, 168, Agricultural Economics 112, 113, History 174A, Political Science 188, Sociology 138, 139, 158, 159, 180A, 180B)

Policy and Planning Option..... 40
Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.
General (Community and Regional Development 118, 142, 151, 153, 154, 156, 160, 161, 162, 168, Environmental Science and Policy 165, Political Science 100, 103, 105, 108, 109, 142, 173, 183)
Environmental Policy (Political Science 107, 175, Environmental Science and Policy 110, 160, 161, 164, 166, 168A, 168B, 171, 172, 173, 179, Environmental and Resource Sciences 121)
Law and Policy (Sociology 120, 152, 155, Political Science 103, 105, 154, 155, 181, 182)
Urban and Regional Planning (Community and Regional Development 140, 141, 152, 157, 158, 159, 171, Economics 115A, Environmental Planning and Management 110, 134, Environmental Science and Policy 171, 173, Geography 155, Political Science 100, 101, 102)

Social Services Option 40
Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.
Community Health (Community and Regional Development 164, Community Health 101, Environmental Science and Policy 126, Psychology 160, Sociology 154)
Aging (Community Health 180, Human Development 100C, 143, 160, 162)
Counseling (Communication 134, 135, Education 160, 163, Human Development 121, 130, Psychology 143, 145, 168)
Youth (American Studies 152, Human Development 100A, 100B, 101, 102, 103, 130, 131, 140, 140L, 141, 142, 151, Psychology 112, Sociology 122, 152)
The Family (Human Development 110, Sociology 131, 134, 135)
Education (Community and Regional Development 173, 175, Agricultural Education 100, 160, 163, Education 100, 110, 114, 120, Psychology 136, Sociology 124)
Bilingual Education (Education 151, 152, 153, Psychology 132)

Unrestricted Electives..... 38-40
Total Units for the Degree..... 180

Major Adviser. M. Wells.
Advising Center for the major is located in 1303 Hart Hall (530) 752-2244.

Minor Program Requirements:

The Community and Regional Development faculty offers the following minor program:

UNITS

Community Development 24
Community and Regional Development 1.. 4
Five courses selected from Community and Regional Development 140, 141, 142, 151 and 151L, 157, 158, 162, 164, 168, 171, 172, 173, 176 20

Minor Adviser. F. Hirtz

Graduate Study. Refer to the Graduate Studies chapter of this catalog.

Related Courses. See Environmental Science and Policy 10, 101, 133.

Courses in Community and Regional Development (CRD)

Lower Division Courses

1.The Community (4)
Lecture—3 hours; discussion—1 hour. Basic concepts of community analysis and planned social change. The dynamics of community change through case studies of communities including peasant, urban ghetto, suburban mainline, and California farm workers. GE credit: SocSci, Div, Wrt.—I, II, III. (I, II, III.) Tarallo, Marcotte

2. Ethnicity and American Communities (4)
Lecture—3 hours; discussion—1 hour. Historical and cultural survey of the role of various ethnic groups in the development of American communities. Examines ethnicity as a cultural factor, ethnicity as power and issues related to selected American ethnic groups. GE credit: SocSci, Div, Wrt.—I, II. (I, II.) Lippin, Guarnizo

17. Population and Community: Issues in Human Ecology (4)
Lecture/discussion—4 hours. Dynamics and challenges of demographic changes in California and the world community, solutions as well as problems, implications for individuals, their possible contributions towards resolving global problems through community action. GE credit: SocSci, Div, Wrt.

47A. Orientation to Community Resources—San Francisco (2)
Fieldwork—4 day field trip; seminar—three 2-hour sessions. Advance registration and orientation required. Intensive fieldwork in San Francisco. Interaction with agencies and individuals who address the range of human service, educational, and social needs in the city. (P/NP grading only.)—II, summer. Fujimoto

47B. Orientation to Community Resources—Central Valley (2)
Fieldwork—4 day field trip; seminar—three 2-hour sessions. Advance registration and orientation required. Intensive fieldwork in the California Central Valley. History of settlement and development of the world's most productive and diverse agricultural region. Housing, land use, development, immigration, and population growth. (P/NP grading only.)—III. (III.) Wiener

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Supervised internship, off and on campus, in community and institutional settings. (P/NP grading only).

98. Directed Group Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

118. Technology and Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 18 or consent of instructor. Impact of technology on labor relations, employment, industrial development and international relations. The internal relations of technology development and deployment. GE credit: SocSci, Wrt.—I. (I.) Kenney

140. Dynamics of Regional Development (4)
Lecture—4 hours. Prerequisite: one undergraduate social science course or consent of instructor. Political economy of domestic regional development. Technology, labor relations and interfirm linkages. California and other regions as case studies. GE credit: SocSci, Wrt.—II. (II.) Kenney

141. Organization of Economic Space (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. The globalization of economic activity focusing on new spatial patterns of production and circulation and their implications for particular countries and regions.

142. Rural Change in the Industrialized World (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Geography of rural environment with special emphasis on rural restructuring. The regional focus is on the developed world and comparisons are drawn between Europe (Eastern and Western) and North America.—III. (III.) Momsen

151. Community Field Research: Theory and Analysis (3)
Lecture—3 hours. Prerequisite: course 151L must be taken concurrently; course 1 and any upper division Community and Regional Development course are recommended. Design and analysis of research at the community level with a focus on the relationship between practice and theory. Focus will be on conducting community research using structural analysis, elite interviewing, ethnographic research, and other qualitative research methods. GE credit: SocSci, Div, Wrt.—III. Tarallo

151L. Laboratory in Community Research and Analysis: Field Experience (1-3)
Fieldwork—3-9 hours. Prerequisite: course 151 concurrently. Field research focused on community or organizational issues and their resolution. Includes assignment with local agencies or community-based organizations. The focus will be conducting community research using such methods as structural analysis, elite interviewing, ethnographic research, and comparative community studies.—III. Tarallo

152. Community Development (4)
Lecture—4 hours. Prerequisite: course 1 or 151, Sociology 2, Anthropology 2, Asian American Studies 100, Chicana/o Studies 132, Geography 5, or African American and African Studies 101 or consent of instructor. Introduction to principles and strategies of community organizing and development. Examination of non-profit organizations, citizen participation, approaches to reducing poverty, community needs assessment, and regional development strategies. GE credit: SocSci, Wrt.—I. Bradshaw

153A. International Community Development: Asia (4)
Lecture—4 hours. Prerequisite: course 1, Anthropology 2, International Agricultural Development 10. Examination and analysis of community development efforts in Japan and the impact of global forces in different settings. Alternative strategies with emphasis on self-reliance and locally controlled development. Course is based in Kyoto, Japan, and includes field trips. GE credit: SocSci, Div.—Fujimoto

153B. International Community Development: Europe (4)
Lecture—4 hours. Prerequisite: course 1 or 2, Anthropology 2, International Agricultural Development 10; course 164 or the equivalent recommended. Examination and analysis of community development efforts in Europe and the impact of global forces in different settings. Alternative strategies with emphasis on self-reliance and locally controlled development. Course is based in Freiburg, Germany, and includes field trips to France and Switzerland. GE credit: SocSci, Div.—Hirtz

154. Social Theory and Community Change (4)
Lecture—4 hours. Prerequisite: course 1, Sociology 1, or Anthropology 2. A comparative overview of the dominant social science paradigms for the study of community development and change. Among the paradigms discussed are functionalism, conflict theory/Marxism, structuralism, and methodological individualism. GE credit: SocSci, Div, Wrt.—II. (II.) Hirtz

156. Community Economic Development (4)
Lecture—4 hours. Prerequisite: course 152 or consent of instructor. How government and community organizations help firms grow and create jobs through local economic development corporations, small business centers, revolving loan funds, incubators, and many other programs. Techniques to analyze community economic potential and identification of appropriate intervention tools. Group project.—III. Bradshaw

157. Politics and Community Development (4)
Lecture—4 hours. Prerequisite: prior course work in sociology or political science recommended. Analyzes political, economic and sociocultural forces shaping the form and function of local communities in the U.S. Considers theories of the state, the community and social change and case studies of actual community development in comparative historical perspective. GE credit: SocSci, Div, Wrt.—II. Smith

158. Small Community Governance (4)
Lecture/discussion—3 hours; fieldwork—3 hours. Prerequisite: course 151 or 160 or Political Science 100. Governing institutions and political processes in rural and small urban places. Local government organization, community autonomy, leadership, political change, policy development, and select policy issues including public finance. Field research on political processes or policy issues in select communities. Offered in alternate years.—III. Campbell

160. Research Design and Method in Community Studies (4)
Lecture—4 hours. Prerequisite: course 1; Statistics 13 or the equivalent. Application of behavioral science research methodology to multidisciplinary problems confronting communities and community organizations. Focuses on design, sampling, measurement and analysis.—I. (I.)

161. Ethnographic Research in America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: completion of 8 units of course work in Anthropology, Sociology, or Community and Regional Development. Methodologies, ethics and goals of qualitative research. Emphasis on analyzing and conducting ethnographic research in American communities; problem formulation, analytic modes, data correction and interpretation. Offered in alternate years.

162. People, Work and Technology (4)
Lecture—4 hours. Prerequisite: course work in the social sciences (e.g., Sociology 1, 3, Anthropology 137, Economics 1A, 1B) or labor history. Relationship between work, technology, and people's lives. Such topics as industrialization, bureaucratization, automation, the structure of work-linked communities, education and the labor market, work and the economic system and the future of work.—III. (III.) Wells

164. Theories of Organizations and Their Roles in Community Change (4)
Lecture—4 hours. Prerequisite: course 1 or 2. Planned change within and through community organizations. Private voluntary organizations, local community associations, and local government. Relationship between community organizations and social capital.—III. Hirtz

168. Program Evaluation and the Management of Organizations (4)
Lecture—4 hours. Prerequisite: courses 160, 161. Role of program evaluation in organizational and program management. Impact of internal evaluation in program planning, improvement, and accountability.—II. (II.)

171. Housing and Social Policy (4)
Lecture—4 hours. Social impact, economics, and politics of housing in the United States. Special attention given to alternative policy strategies at the national and local levels.—III. Wiener

172. Social Inequality: Issues and Innovations (4)
Lecture—4 hours. Prerequisite: upper division standing; 8 units of sociology or anthropology or combination. Study of the phenomenon of inequality in the U.S. Various approaches to inequality examined, including structural and historical explanations, prejudice and discrimination, the "culture of poverty," and arguments concerning race, sex, and genetic potential.—I. (I.) Wells

173. The Continuing Learner (4)
Lecture—4 hours. Prerequisite: upper division standing. Theories of adult learning and teaching emphasizing the role of adult education in the community. Designing of adult education programs.—II. (II.) Lippin

174. Communication for Community Change (4)
Lecture—4 hours. Prerequisite: course 1. Communication as a mechanism and method for creating change in communities. Theories and practices; impact of message on attitudes and behavior; ethics of change induced through communication. Not offered every year.

176. Comparative Ethnicity (4)
Lecture—4 hours. Prerequisite: upper division standing, 8 units of sociology or anthropology or combination. Exploration of the role of ethnicity in shaping social systems and interaction. Examination of analytical approaches to and issues arising from the study of ethnicity, through utilization of data from a range of different societies. GE credit: SocSci, Div, Wrt.—II. Guarnizo

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Supervised internship, off and on campus, in community and institutional settings. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

240. Community Development Theory (4)
Lecture/discussion—4 hours. Introduction to theories of community development and different concepts of community, poverty, and development. Emphasis on building theory, linking applied development techniques to theory, evaluating development policy, and examining case studies of community development organizations and projects.—I. (I.) Bradshaw

241. The Economics of Community Development (4)
Seminar—4 hours. Prerequisite: graduate standing. Economic theories and methods of planning for communities. Human resources, community services and infrastructure, industrialization and technological change, and regional growth. The community's role in the greater economy.—I. Kenney

242. Community Development Organizations (4)
Seminar—4 hours. Prerequisite: course 240. Theory and praxis of organizations with social change agendas at the community level. Emphasis on non-profit organizations and philanthropic foundations.—III. (III.) Hirtz

245. The Political Economy of Urban and Regional Development (4)
Lecture—4 hours. Prerequisite: course 157, 244, or the equivalent. How global, political and economic restructuring and national and state policies are mediated by community politics; social production of urban form; role of the state in uneven development; dynamics of urban growth and decline; regional development in California.—III. (III.) Smith

246. The Political Economy of Transnational Migration (4)
Lecture—4 hours. Prerequisite: graduate standing. Theoretical perspectives and empirical research on social, cultural, political, and economic processes of transnational migration to the U.S. Discussion of conventional theories will precede contemporary comparative perspectives on class, race, ethnicity, citizenship, and the ethnic economy.—II. (II.) Guarnizo

247. Transformation of Work (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing in history or social science degree program or consent of instructor. Exploration of the ways that the experience, organization, and systems of work are being reconfigured in the late twentieth century. The impacts of economic restructuring on local communities and workers.—III. (III.) Wells

248A. Social Policy, Welfare Theories and Communities I (2)
Seminar—2 hours. Prerequisite: graduate standing. Theories and comparative histories of modern welfare states. Theories of welfare and social policy in relation to normative, organizational, and administrative aspects of welfare and social policy. Offered in alternate years.—Hirtz

248B. Social Policy, Welfare Theories and Communities II (2)
Seminar—2 hours. Prerequisite: graduate standing, course 248A concurrently. Analysis of a specific set of social issues within the U.S./California context. Issues may include poverty, hunger, housing, health, family, disability, economic opportunity, affirmative action orientations, gender, old age, or special social groups. Offered in alternate years—Hirtz

290. Seminar (1)
Seminar—1 hour. Analysis of research in applied behavioral sciences. (S/U grading only.)—I. Hirtz

292. Graduate Internship (1-12)
Internship—3-36 hours. Individually designed supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor. (S/U grading only.)

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Professional Course

440. Professional Skills for Community Development (4)
Seminar—4 hours. Prerequisite: course 240. The intersection of theory and case studies to develop practical skills needed to work as a professional community developer, program administrator, and/or policy consultant.—II. (II.) Bradshaw

Community Development (A Graduate Group)

Michael P. Smith, Ph.D., Chairperson of the Group
Group Office, 1303 Hart Hall (Human and Community Development; 530-752-1926)
http://hcd.ucdavis.edu

Faculty

Rina Alcalay, Ph.D., Associate Professor *(Communication)*
Ted K. Bradshaw, Ph.D., Assistant Professor *(Human and Community Development)*
Stephen B. Brush, Ph.D., Professor *(Human and Community Development)*
David Campbell, Ph.D., Director, California Communities Program *(Human and Community Development)*
Dennis Dingemans, Ph.D., Professor *(Geography)*
Deborah Elliott-Fisk, Ph.D., Professor *(Wildlife, Fish, and Conservation Biology)*
Patsy Eubanks-Owens, M.L.A., Assistant Professor *(Landscape Architecture)*
Gail Feenstra, Ed.D., Food System Analyst *(Sustainable Agriculture Research and Education Program)*
Yvette Flores-Ortiz, Ph.D., Associate Professor *(Chicana/o Studies)*
Mark Francis, M.L.A., Professor *(Landscape Architecture)*
Isao Fujimoto, M.A., Senior Lecturer Emeritus
Barbara G. Goldman, Ph.D., Lecturer *(Education, Human and Community Development)*
James I. Grieshop, Ph.D., Lecturer *(Human and Community Development)*
Luis Guarnizo, Ph.D., Assistant Professor *(Human and Community Development)*
Pat Harrison, M.Arch., Associate Professor *(Design)*
Frank W. Hirtz, Ph.D., Assistant Professor *(Human and Community Development)*
Desmond A. Jolly, Ph,.D., Lecturer *(Agricultural and Resource Economics)*
Robert A. Johnston, Ph.D., Professor *(Environmental Science and Policy)*
Carl C. Jorgensen, Ph.D., Associate Professor *(Sociology)*
Susan B. Kaiser, Ph.D., Professor *(Textiles and Clothing)*
E. Dean MacCannell, Ph.D., Professor *(Environmental Design)*
Philip E. Martin, Ph.D., Professor *(Agricultural and Resource Economics)*
E. Stephen McNiel, M.L.A., Lecturer *(Landscape Architecture)*
Jay Mechling, Ph.D., Professor *(American Studies)*
Janet D. Momsen, Ph.D., Professor *(Human and Community Development)*
Helge Olsen, Senior Lecturer *(Design)*
Donald A. Palmer, Ph.D., Professor *(Graduate School of Management)*
Beztriz M. Pesquera, Ph.D., Associate Professor *(Chicana/o Studies)*
Heath Schenker, M.A., Associate Professor *(Landscape Architecture)*
Seymour I. Schwartz, Ph.D., Professor *(Environmental Science and Policy)*
Michael P. Smith, Ph.D., Professor *(Human and Community Development)*
Alvin D. Sokolow, Ph.D., Lecturer *(Human and Community Development)*
Geoffrey A. Wandesforde-Smith, Ph.D., Associate Professor *(Political Science, Environmental Science and Policy)*
Bernadette Tarallo, Ph.D., Lecturer *(Human and Community Development)*
Robert L.Thayer, Jr., M.A., Professor *(Landscape Architecture)*
O. E. Thompson, Ph.D., Professor Emeritus
Jessica M. Utts, Ph.D., Professor *(Statistics)*
Stefano Varese, Ph.D., Professor *(Native American Studies)*
Ronald E. Voss, Ph.D., Lecturer *(Vegetable Crops Extension)*
Miriam J. Wells, Ph.D., Professor *(Human and Community Development)*
Joan Wright, Ph.D., Lecturer Emeritus

Graduate Study. The Graduate Group in Community Development offers a multidisciplinary program of study which leads to the M.S. degree. The program prepares students for professional roles as administrators, designers, planners, or researchers, with emphasis upon urban and rural communities and human service organizations. Graduate study in community development also prepares individuals to work within government or non-profit organizations in the realm of social and economic change. Students have the opportunity to specialize in (1) urban and rural development, (2) community economic and political development, (3) community design and planning, (4) racial and ethnic relations, (5) international migration and development, (6) gender and community development, and (7) social policy analysis.

Preparation. Applicants to this program can prepare themselves by enrolling for upper division courses in the social or behavioral sciences, e.g., anthropology, economics, sociology, psychology, cultural geography, or political science, and courses in community studies.

Graduate Advisers. Contact the Group Office.

Community Health

See Epidemiology and Preventive Medicine; and Family and Community Medicine, under Medicine, School of

Community Nutrition

See Nutrition Science

Comparative Literature

(College of Letters and Science)
Gail Finney, Program Director
Program Office, 522 Sproul Hall (530-752-1219)
http://complit.ucdavis.edu

Committee in Charge

Marc E. Blanchard, Agrégé de Lettres *(Comparative Literature, French)*
Gail Finney, Ph.D. *(Comparative Literature, German)*
Neil Larsen, Ph.D. *(Comparative Literature, Critical Theory)*
Kari Lokke, Ph.D. *(Comparative Literature)*
Sheldon Lu, Ph.D. *(Comparative Literature)*
Seth L. Schein, Ph.D. *(Comparative Literature)*
Juliana Schiesari, Ph.D. *(Comparative Literature, Italian)*
Brenda Schildgen, Ph.D. *(Comparative Literature)*
Jocelyn Sharlet, Ph.D. *(Comparative Literature)*

Faculty

Marc Eli Blanchard, Agrégé de Lettres, Professor *(Comparative Literature, French)*
Gail Finney, Ph.D., Professor *(Comparative Literature, German)*
Neil Larsen, Ph.D., Professor *(Comparative Literature, Critical Theory)*
Kari Lokke, Ph.D., Professor
Sheldon Lu, Ph.D., Professor
Seth L. Schein, Ph.D., Professor
Juliana Schiesari, Ph.D., Professor *(Italian, Comparative Literature)*
Brenda Schildgen, Ph.D., Professor
Jocelyn Sharlet, Ph.D., Assistant Professor

Emeriti Faculty

Ruby Cohn, Ph.D., Professor Emerita
Manfred Kusch, Ph.D., Senior Lecturer Emeritus
Robert M. Torrance, Ph.D., Professor Emeritus

Affiliated Faculty

Scott McLean, Ph.D., Lecturer

The Major Program

Comparative literature encourages students to read, think about, and compare books from different national languages and from different parts of the world. Comparative literature enlarges students' horizons by bridging the divisions between national cultures instead of concentrating on a single tradition.

The Program. Both the major programs and the minor programs in comparative literature allow students to combine courses in one or more national literature departments with courses in comparative literature. The introductory course sequence, "Great Books of Western Culture" and "Major Books of the Contemporary World," provides both an overview of European literary culture from ancient times to the present and intensive practice in analytical thought and English composition. All readings in undergraduate comparative literature courses are in English, but majors take upper division courses in at least one foreign literature in the original language.

Career Alternatives. Careers directly related to comparative literature include teaching, journalism, publishing, and translating. Because many professional schools consider a literature major an excellent background for their graduate disciplines, comparative literature provides valuable preparation (supplemented with courses outside the major) for careers in business, government, medicine, or law.

A.B. Major Requirements:

European Emphasis

UNITS

Preparatory Subject Matter 15-46
Comparative Literature 1, 2, 3..... 12
One other lower division course in Comparative Literature..... 3-4
Foreign language: sufficient preparation to ensure satisfactory performance at the upper division level 0-30

Depth Subject Matter..... 40
Five upper division Comparative Literature courses including at least one course in a major period (such as 164A-164B-164C-164D), movement (such as 168A-168B, 169) or genre (such as 160A-160B, 161A-161B, 163, 166A-166B) and including Comparative Literature 141 20
Three upper division literature courses in a language other than English 12
Two additional upper division literature courses in Comparative Literature or in any other program including English or literature in translation 8

Total Units for the Major (European Emphasis)..... 55-86

Recommended
Anthropology 2; Classics 10; English 171A, 171B; French 114; History 4A-4B-4C, 101; Linguistics 1, 4, 163; Philosophy 24, 123; Religious Studies 2.

Major Adviser.————.

Asian Emphasis

UNITS

Preparatory Subject Matter 14-44
Comparative Literature 1or 2; 3 or 4 8
Two other lower division courses from Comparative Literature 53 series..... 6
Foreign language: sufficient preparation to ensure satisfactory performance at the upper division level in an Asian language 0-30

Depth Subject Matter..... 40
Comparative Literature 141 and 151..... 8
Four other upper division Comparative Literature courses such as Comparative Literature 153 or 166, (or any other Comparative Literature courses with an Asian emphasis)..... 16
Note: Courses in the East Asian Languages and Cultures Department can be substituted for these courses with the approval of an adviser.
Three upper division literature courses in an Asian language 12
One additional upper division course selected from Film Studies, Asian American Studies, History or Religious Studies 4

Total Units for the Major (Asian Emphasis) 54-84

Minor Program Requirements:

The minor in Comparative Literature allows students to combine courses in Comparative Literature with courses in a national literature, including English or foreign literatures in translation. There is no foreign language requirement for the minor.

UNITS

Comparative Literature 24
Comparative Literature 1, 2, 3, or 4..... 4
At least five upper division literature courses, at least four of which are in Comparative Literature (Comparative Literature 141 recommended)..... 20
Courses should be chosen in consultation with, and with the approval of, the adviser.

Minor Adviser. Same as Major Adviser.

Advising. All Comparative Literature majors and minors must consult with their adviser, individually, at least once at the beginning and once at the end of each academic year.

Honors Program. Candidates for high or highest honors in Comparative Literature must write a senior thesis under the direction of a faculty member approved by the Program Director. For this purpose, in addition to fulfilling all other major requirements, honors candidates must enroll in 6 units of Comparative Literature 194H during the first two quarters of the senior year. Only students who have attained a cumulative GPA of 3.5 in all courses satisfying the major (except elementary foreign language courses) at the end of the junior year will be eligible for the honors program.

Teaching Credential Subject Representative. The Staff. See also the Teacher Education Program.

Graduate Study. Refer to Comparative Literature (A Graduate Group). See also the Graduate Studies chapter of this catalog.

Courses in Comparative Literature (COM)

Lower Division Courses

1. Great Books of Western Culture: The Ancient World (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. An introduction, through class discussion and frequent written assignments, to some of the great books of western civilization from The Epic of Gilgamesh to St. Augustine's Confessions. GE credit: ArtHum, Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

2. Great Books of Western Culture: From the Middle Ages to the Enlightenment (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. An introduction, through class discussion and frequent written assignments, to some of the great books of western civilization from Dante's Inferno to Swift's Gulliver's Travels. GE credit: ArtHum, Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

3. Great Books of Western Culture: The Modern Crisis (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. An introduction, through class discussion and frequent written assignments, to some of the great books of western civilization from Goethe's *Faust* to Beckett's *Waiting for Godot.* GE credit: ArtHum, Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

4. Major Books of the Contemporary World (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. Comparative study of selected major Western and non-Western texts composed in the period from 1945 to the present. Intensive focus on writing about these texts, with frequent papers written about these works. GE credit: ArtHum, Div, Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

5. Fairy Tales, Fables, and Parables (4)
Lecture—3 hours; discussion—1 hour. An introduction to fairy tales, fables, and parables as recurrent forms in literature, with such readings as tales from Aesop and Grimm, Chaucer and Shakespeare, Kafka and Borges, Buddhist and Taoist parables, the Arabian Nights, and African American folklore. GE credit: ArtHum, Div, Wrt.—I, II, III. (I, II, III.) Schildgen, Sharlet

6. Myths and Legends (4)
Lecture—3 hours; discussion—1 hour. Introduction to the comparative study of myths and legends, excluding those of Greece and Rome, with readings from Near Eastern, Teutonic, Celtic, Indian, Japanese, Chinese, African and Central American literary sources. GE credit: ArtHum, Div, Wrt.—I, II. (I, II.) Schein, McLean

7. Literature of Fantasy and the Supernatural (4)
Lecture—3 hours; discussion—1 hour. The role of fantasy and the supernatural in literature: tales of magic, hallucination, ghosts, and metamorphosis, including diverse authors such as Shakespeare, P'u Sung-Ling, Kafka, Kawabata, Fuentes, and Morrison. GE credit: ArtHum, Div, Wrt.—II, III. (II, III.)

8. Utopias and their Transformations (4)
Lecture/discussion—3 hours; term paper. Prerequisite: satisfaction of the Subject A requirement. A consideration, in literary works from different ages, of visionary and rational perceptions of a lost paradise, Golden Age, or Atlantis—and of the inhuman nightmares that can result from perversions of the utopian dream of perfection. GE credit: ArtHum, Wrt.—(I.)

9. The Short Story and Novella (4)
Lecture/discussion—3 hours; term paper. An introduction to shorter forms of prose fiction by major authors of different countries, with special emphasis on the modern period. GE credit: ArtHum, Div, Wrt.—(III.)

10A-N. Master Authors in World Literature (2)
Lecture/discussion—1 two-hour session. Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: **(A)** Gilgamesh, Ramayana, Beowulf, Nibelungenlied; **(B)** Metamorphoses, Decameron, Arabian Nights, Canterbury Tales; **(C)** Chanson de Roland, El Cid, Igor's Campaign, Morte D'Arthur; **(D)** Sakuntala, Tristan and Isolde, Aucassin and Nicolette, Gawain and the Green Knight; **(E)** Swift, Rabelais, La Celestina, Simplicissimus; **(F)** Cervantes, Saikaku, Fielding, Voltaire; **(G)** Machiavelli, Shakespeare, Lope de Vega/Calderón, Molière/Racine, Lessing/Schiller; **(H)** Goethe, Byron, Stendhal, Pushkin, Lermontov; **(I)** Hoffmann, Gogol, Poe, Hawthorne, Maupassant, Chekhov, Melville; **(J)** Flaubert, Twain, Turgenev, Galdós, Ibsen; **(K)** Balzac, Dostoevski/Tolstoi, Hardy, Shaw, Strindberg; **(L)** Unamuno, Svevo, Conrad, Gide, Kafka, Faulkner; **(M)** Rilke/Yeats, Joyce/Woolf, Mann/Céline, Bulgakov/Tanizaki, O'Neill/Brecht, Lorca/Pirandello; **(N)** Camus/Sartre, García Márquez/Grass, Borges/Sarraute, Bellow/Nabokov, Beckett/Pinter, Genet/ Dürrenmatt. May be repeated for credit in different subject area. Limited enrollment. (P/NP grading only.)—I, II, III. (I, II, III.)

12. Introduction to Women Writers (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: completion of subject A requirement. Survey of fiction, drama, and poetry by women writers from all continents. Concerns of women compared in light of their varied social and cultural traditions. Literary analysis of voice, imagery, narrative strategies and diction. GE credit: ArtHum, Div, Wrt.—III. Lokke

13. Dramatic Literature (3)
Lecture—3 hours. Prerequisite: completion of Subject A requirement or the equivalent. Introduction, through careful reading of selected plays, to some of the major forms of Western drama, from the earliest tragedies of ancient Greece to the contemporary American theater. Offered in alternate years. GE credit: ArtHum, Wrt.—II. Finney

14. Introduction to Poetry (3)
Lecture/discussion—3 hours. Prerequisite: completion of Subject A requirement. Comparative study of poetry in a variety of lyric and other poetic forms from different historical periods and different linguistic, national, and cultural traditions. Offered in alternate years. GE credit: ArtHum, Wrt.—(I.)

20. Man and the Natural World (4)
Lecture/discussion—3 hours; term paper. Examination of the changing relationship between the individual human being and his "natural" environment, whether cultivated or wild, as reflected in literary works from ancient times to the present by such

authors as Hesiod, Virgil, Rousseau, Wordsworth, and Thoreau. GE credit: ArtHum, Wrt.—I. (II.) McLean

25. Ethnic Minority Writers in World Literature (4)
Lecture—3 hours; term paper. Consideration of a broad range of writers who speak from an ethnic perspective different from the nominally or politically dominant culture of their respective countries and who explore the challenges faced by characters significantly affected by their ethnic minority status. GE credit: ArtHum, Div, Wrt.—(I.) Blanchard

53A. Literature of China and Japan (3)
Lecture—2 hours; discussion—1 hour. Introduction to representative masterpieces of East Asia with readings from such works as The Story of the Stone, The Peach Blossom Fan, T'ang and Sung poetry, classical Japanese poetry, drama, and travel diaries, and The Tale of Genji. GE credit: ArtHum, Div, Wrt.

53B. Literature of India and Southeast Asia (3)
Lecture—2 hours; discussion—1 hour. Introduction to representative masterpieces of South Asia with readings from such works as the Mahabharata and Ramayana, The Cloud Messenger, Shakuntala, The Little Clay Cart, and the stories and poems of both ancient and modern India and Southeast Asia. GE credit: ArtHum, Div, Wrt.—(III.) Schildgen

53C. Literatures of the Islamic World (3)
Lecture—2 hours; discussion—1 hour. Introduction to classical Islamic culture through translations of literature primarily from Arabic and Persian, as well as other languages. Topics include the concept of the self, society and power, spirituality, the natural world, the cosmos, and the supernatural. GE credit: ArtHum, Div, Wrt.—I. Sharlet

90X. Lower Division Seminar (1-2)
Seminar—1-4 hours. Prerequisite: consent of instructor. Examination of a special topic in a small group setting.

98. Directed Group Study (1-5) I, II, III. The Staff (Director in charge)
Restricted to lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

120. Writing Nature: 1750 to the Present (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. Study of representations, descriptions, and discussions of humankind's problematical relationship with the non-human world in texts written in a variety of European and American traditions between 1750 and the present. Offered in alternate years. GE credit: ArtHum, Wrt.—(III.) McLean

135. Women Writers (4)
Lecture/discussion—3 hours; term paper. An exploration of women's differing views of self and society as revealed in major works by female authors of various times and cultures. Readings, principally of fiction, will include such writers as Lady Murasaki, Mme de Lafayette, and Charlotte Bronte. GE credit: ArtHum, Div, Wrt.—I, III. (I, II.) Lokke, Schiesari

138. Gender and Interpretation (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. Study of the representation of gender roles and gender hierarchy in literary texts from various periods, societies, and cultures in light of research and theory on gender, with attention to gender as a topic for literary interpretation. GE credit: ArtHum, Div, Wrt.—II. Schiesari

139. Shakespeare and the Classical World (4)
Lecture/discussion—3 hours; term paper. Prerequisite: at least one course in literature. Shakespeare's representations of the classical world in the light of selected ancient texts and Renaissance conceptions of Antiquity, with special attention to the depiction of politics and history. Offered in alternate years.—(II.) Schein

140. Thematic and Structural Study of Literature (4)
Lecture/discussion—3 hours; term paper. Interpretation of selected works illustrating the historical evolution of themes, as well as of formal and structural elements. May be repeated for credit when substance of course varies. GE credit: ArtHum, Wrt.—(II.)

141. Introduction to Critical Theoretical Approaches to Literature and Culture (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one upper division literature course or consent of instructor. Introduction to critical theory and its use for interpreting literary texts, film, and media forms in our present global culture. (Same course as Critical Theory 101.) GE credit: ArtHum, Wrt.—III. (III.)

142. Critical Reading and Analysis (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Close reading of selected texts; scrutiny of very limited amount of material, with attention to the problems of texts in translation.

144. The Grotesque (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. Study of the "grotesque" in selected texts from the Renaissance to the 20th century, with attention to the "grotesque" as a means of social, cultural, and political commentary, as well as of aesthetic innovation. Offered in alternate years. GE credit: ArtHum, Wrt.—(I.)

145. Representations of the City (4)
Lecture/discussion—3 hours; term paper. Examination of the portrayal of the modern city in 19th and 20th century western literature. Readings include works by Balzac, Dickens, Poe, Baudelaire, Dostoevsky, Whitman, Zola, T.S. Eliot, and William Carlos Williams. GE credit: ArtHum, Wrt.—(I.) Sharlet

146. Myth in Literature (4)
Lecture—3 hours; term paper. Prerequisite: course 6 recommended. Comparative study of different versions of one or more central myths, with attention to their cultural settings, artistic and literary forms of representation, as well as to their psychological dimensions. GE credit: ArtHum, Wrt.—(II.)

147. Modern Jewish Writers (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of the Subject A requirement and one lower division literature course. Problems of the modern Jewish experience from the perspective of the writer's construction of the self in relation to the future and to the non-Jew. Draws upon Russian, German, Yiddish, and American traditions. GE credit: ArtHum, Div, Wrt.—II. (III.) Schein

151. Colonial and Postcolonial Experience in Literature (4)
Lecture—3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. A literary introduction to the cultural issues of colonialism and postcolonialism through reading, discussing and writing on narratives which articulate diverse points of view. GE credit: ArtHum, Div, Wrt.—II. (III.) Blanchard, Larsen

152. Literature of the Americas (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. Study of the various stylistic, historical, social and cultural factors that contribute to a hemispheric vision of American literature, en-compassing works by Canadian, United States, Caribbean, Brazilian, and Spanish-American writers. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I. (I.) Blanchard

153. The Forms of Asian Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Introduction to distinctive Asian literary forms, such as haiku, noh, the Chinese novel and tale, through reading of major works. Comparison with Western genres and study of native and Western critical traditions. GE credit: ArtHum, Div, Wrt.

154. African Literature (4)
Lecture—3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. Pre- and post-colonial sub-Saharan African literature and the African oral traditions from which it emerged. Genres and themes of African literature in the 19th and 20th centuries. GE credit: ArtHum, Div, Wrt.—III. (I.) Schildgen

157. War and Peace in Literature (4)
Lecture/discussion—3 hours; term papers. Prerequisite: course 1, 2, or 3, or consent of instructor. Through study of a few major works from Western and non-Western literature the course seeks to illuminate the way in which literature from antiquity to the present has dealt with the antinomy peace/war through the ages. GE credit: ArtHum, Wrt.

158. The Detective Story as Literature (4)
Lecture—3 hours; term paper. Study of the origins, literary and social background, development and implications of the literature of detection in a comparative context. GE credit: ArtHum, Wrt.—I. Cannon

159. Women in Literature (4)
Lecture—3 hours; term paper. Prerequisite: course 1, 2, 3, or 4 or the equivalent recommended. Portrayals of women in literature, comparing selected heroines who represent a particular theme, period, or genre. Texts range around the globe and from ancient to modern works, such as Lysistrata, Emma, Hedda Gabler, The Makioka Sisters, and Top Girls. GE credit: ArtHum, Div, Wrt.

160A. The Modern Novel (4)
Lecture/discussion—3 hours; term paper. The changing image of man and his world as seen in novels by such writers as Joyce, Proust, and Mann. GE credit: ArtHum, Wrt.—III. (III.)

160B. The Modern Drama (4)
Lecture/discussion—3 hours; term paper. Readings in representative authors such as Ibsen, Strindberg, Chekhov, Pirandello and Brecht. GE credit: ArtHum, Wrt.—I. (II.) Finney

161A. Tragedy (4)
Lecture/discussion—3 hours; term paper. Persistent and changing aspects of the tragic vision in literature from ancient times to the present. GE credit: ArtHum, Wrt.

161B. Comedy (4)
Lecture/discussion—3 hours; term paper. Comic attitudes towards life in literary works of different ages. GE credit: ArtHum, Wrt.

163. Biography and Autobiography (4)
Lecture/discussion—3 hours; term paper. Portrayals of a human life in biographies and/or autobiographies of different countries and ages. Offered in alternate years. GE credit: ArtHum, Wrt.—II. (I.)

164A. The Middle Ages (4)
Lecture/discussion—3 hours; term paper. Readings in heroic epics, chivalric romances, and such major authors as Dante and Chaucer, with emphasis on shared assumptions concerning man's place in the world. GE credit: ArtHum, Wrt.—I.

164B. The Renaissance (4)
Lecture/discussion—3 hours; term paper. Readings in major authors such as Petrarch, Machiavelli, Erasmus, Montaigne, Rabelais, Cervantes, and Shakespeare, with particular emphasis on changing conceptions of the possibilities and limitations of man. GE credit: ArtHum, Wrt.—(I.) Schiesari

164C. Baroque and Neoclassicism (4)
Lecture/discussion—3 hours; term paper. Readings in major authors such as Calderón, Corneille, Pascal, Racine, Milton, and Grimmelshausen, with consideration of the tension between the expansive energies of the "baroque" and the restraints of dogma and reason. GE credit: ArtHum, Wrt.

164D. The Enlightenment (4)
Lecture/discussion—3 hours; term paper. Readings in major authors such as Swift, Voltaire, Rousseau, Sterne, and Kant, with emphasis on philosophical ideas and literary forms. GE credit: ArtHum, Wrt.—III. (III.)

165. Caribbean Literatures (4)
Lecture/discussion—4 hours. A comparative approach to the multi-lingual and multi-cultural literatures of the Caribbean. Works from English, French and Spanish speaking regions with special attention

given to problems of identity, diaspora and resistance, class, gender and race. GE credit: ArtHum, Div, Wrt.—III. (III.) Blanchard

166. Literatures of the Modern Middle East (4)
Lecture/discussion—4 hours. Study of major translated works in modern Middle East literature, including Turkish, Arabian, Palestinian-Arab, Israeli, and Persian contemporary writings. Discussion of social and historical formation, and special attention given to dissident and minority writers. GE credit: ArtHum, Div, Wrt.—I. (I.) Blanchard

166A. The Epic (4)
Lecture/discussion—3 hours; term paper. Study of various forms of epic poetry in both the oral and literary traditions. May be repeated for credit in different subject area. GE credit: ArtHum, Wrt.—(I.) Schein

166B. The Novel (4)
Lecture/discussion—3 hours; term paper. Readings in various forms of the novel such as the picaresque, the developmental, and the confessional, with emphasis on the evolution of the genre. May be repeated for credit in different subject area. GE credit: ArtHum, Wrt.—III. (III.)

167. Comparative Study of Major Authors (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Pivotal works of artists in the Western mainstream, such as Dante, Shakespeare, Cervantes, Goethe, Tolstoi, Proust, and Joyce. GE credit: ArtHum, Wrt.

168A. Romanticism (4)
Discussion—3 hours; term paper. Prerequisite: any introductory course in literature. Introduction to the Romantic movement with emphasis upon Romantic concepts of the self, irony, love, the imagination and artistic creativity, and the relationship of the individual to nature and society. GE credit: ArtHum, Wrt.—I. McLean

168B. Realism and Naturalism (4)
Discussion—3 hours; term paper. Prerequisite: consent of instructor. Novels and plays by Dickens, Zola, Flaubert, Dreiser, Ibsen, and Strindberg investigate marriage and adultery, the city and its perils, the hardships of industrialization, the war between the sexes, the New Woman, and other 19th-century themes. Offered in alternate years. GE credit: ArtHum, Wrt.—II.

169. The Avant-Garde (4)
Lecture/discussion—3 hours; term paper. Studies in movements such as surrealism, expressionism and the absurd. GE credit: ArtHum, Wrt.

170. The Contemporary Novel (4)
Lecture—3 hours; term paper. Study of important novels from different parts of the world, including Asia, Africa, Latin America, Europe, and the United States, in the period from the Second World War to the present. GE credit: ArtHum, Wrt.

180. Selected Topics in Comparative Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. Study of a selected topic or topics appropriate to student and faculty interests and areas of specialization of the instructor. May be repeated once for credit when the topic differs. GE credit: ArtHum, Wrt.

194H. Special Study for Honors Students (1-5)
Independent study—1-5 hours. Prerequisite: open only to majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis on a comparative topic. May be repeated for credit. (P/NP grading only.)

195. Seminar in Comparative Literature (4)
Seminar—3 hours; term paper. Prerequisite: junior standing and major in Comparative Literature, or consent of instructor. Advanced comparative study of selected topics and texts, with explicit emphasis on the theoretical and interpretive approaches that define Comparative Literature as a discipline and distinguish it from other literary disciplines. May be repeated once for credit when topic differs. Offered in alternate years.—(III.)

197T. Tutoring in Comparative Literature (1-5)
Discussion—2-4 hours. Prerequisite: upper division standing with declared major in Comparative Literature. Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with current courses offered by Comparative Literature. May be repeated for credit for a total of 6 units. (P/NP grading only.)

198. Directed Group Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

210. Topics and Themes in Comparative Literature (4)
Discussion—3 hours; term paper. Prerequisite: graduate standing in Comparative Literature, English, or a foreign-language literature, or consent of instructor. Comparative, interpretive study of the treatment of specific topics and themes in literary works from various periods, societies, and cultures, in light of these works' historical and sociocultural contexts. May be repeated for credit when topic differs.—III. (II.) Finney

214. Approaches to Lyric Poetry (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Analysis and interpretation of poetic texts in different historical periods and national literatures, with consideration of major theoretical developments in the understanding of poetic discourse. Offered in alternate years.—(III.) Schiesari

215. Forms of the Spiritual Quest (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor; knowledge of at least one foreign language. An exploration, culminating in a research paper, of changing forms of the quest for transcendence in different cultures, mainly in major works of Western literature, but also in other traditions and from the perspectives of other disciplines.

220. Literary Genres (4)
Discussion—3 hours; term paper. Prerequisite: graduate standing in Comparative Literature, English, or a foreign-language literature, or consent of instructor. Comparative literature of major works in a particular genre from various linguistic, national, and cultural traditions, with particular attention to historical developments within the genre and to genre theory. May be repeated for credit when topic differs.—I. Schein

238. Gender and Interpretation (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of how literary texts from different periods, societies, and cultures represent gender roles and gender hierarchy, building on recent work on gender in anthropology, literature, psychology, and women's studies.

250A. Research in Comparative Literature (4)
Individual instruction—1 hour. Individually guided research, under the supervision of a faculty member, in a comparative topic culminating in a term paper. Required of M.A. and Ph.D. candidates.—I, II, III. (I, II, III.)

250B. Research in Comparative Study of Author, Period, or Genre (4)
Individual instruction—1 hour. Individually guided research, under the supervision of a faculty member, in the specialized study of an individual author, historical period, or literary genre culminating in a term paper. Required of Ph.D. candidates.—I, II, III. (I, II, III.)

250C. Basic Research for the Dissertation (4)
Individual instruction—1 hour. Individually guided research, under the supervision of a faculty member, in preparation for the dissertation in Comparative Literature. Required of Ph.D. candidates.—I, II, III. (I, II, III.)

255. Colloquium (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing. Oral presentation and critique of research papers; discussion of current problems in teaching and research in Comparative Literature. May be repeated for credit. (S/U grading only.)—(II.)

260. Contexts of the 19th-Century Novel (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Development in 19th-century history, culture, and society in relation to major trends in the 19th-century novel. Offered in alternate years.—(III.)

298. Directed Group Study (1-5)
Prerequisite: graduate standing. (S/U grading only.)

299. Individual Study (1-12)
(S/U grading only.)

299D. Special Study for the Doctoral Dissertation (1-12)
(S/U grading only.)

Professional Courses

390. Teaching Comparative Literature in College (3)
Lecture—1 hour; discussion—2 hours. Methods of teaching Comparative Literature with specific application to the introductory courses 1, 2, and 3, in relation to major cultural and social developments. Discussion also of ways to teach analytical writing. (S/U grading only.)—I. (I.)

392. Teaching Internship in Comparative Literature (1)
Discussion—1 hour. Regular consultations between the student instructor teaching Comparative Literature courses and a supervisor. In-class evaluation of teaching. May be repeated for credit after consultation with supervisor. (S/U grading only.)—I, II, III. (I, II, III.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Comparative Literature (A Graduate Group)

Kari Lokke, Ph.D., Chairperson of the Group

Group Office, 522 Sproul Hall (530-752-2239)

Faculty

Marc Blanchard, Ph.D, Professor *(Comparative Literature, French)*
Margaret Ferguson, Ph.D., Professor *(English)*
Gail Finney, Ph.D., Professor *(Comparative Literature, German)*
Manfred Kusch, Ph.D., Senior Lecturer *(Comparative Literature, French)*
Neil Larsen, Ph.D., Professor *(Spanish)*
Kari Lokke, Ph.D., Associate Professor *(Comparative Literature, English)*
Harriet Murav, Ph.D., Professor *(Comparative Literature, Russian)*
Seth Schein, Ph.D., Professor *(Comparative Literature)*
Juliana Schiesari, Ph.D., Professor *(Comparative Literature, Italian)*
Robert Torrance, Ph.D., Professor *(Comparative Literature)*
Michelle Yeh, Ph.D., Professor *(East Asian Languages and Cultures)*

Graduate Study. The Comparative Literature Program offers the M.A. and Ph.D. degrees with a strong emphasis on individual research under the supervision of a faculty member. Candidates for the M.A. combine study of Comparative Literature with study of two literatures (one of which may be English or American) in the original languages. Ph.D.

candidates, in addition to further research of a comparative nature, study three literatures (one of which may be English and/or American) in the original languages, acquiring an extensive knowledge of the overall development of one. Within this framework, each student's program will be tailored to individual interests, and may center on a major historical period, such as the Renaissance or the modern age; a genre, such as lyric poetry, epic, drama, or the novel; or any other special emphasis approved by the Graduate Adviser.

Preparation. For admission to the Program, M.A. candidates should have an undergraduate major in literature and reading ability in one foreign language. Ph.D. candidates should have an undergraduate major in literature and reading ability in two foreign languages. The Group requires three letters of recommendation and a sample of recent written work, and it is recommended that students submit their GRE scores.

Graduate Adviser. S. Schein *(Comparative Literature),* J. Schiesari *(Comparative Literature).*

Comparative Pathology (A Graduate Group)

Dennis W. Wilson, D.V.M., Ph.D., Chairperson of the Group

Group Office, 1042 Haring Hall (530-752-2657)

http://www.vetmed.ucdavis.edu/pmi/comppath/homecp.htm

Faculty

Alex A. Ardans, D.V.M., M.S., Professor *(Medicine and Epidemiology)*
Barry A. Ball, D.V.M., Ph.D., Professor (Population Health and Reproduction)
Danika Bannasch, D.V.M., Ph.D., Assistant Professor *(Population Health and Reproduction)*
Peter A. Barry, Ph.D., Assistant Adjunct Professor *(Pathology and Oncology)*
Stephen W. Barthold, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Nicole Baumgarth, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Richard J. Bold, M.D., Assistant Professor *(Surgery)*
Robert H. BonDurant, D.V.M., Professor *(Population Health and Reproduction)*
Christopher Bowlus, M.D., Assistant Professor *(Internal Medicine)*
Walter M. Boyce, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Hilary A. Brodie, M.D., Ph.D., Professor *(Otolaryngology)*
Robert D. Cardiff, M.D. Ph.D., Professor *(Pathology)*
Mary Chang, Ph.D., M.S. Assistant Researcher *(Internal Medicine)*
Anthony T.W. Cheung, Ph.D., Professor *(Pathology)*
Bruno B. Chomel, D.V.M., Ph.D., Professor *(Population Health and Reproduction)*
Mary M. Christopher, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Alan J. Conley, D.V.M., Ph.D., Associate Professor *(Population Health and Reproduction)*
Patricia A. Conrad, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
James S. Cullor, D.V.M., Ph.D., Professor *(Population Health and Reproduction)*
Satya Dandekar, Ph.D., Professor *(Microbiology and Immunology)*
William G. Ellis, M.D., Professor *(Pathology and Oncology)*
Kent L. Erickson, Ph.D., Professor *(Human Anatomy)*
Thomas B. Farver, Ph.D., Professor *(Population Health and Reproduction)*
Lisle W. George, D.V.M., Ph.D., Professor *(Medicine and Epidemiology)*
Laurel J. Gershwin, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
M. Eric Gershwin, M.D., Professor *(Rheumatology)*
Sergi A. Grando, M.D., Ph.D., Professor *(Dermatology)*
Jeffrey Gregg, M.D., Assistant Professor *(Pathology)*
Clare R. Gregory, D.V.M., Professor *(Surgical and Radiological Sciences)*
Steve Haskins, D.V.M., M.S., Professor *(Surgical and Radiological Science)*
Ronald P. Hedrick, Ph.D., Professor *(Medicine and Epidemiology)*
Andrew G. Hendrickx, Ph.D., Professor *(Human Anatomy)*
Robert J. Higgins, B.V.Sc., M.Sc., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
William J. Hornof, D.V.M., M.S., Professor *(Population Health and Reproduction)*
Dallas M. Hyde, Ph.D., Professor *(Anatomy, Physiology, and Cell Biology)*
Rosyln-Rivkah Isseroff, M.D., Professor *(Dermatology)*
Lynelle Johnson, D.V.M. Ph.D., Assistant Professor *(Medicine and Epidemiology)*
James H. Jones, D.V.M., Ph.D., Professor *(Surgical and Radiological Sciences)*
Mark D. Kittleson, D.V.M., M.S., Ph.D., Professor *(Medicine and Epidemiology)*
Gerald J. Kost, M.D., Professor *(Pathology and Oncology)*
Andrew E. Kyles, B.V.M.S., Ph.D., Associate Professor *(Surgical and Radiological Sciences)*
Kenneth M. Lam, Ph.D., Professor *(Population Health and Reproduction)*
Kit S. Lam, M.D., Professor *(Internal Medicine)*
Bill Lasley, Ph.D., Professor *(Population Health and Reproduction)*
Richard A. LeCouteur, BVSc., Ph.D., Professor *(Surgical and Radiological Sciences)*
Rance B. LeFebvre, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Irwin K. Liu, D.V.M., Ph.D., Professor *(Population Health and Reproduction)*
Cheryl A. London, D.V.M., Ph.D., Assistant Professor *(Surgical and Radiological Sciences)*
Linda J. Lowenstine, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Paul A. Luciw, Ph.D., Professor *(Pathology and Oncology)*
Leslie A. Lyons, Ph.D, Assistant Professor *(Population Health and Reproduction)*
Melinda H. MacDonald, D.V.M., Ph.D., Assistant Professor *(Surgical and Radiological Sciences)*
N. James MacLachlan, BVSc., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Bruce R. Madewell, V.M.D., M.S., Professor *(Surgical and Radiological Sciences)*
John E. Madigan, M.S., D.V.M., Professor *(Medicine and Epidemiology)*
Sudesh P. Makker, M.D., Professor *(Pediatrics)*
Jonna A.K. Mazet, D.V.M., M.P.V.M., Ph.D., Associate Professor of Clinical Wildlife Health *(Medicine and Epidemiology)*
Michael B. McChesney, Ph.D., Associate Adjunct Professor *(Pathology and Oncology)*
Frederick J. Meyers, M.D., Professor *(Internal Medicine)*
Chris J. Miller, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
F. Charles Mohr, D.V.M., Ph.D., Associate Professor *(Pathology, Microbiology, and Immunology)*
Peter F. Moore, BVSC., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Linda Munson, D.V.M. Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Thomas W. North, Ph.D., Professor *(Molecular Biosciences)*
Bennie I. Osburn, D.V.M., Ph.D., Professor and Dean *(Pathology, Microbiology, and Immunology)*
Demosthenes Pappagianis, M.D., Ph.D., Professor *(Microbiology)*
Niels C. Pedersen, D.V.M., Ph.D., Professor *(Medicine and Epidemiology)*
Kent E. Pinkerton, Ph.D., Professor *(Anatomy, Physiology, and Cell Biology)*
Charles G. Plopper, Ph.D., Professor *(Anatomy, Physiology, and Cell Biology)*
Jerry S. Powell, M.D., Professor *(Anatomy, Physiology, and Cell Biology)*
Thomas P. Prindiville, M.D., Professor *(Internal Medicine)*
Dick L. Robbins, M.D., Professor *(Internal Medicine)*
Jose Eduardo P. Santos, D.V.M., Ph.D., Assistant Professor *(Population Health and Reproduction)*
Earl T. Sawai, Ph.D., Assistant Adjunct Professor *(Pathology)*
Kurt S. Schulz, D.V.M., M.S., Professor *(Surgical and Radiological Sciences)*
William M. Sishco, D.V.M., Ph.D., Associate Professor *(Population, Health and Reproduction)*
Jack R. Snyder, D.V.M., Ph.D., Professor *(Surgical and Radiological Sciences)*
Jay V. Solnick, M.D. Associate Professor *(Internal Medicine)*
Eugene P. Steffey, V.M.D., Ph.D., Professor *(Surgical and Radiological Sciences)*
Jeffrey L. Stott, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Susan M. Stover, D.V.M., Ph.D., Professor *(Anatomy, Physiology, and Cell Biology)*
Fern Tablin, V.M.D., Ph.D., Professor *(Anatomy, Physiology, and Cell Biology)*
Alice F. Tarantal, Ph.D., Professor *(Pediatrics)*
Jerold H. Theis, D.V.M., Ph.D., Professor *(Microbiology)*
Alain P. Theon, D.M.V., Ph.D., Professor *(Surgical and Radiological Sciences)*
Jose V. Torres, Ph.D., Professor *(Microbiology)*
Francisco Uzal, D.V.M., Ph.D., Assistant Professor of Clinical Diagnostic Pathology *(Pathology, Microbiology, and Immunology)*
P. Richard Vulliet, D.V.M., Ph.D., Professor *(Molecular Biosciences)*
Patricia S. Wakenell, D.V.M., Ph.D., Associate Professor *(Population Health and Reproduction)*
Jonathan Widdicombe, Ph.D., Professor *(Human Physiology)*
Jean A. Wiedeman, M.D., Ph.D., Professor *(Pediatrics)*
Dennis W. Wilson, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Erik R. Wisner, D.V.M., Professor *(Surgical and Radiological Science)*
Jian Wu, M.D., Ph.D., Assistant Adjunct Professor *(Internal Medicine)*
Reen W. Wu, Ph.D, Professor *(Internal Medicine)*
Tilahun Yilma, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Joseph G. Zinkl, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*

Affiliated Faculty

Carol J. Cardona, D.V.M., Ph.D., Assistant Agronomist/Assistant Cooperative, Specialist *(Population Health and Reproduction)*
Michelle Fanucchi, Ph.D., Assistant Research Cell Biology *(Anatomy, Physiology and Cell Biology)*
Janet Foley, D.V.M., Ph.D., M.S., Assistant Adjunct Professor *(Medicine and Epidemiology)*
Nicholas W. Lerche, D.V.M., M.P.V.M., Associate Adjunct Professor *(Medicine and Epidemiology)*
Marta L. Marthas, Ph.D., Assistant Adjunct Professor *(Pathology, Microbiology, and Immunology)*
Lisa Miller, Ph.D., Assistant Research Cell Biologist *(Anatomy, Physiology and Cell Biology)*
Edward S. Schelegle, Ph.D., Professor *(Anatomy, Physiology, and Cell Biology)*
Ellen E. Sparger, D.V.M., Ph.D., Assistant Adjunct Professor *(Medicine and Epidemiology)*
Michael Vajdy, Ph.D. Adjunct Clinical Assistant Professor *(Internal Medicine)*
Johanna L. Watson, D.V.M., Ph.D., Assistant Clinical Professor *(Medicine and Epidemiology)*
Michael Ziccardi, D.V.M., MPVM, Ph.D., Lecturer *(Pathology, Microbiology, and Immunology)*

Graduate Study. The Graduate Group in Comparative Pathology offers the M.S. and Ph.D. degrees for graduate study in disciplines concerned with disease processes. The group's focus is the study of the causes and nature of disease processes in

animals and humans, with major emphasis on the mechanisms responsible for the development of diseases at the level of organ systems, the cell, or subcellular mechanisms. The group brings a wide array of scientific knowledge to this study, so that students with divergent interests can be accommodated in programs designed for individual needs. Beyond core courses selected from disciplines such as anatomy, bacteriology, genetics, immunology, parasitology, pathology, physiology, and virology, course programs are intentionally flexible.

Preparation. This program is primarily for students who have a professional medical degree, i.e., D.V.M., M.D., D.D.S. Students without a professional degree will be considered if they have an especially strong background in basic biomedical sciences.

Graduate Adviser. R.B. Le Febvre *(Pathology, Microbiology, and Immunology),* S.M. Stover *(Anatomy, Physiology, and Cell Biology),* J.G. Zinkl *(Pathology, Microbiology, and Immunology).*

Computer Science

See Computer Science; Computer Science (A Graduate Group); Engineering: Computer Science; and Engineering: Electrical and Computer Engineering

Computer Science

(College of Letters and Science)

Daniel Gusfield, Ph.D., Chairperson of the Department

Department Office, 2063 Engineering II (530-752-7004)

http://www.cs.ucdavis.edu

Faculty. For complete faculty listing, please see Engineering: Computer Science.

The Major Program

The computer science major prepares students for careers involving the design of computer systems and their application to science, industry, and management.

The Program. Students taking this major receive solid grounding in fundamentals of computer languages, operating systems, computer architecture, and the mathematical abstraction required to use the computer in solving complex tasks. For students interested in the engineering aspects of computer science, see Engineering: Computer Science.

Preparatory Requirements. All continuing UC Davis students must meet the following requirements prior to requesting a change of major to computer science or double major with computer science:

1. Be a registered student at UC Davis at least one quarter prior to petitioning for change of major or double major.
2. Have completed the following courses or their equivalents:
   Mathematics 21A, 21B, 21C, 22A ... 15 units
   Computer Science Engineering 20, 30, 40, and either 50 or Electrical and Computer Engineering 70..... 16 units
3. Have a UC Davis grade point average of 2.75 or better in the courses listed above. Students who have completed courses at another institution equivalent to those listed above must have a grade point average of 3.0 or better in the equivalent course work. All courses must be taken for a letter grade.

Career Alternatives. The computer science program prepares students for advanced work in computer science or in other disciplines requiring advanced knowledge of the use of computers.

B.S. Major Requirements:

	UNITS
Preparatory Subject Matter	**52-56**
Mathematics 21A-21B-21C, 22A-22B	18
Statistics 32	3
Computer Science Engineering 20, 40	8
Computer Science Engineering 30	4
Computer Science Engineering 50 or Electrical and Computer Engineering 70	4
One series from the following four	15-19
(a) Chemistry 2A-2B-2C	
(b) Chemistry 2A-2B and Biological Sciences 1A	
(c) Chemistry 2AH-2BH-2CH	
(d) Physics 9A-9B-9C and Mathematics 21D	
Depth Subject Matter	**53**
Computer Science Engineering 110; 120 or 122B (completion of only 120 or 122B will satisfy the core requirement, but not a computer science elective simultaneously); 122A, 140A; 150, 154A-154B	28
Computer science electives. Minimum of 4 courses and a minimum of 13 units from Computer Science Engineering 120, 122B (completion of only 120 or 122B will satisfy the core requirement, but not a computer science elective simultaneously), 130, 140B, 142, 152A, 152B, 153, 158, 160, 163, 165A, 165B, 168, 170, 175, 177, 178, 188; one course (minimum of 3 units) from approved 192, 199; Electrical and Computer Engineering 180A, 180B, Mathematics 160 (completion of Mathematics 160 will satisfy either a computer science elective or a mathematics elective, but not both requirements simultaneously).	13
Mathematics electives. Mathematics 108; and one course from Mathematics 115A, 115B, 115C, 127A, 127B, 127C, 131 (or Statistics 131A), 141, 145, 147, 149A, 149B, 150A, 150B, 150C; and one upper division Mathematics course numbered below 188 except not 111	12
Total Units for the Major	**104-109**

Major Advisers. M. Franklin, V. Filkov, O. Staadt, N. Matloff, Z. Su.

Minor Program Requirements

	UNITS
Computer Science	**24**
Computer Science Engineering 50	4
Computer Science Engineering 110	4
Upper division Computer Science Engineering courses. Select from Computer Science Engineering 120, 122A, 122B, 130, 140A, 140B, 142, 150, 152A, 152B, 153, 154A, 154B, 158, 160, 163, 165A, 165B, 168, 170, 175, 177, 178, 189A-L, combined maximum of 3 units from approved 192 and 199 courses.	16

Graduate Study. See the Graduate Studies chapter of this catalog.

Computer Science (A Graduate Group)

Charles V. Martel, Ph.D., Chairperson of the Group

Group Office, 2063 Engineering II (Department of Computer Science) (530-752-7004; gradinfo@cs.ucdavis.edu)

http://www.cs.ucdavis.edu

Faculty

Demet Aksoy, Ph.D., Assistant Professor *(Computer Science)*
Zhaojun Bai, Ph.D., Professor *(Computer Science)*
Matthew Bishop, Ph.D., Associate Professor *(Computer Science)*
T.S. Chang, Ph.D., Professor *(Electrical and Computer Engineering)*
Harry Cheng, Ph.D., Associate Professor *(Mechanical and Aeronautical Engineering)*
Frederic Chong, Ph.D., Associate Professor *(Computer Science)*
Jesus DeLoera, Ph.D., Assistant Professor *(Mathematics)*
Prem Devanbu, Ph.D., Associate Professor *(Computer Science)*
Matthew Farrens, Ph.D., Associate Professor *(Computer Science)*
Gary Ford, Ph.D., Professor *(Electrical and Computer Engineering)*
Matthew Franklin, Ph.D., Associate Professor *(Computer Science)*
Michael Gertz, Ph.D., Assistant Professor *(Computer Science)*
Dipak Ghosal, Ph.D., Associate Professor *(Computer Science)*
Daniel Gusfield, Ph.D., Professor *(Computer Science)*
Bernd Hamann, Ph.D., Professor *(Computer Science)*
Mont Hubbard, Ph.D., Professor *(Mechanical and Aeronautical Engineering)*
Kenneth Joy, Ph.D., Professor *(Computer Science)*
Alan Laub, Ph.D., Professor *(Applied Science, Computer Science)*
Karl Levitt, Ph.D., Professor *(Computer Science)*
Kwan-Liu Ma, Ph.D., Associate Professor *(Computer Science)*
Charles Martel, Ph.D., Professor *(Computer Science)*
Norman Matloff, Ph.D., Professor *(Computer Science)*
Nelson Max, Ph.D., Professor *(Applied Science)*
E.O. Milton, Ph.D., Professor *(Mathematics)*
Prasant Mohapatra, Ph.D., Associate Professor *(Computer Science)*
Biswanath Mukherjee, Ph.D., Professor *(Computer Science)*
Bruno Olshausen, Ph.D., Associate Professor *(Psychology)*
Ronald Olsson, Ph.D., Professor *(Computer Science)*
Raju Pandey, Ph.D., Associate Professor *(Computer Science)*
Robert Redinbo, Ph.D., Professor *(Electrical and Computer Engineering)*
Todd Reed, Ph.D., Professor *(Electrical and Computer Engineering)*
David Rocke, Ph.D., Professor *(Graduate School of Management)*
Garry Rodrique, Ph.D., Professor *(Applied Science)*
Phillip Rogaway, Ph.D., Associate Professor *(Computer Science)*
Oliver Staadt, Ph.D., Assistant Professor *(Computer Science)*
Donald Topkis, Ph.D., Professor *(Graduate School of Management)*
Rao Vemuri, Ph.D., Professor *(Applied Science)*
Shih-Ho Wang, Ph.D., Professor *(Computer Science)*
Kent Wilken, Ph.D., Associate Professor *(Electrical and Computer Engineering)*
David Woodruff, Ph.D., Associate Professor *(Graduate School of Management)*
Felix Wu, Ph.D., Associate Professor *(Computer Science)*

Emeriti Faculty

Ralph Algazzi, Ph.D., Professor Emeritus
Meera Blattner, Ph.D., Professor Emeritus
S.L. Hakimi, Ph.D., Professor Emeritus
Peter Linz, Ph.D., Professor Emeritus
Manfred Ruschitzka, Ph.D., Professor Emeritus
Michael Soderstrand, Ph.D., Professor Emeritus
Richard Walters, Ph.D., Professor Emeritus

Graduate Study. The Graduate Group in Computer Science offers programs of study leading to the M.S. and Ph.D. degrees in Computer Science. The varied nature of the faculty brings a wide variety of research interests to the program. Research strengths lie in algorithms, computational biology, computer architecture, computer graphics and visualization, computer systems design, database systems, computer security and cryptography, computer networks, fault tolerance, program specifications and verification, programming languages and compilers, parallel and distributed systems, performance evaluation, robotics, scientific computation, and software engineering. Interdisciplinary research in computer science is encouraged.

Preparation. Normal preparation for the program is a bachelor's degree in either computer science or in a closely related field (such as electrical engineering or mathematics, with substantial course work in computer science). Applications are also considered from students with outstanding records in other disciplines. M.S. students may either complete a thesis or pass a comprehensive examination. Ph.D. students must pass preliminary written examinations in three areas of specialization as defined by the Graduate Group. Ph.D. students must also pass a qualifying oral examination and complete a dissertation demonstrating original research in an area approved by the Graduate Group.

Graduate Advisers. P. Devanbu, D. Ghosal, R. Pandey, K. Wilkin.

Conservation Biology

See Ecology (A Graduate Group); Environmental Biology and Management; and Wildlife, Fish, and Conservation Biology

Consumer Science

(College of Agricultural and Environmental Sciences)

Faculty. See under the Division of Textiles and Clothing.

Major Programs. The Consumer Food Science option under the Food Science major is a related program. See also Food Science and Technology, Nutrition, and Textiles and Clothing.

Graduate Study. For graduate study, see the Graduate Studies chapter of this catalog.

Courses in Consumer Science (CNS)

Questions pertaining to the following courses should be directed to the Division of Textiles and Clothing Advising Office, 133 Everson Hall.

Lower Division Courses

92. Internship in Consumer Science (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Internship on and off campus in a consumer science related area. (P/NP grading only.)

Upper Division Courses

100. Consumer Behavior (3)
Lecture—3 hours. Prerequisite: preparation in areas of psychology or sociology and economics recommended. Provides a set of behavioral concepts and theories useful in understanding consumer behavior on the part of the individual, business, and social organizations. Conceptual models to help guide and understand consumer research will be presented. GE credit: SocSci, Div, Wrt.

192. Internship in Consumer Science (1-12)
Internship—3-36 hours. Prerequisite: completion of a minimum of 84 units; consent of instructor. Internship on and off campus in a consumer science related area. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Course

299. Research (1-12)
(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Contemporary Leadership

(College of Agricultural and Environmental Sciences)

The Science and Society Program offers a minor in Contemporary Leadership, open to all undergraduate students regardless of major. The minor provides a broad overview of leadership theory and practice, and engages students in critical thinking, self-reflection, problem solving and multicultural education. Students should contact the minor adviser for course selection and plan approval.

	UNITS
Contemporary Leadership	**24**
Science and Society 130	4
Science and Society 192 concurrent with an approved internship	2
Science and Society 190X	2
One upper division course from each of the following four areas:	
Computer Science 188, English 107, Environmental Science and Policy 164, Military Science 143, Native American Studies 156, Nature and Culture 120, Philosophy 115, Religious Studies 150, Science and Society 120, Veterinary Medicine 170	4
Anthropology 139AN, Communication 130, 134, Community and Regional Development 172, 174, English 104, Linguistics 163, Military Science 131, Psychology 145, Sociology 126	4
American Studies 15, Anthropology 123BN, Community and Regional Development 152, 164, 173, Psychology 156, Sociology 30A, 156, 183, Women's Studies 140	4
American Studies 156, Community and Regional Development 176, English 179, History 173, 178, Political Science 166, 176, Sociology 130, 134, Textiles and Clothing 174	4

Minor Adviser. Consult Program Office.

Critical Theory

Julia Simon, Ph.D., Program Co-Director
Elizabeth Constable, Ph.D., Program Co-Director
Program Office, 611 Sproul Hall (530-752-5799)
http://crittheory.ucdavis.edu

Committee in Charge

Anna Marie Busse Berger, *(Music)*
Elizabeth Constable, Ph.D. *(French and Italian)*
Lynette Hunter, Ph.D. *(Theatre and Dance)*
Caren Kaplan, Ph.D. *(Cultural Studies)*
Sheldon Lu, Ph.D. *(Comparative Literature)*
Julia Simon, Ph.D. *(French and Italian)*
Leslie Rabine, Ph.D. *(Women and Gender Studies)*
David Simpson, Ph.D. *(English)*
George Wilson, Ph.D. *(Philosophy)*

Graduate Study. The program in Critical Theory offers study and research leading to the Ph.D. with a designated emphasis in Critical Theory. The program provides theoretical emphasis and interdisciplinary perspective to students already preparing for the Ph.D. in one of 13 participating departments (Anthropology, Comparative Literature, Education, English, French, German, History, Music, Philosophy, Psychology, Sociology, Spanish, and Theatre and Dance). Students complete all requirements for the Ph.D., including the dissertation, in one of the participating departments. Minimum coursework for the Critical Theory Designated Emphasis consists of four courses. The first three of these, Critical Theory 200A, 200B, and 200C form a coherent sequence and are normally taken in consecutive order. For the fourth course, students have the option of taking Critical Theory 201 or an approved course from their own department.

Graduate Adviser. Consult Critical Theory Program Office.

Courses in Critical Theory (CRI)

Upper Division Courses

101. Introduction to Critical Theoretical Approaches to Literature and Culture (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one upper division literature course or consent of instructor. Introduction to critical theory and its use for interpreting literary texts, film, and media forms in our present global culture. (Same course as Comparative Literature 141.) GE credit: ArtHum, Wrt.—III. (III.)

Graduate Courses

200A. Approaches to Critical Theory (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing in a participating program. The problem of interpretation in 20th-century thought with a critical overview of various theoretical approaches (e.g., semiotics, hermeneutics, deconstruction, social and cultural critique, feminist theory, psychoanalysis).—I, II, III. (I, II, III.)

200B. Problems in Critical Theory (4)
Seminar—3 hours; term paper. Prerequisite: course 200A with a grade of B+ or better. Focused study of a particular critical theoretical approach, school or perspective. Topics will vary. May be repeated for credit with consent of instructor when topic differs.—I, II, III. (I, II, III.)

200C. History of Critical Theory (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing in a program participating in the critical theory designated emphasis and successful completion of course 200A with a B+ or better. Critical analysis and discussion of pre-twentieth century theories of literary and cultural criticism. Topics will vary. May be repeated for credit when topic differs.—II. (II.)

201. Critical Theory Special Topics (4)
Seminar—3 hours; term paper. Prerequisite: course 200A. Application of theoretical principles to one specific research topic. May be repeated for credit

with consent of instructor when topic differs.—I, II, III. (I, II, III.)

202. Visual Culture (4)
Lecture/discussion—4 hours. Prerequisite: course 200A strongly recommended. Analysis of image production in the contemporary world (photography, film, television, advertising, etc.) and their effects on individual subjectivities and collective social identities.—II. (II.)

298. Directed Group Study (1-5)
299. Individual Study (1-12)
(S/U grading only.)

Crop Science and Management

(College of Agricultural and Environmental Sciences)

Faculty. See under Departments of Agronomy and Range Science; Agricultural and Resource Economics; Environmental Horticulture; Land, Air and Water Resources; Plant Pathology; Pomology; Vegetable Crops; and Viticulture and Enology.

Related Major Programs. The major relies on courses taught in conjunction with numerous other major programs, particularly Plant Biology, Agricultural Management and Rangeland Resources and Agricultural and Resource Economics.

The Major Program

The Crop Science and Management major trains students in biological and natural sciences and economics as they apply to the production, protection, and maintenance of crop plants, and their quality following harvest.

The Program. Students majoring in crop science and management spend the first two years of study developing the scientific and general background necessary for upper division work. The science courses include chemistry, biology, botany, physics, and mathematics. Management courses include economics and accounting. General background is provided by courses in the social sciences/humanities (English, rhetoric, and the general education program). At the upper division level, students take courses in areas supportive of crop science and farm management, such as entomology, weed science, water and soil science, plant pathology, nematology, plant physiology and agricultural economics. Students may specialize by electing courses pertinent to specific crop types (vegetables, fruits and nuts, small grains, or nursery crops).

Internships and Career Alternatives. This program prepares graduates for careers in farm management and various other technical and management positions in agricultural business and associated enterprises, such as banking and equipment and supply companies, as well as private, state and federal service in consulting and research. Graduates are also qualified to pursue graduate studies in sciences such as plant biology, horticulture, agronomy, agroecology, pest management, economics or business management. Internships are available in local companies involved in farm production and in extension work with farm advisers.

B.S. Major Requirements:

English Composition Requirement..... 8
See College requirement.

Preparatory Subject Matter 62-64
Biological Sciences 1A, 1B, 1C..... 15
Chemistry 2A, 2B, 8A, 8B..... 16
Mathematics 16A, 16B..... 6
Physics 1A-1B or 7A-7B..... 6-8
Agricultural Management and Rangeland Resources 21..... 3
Economics 1A, 1B..... 10
Agricultural Management and Rangeland Resources 120, Statistics 13 or 102..... 4
Applied Biological Systems Technology 49..... 2

Breadth/General Education 24
See General Education requirement and consult your adviser

Depth Subject Matter..... 57-60
Crop and Soil Science Component..... 22-24
Plant Biology 111 or Environmental Horticulture 102; Plant Biology 142; Soil Science 100; Hydrologic Science 110 or 124..... 14-16
In consultation with adviser select a minimum of 8 additional units from Agricultural Management and Rangeland Resources 110A, 110B, 110C, 110L, Environmental Horticulture 125, Plant Biology 173, 174, Viticulture and Enology 115, 116..... 8
Pest Management Component..... 16
Entomology 110, Nematology 100, Plant Biology 176, Plant Pathology 120 .. 16
Economics and Business Management Component..... 19-20
Agricultural and Resource Economics 100A, 130, 112 or 140..... 12-13
In consultation with adviser select a minimum of 7 additional units from Agricultural and Resource Economics 100B, 112, 113, 120, 136, 145, 147M, 150 or 157; International Agricultural Development 110, 111..... 7

Restricted Electives 10
In consultation with adviser select a minimum of 10 units from the following: Agricultural Management and Rangeland Resources 101, 105, 107, 112, 118, 120, 121, 122, 150, 170A, 170B, 192, 194H; Applied Biological Systems Technology 52; Entomology 119, 135; Environmental Horticulture 102, 105, 120, 125, 130; Plant Biology 111L, 112, 117, 121, 146, 152, 153, 154, 157, 158, 160, 171, 172, 172L, 175, 177, 196; Plant Pathology 125; Soil Science 109; Viticulture and Enology 101A, 101B, 101C, 110, 111, 118.

Unrestricted Electives..... 14-19
(Internship and Spanish Recommended)

Total Units for the Major 180
Major Adviser. T. DeJong.

Advising Center for the major is located in 1220A Plant and Environmental Sciences (530-752-1715).

Related Courses. See under Departments of Agronomy and Range Science, Agricultural and Resource Economics, Environmental Horticulture, Plant Biology, Plant Pathology, and Viticulture and Enology.

Courses in Crop Science and Management (CSM)

Lower Division Courses

92. Internship in Crop Science and Management (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Supervised internship in crop production, research or management. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

192. Internship in Crop Science and Management (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Supervised internship off or on campus in crop production, research or management; or in a business, industry, or agency associated with these or other crop science enterprises. (P/NP grading only.)

194H. Special Study for Honors Students (1-5)
Independent study—3-15 hours. Prerequisite: senior standing, Crop Science and Management major, overall GPA of 3.25 or higher, and consent of Master Adviser. Two or three successive quarters of guided research on crop science and management related subject of special interest to the student. (P/NP grading only; deferred grading only, pending completion of thesis.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Cultural Studies (A Graduate Group)

Caren Kaplan, Ph.D., Chairperson of the Group
Group Office, 3337 Hart Hall, (530-754-7683)
http://culturalstudies.ucdavis.edu

Committee in Charge

Carolyn de la Peña, Ph.D *(American Studies, Technocultural Studies)*
Susan Kaiser, Ph.D. *(Textiles and Clothing, Women and Gender Studies)*
Caren Kaplan, Ph.D. *(Women and Gender Studies)*
Anna Kuhn, Ph.D. *(Women and Gender Studies)*
Catherine Kudlick, Ph.D. *(History)*
Judith Newton, Ph.D. *(Women and Gender Studies)*
Evan Watkins, Ph.D. *(English)*

Faculty

Moradewun Adejunmobi, Ph.D., Assistant Professor *(African American and African Studies)*
Cynthia Brantley, Ph.D., Professor *(History)*
Katharine Burnett, Ph.D., Assistant Professor *(Art History)*
Patrick Carroll-Burke, Ph.D., Assistant Professor *(Sociology, Science and Technology Studies)*
Angie Chabram-Dernersesian, Ph.D., Professor *(Chicana/o Studies)*
Elizabeth Constable, Ph.D., Assistant Professor *(French, Italian)*
Sergio de la Mora, Ph.D., Assistant Professor *(Chicana/o Studies)*
Carolyn de la Peña, Ph.D., Assistant Professor *(American Studies, Technocultural Studies)*
Gail Finney, Ph.D., Professor *(Comparative Literature, German)*
Yvette Flores-Ortiz, Ph.D., Associate Professor *(Chicana/o Studies)*
Xiaojia Ge, Ph.D., Professor *(Human and Community Development)*
Gayatri Gopinath, Ph.D., Assistant Professor *(Women and Gender Studies)*
Laura Grindstaff, Ph.D., Associate Professor *(Sociology)*
Luis Guarnizo, Ph.D., Associate Professor *(Human and Community Development)*
William Hagen, Ph.D., Professor *(History)*
John R. Hall, Ph.D., Professor *(Sociology)*
Darrell Hamamoto, Ph.D., Professor *(Asian American Studies)*
Lynn Hershman, M.A., Professor *(Art Studio, Art History)*
Wendy Ho, Ph.D., Associate Professor *(Asian American Studies, Women and Gender Studies)*
Carole Joffe, Ph.D., Professor *(Sociology)*
Alessa Johns, Ph.D., Professor *(English)*
Suad Joseph, Ph.D., Professor *(Anthropology, Women and Gender Studies)*
Susan Kaiser, Ph.D., Professor *(Textiles and Clothing, Women and Gender Studies)*
Caren Kaplan, Ph.D., Professor *(Women and Gender Studies)*
Catherine Kudlick, Ph.D., Professor *(History)*
Anna Kuhn, Ph.D., Professor *(Women and Gender Studies)*
Neil Larsen, Ph.D., Professor *(Comparative Literature, Critical Theory)*

Dean MacCannell, Ph.D., Professor *(Environmental Design)*
Ross MacDonald, Ph.D., *(Science and Society)*
Dianne Macleod, Ph.D., Professor *(Art Studio, Art History)*
Jay Mechling, Ph.D., Professor *(American Studies)*
Linda Morris, Ph.D., Professor *(English)*
Judith Newton, Ph.D., Professor *(Women and Gender Studies)*
Jacob Olupona, Ph.D., Professor *(African American and African Studies)*
Beatriz Pesquera, Ph.D., Associate Professor *(Chicana/o Studies)*
Michele Praeger, Ph.D., Professor *(French, Italian)*
David Robertson, Ph.D., Professor *(English)*
Catherine Robson, Ph.D., Associate Professor *(English)*
Roger Rouse, Ph.D., Assistant Professor *(Anthropology)*
Margaret Rucker, Ph.D., Professor *(Textiles and Clothing)*
Jeffrey Ruda, Ph.D., Professor *(Art History)*
Michael Saler, Ph.D., Associate Professor *(History)*
Suzana Sawyer, Ph.D., Assistant Professor *(Anthropology)*
Seth Schein, Ph.D., Professor *(Comparative Literature)*
Barbara Sellers Young, Ph.D., Associate Professor *(Theatre and Dance)*
Karen Shimakawa, Ph.D., Associate Professor *(English, Asian American Studies)*
Carol A. Smith, Ph.D., Professor *(Anthropology)*
Michael L. Smith, Ph.D., Professor *(American Studies)*
Michael P. Smith, Ph.D., Professor *(Human and Community Development)*
Eric Smoodin, Ph. D., Professor *(American Studies)*
Blake Stimson, Ph.D., Assistant Professor *(Art History)*
Kathleen Stuart, Ph.D., Associate Professor *(History)*
Stanley Sue, Ph.D., Professor *(Psychology, Asian American Studies)*
Lenora Timm, Ph.D., Professor *(Linguistics)*
Patricia Turner, Ph.D., Professor *(African American and African Studies, American Studies)*
David Van Leer, Ph.D., Professor *(English)*
Clarence Walker, Ph.D., Professor *(History)*
Evan Watkins, Ph.D., Professor *(English)*
Karen Watson-Gegeo, Ph.D., Professor *(Education)*
Diane Wolf, Ph.D., Professor *(Sociology)*
Michelle Yeh, Ph.D., Professor *(East Asian Languages and Cultures)*

Graduate Study. The Cultural Studies Graduate Program offers both M.A. and Ph.D. degrees in Cultural Studies. The program emphasizes an interdisciplinary approach to cultural inquiry that includes analyses of intersecting categories such as class, gender, race, ethnicity, sexuality, nationality, and the like. Students entering the program will use and develop methodologies from many fields to suit their objects of study. Students may pursue research in the following designated areas: 1) gender (including masculinity studies), 2) sexualities, 3) comparative race studies, 4) media and popular cultural representation, 5) science and society, 6) transnational and global studies, 7) religions, communities, and politics, and 8) rhetoric and critical theory. Or, with the close guidance and supervision of a faculty committee, students may create their own areas of emphasis.

Preparation. Normal preparation for the program is a bachelor's degree in a related field. M.A. students must pass an examination. Ph.D. students must pass a qualifying examination, a comprehensive examination, and complete a dissertation demonstrating original research in an area approved by the Graduate Group. In addition to the standard UC Davis graduate application (which requires a statement of purpose), we also require three letters of recommendation, transcripts, GRE scores, writing sample (ten-page minimum, not exceeding twenty pages), fellowship application, and a 250 word statement explaining the applicant's interest in pursuing a degree in Cultural Studies.

Graduate Adviser. A. Kuhn *(Women and Gender Studies).*

Courses in Cultural Studies (CST)

200A. Histories of Cultural Studies (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Undergraduate coursework in the humanities or social sciences recommended. Histories and traditions of cultural studies internationally; multiple legacies of cultural studies as a field of inquiry in various geographical contexts; foregrounds important critical perspectives resulting from social and intellectual movements worldwide.—I. (I.)

200B. Theories of Cultural Studies (4)
Lecture/discussion—4 hours. Prerequisite: course 200A or consent of instructor. Definitions of "critical" scholarship and examination of various contexts in which cultural studies theory has emerged worldwide. Both mainstream and alternative theoretical traditions, such as those developed by people of color and by other minoritized groups.—II. (II.)

200C. Practices of Cultural Studies (4)
Lecture/discussion—4 hours. Prerequisite: courses 200A and 200B or consent of instructor. Methodological and practical applications of cultural studies research. Critical analyses of ethnography, textual analysis, social change, community development, and identity formation. Emphasis given to students' unique versions of cultural studies practices.—III. (III.)

204. History and Theory of Sexualities (4)
Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Studies of sexualities in feminist, literary, historical, and cultural studies research, specifically examining the emergence of "sexuality" as a field of research and the relationship of sexuality studies to cultural forms, subjectivity, and social relations generally. Not offered every year.—I. (I.)

206. Studies in Race Theory (4)
Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Theoretical framework for the critical study of race, drawing on contemporary cultural studies and postcolonial scholarship in order to understand the social production of "race" as a category for organizing social groups and determining group processes. Not offered every year.—II. (II.)

208. Studies in Nationalism, Transnationalism, and Late Capitalism (4)
Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Contemporary theories of nation, nationalism, postcolonialism, and transnationalism. Specific attention to the relationship between cultural production and the formation of ideas about nation and nationalism, including examination of both "legitimizing" and resistant discourses. Not offered every year.—III. (III.)

212. Studies in the Rhetorics of Culture (4)
Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Survey of critical and analytical approaches to the study of texts. Examination of multi-mediated objects to understand their cultural import by focusing on discursive production, dispersal, and reception processes, and related shifts in power relations. Not offered every year.—I. (I.)

214. Studies in Political and Cultural Representations (4)
Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) and consent of graduate adviser. Framework for the analysis of political and popular cultural representations. Emphasis on concepts, theories, and methodologies illuminating dominant and vernacular cultural representation, appropriation, and innovation in transnational contexts. May be repeated for credit up to 4 times when topic differs. Not offered every year.—II.

250. Research Seminar (4)
Seminar—4 hours. Prerequisite: courses 200A, 200B, 200C or consent of instructor. Designed to facilitate student interaction and promote student research by guiding students through the production of a publishable essay. Essays submitted, distributed, and discussed by seminar participants. May be repeated up to 12 units of credit.—I. (I.)

270A-270B-270C. Individually Guided Research in Cultural Studies (4-4-4)
Discussion—1 hour; independent study—2 hours; extensive writing. Prerequisite: course 200C, 250, consent of instructor. Individually guided research, under the supervision of a faculty member, on a Cultural Studies topic related to the student's proposed dissertation project to produce a dissertation prospectus.—I, II, III.

290. Colloquium (1)
Lecture—1 hour. Prerequisite: graduate standing or consent of instructor. Designed to provide cohort identity and faculty student exchange. Opportunity to present papers, hear guest lecturers, and see faculty presentations, gather for organizational and administrative news, exchange information, and make announcements. May be repeated up to 12 units of credit. (S/U grading only.)—I, II, III. (I, II, III.)

295. Special Topics (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Special topics courses offered according to faculty and student interests and demands. May be repeated for credit with consent of adviser.—I, II, III. (I, II, III.)

298. Group Research (1-5)
(S/U grading only.)

299. Directed Research (1-5)
(S/U grading only.)

299D. Dissertation Research (1-12)
Independent study—3-36 hours. Prerequisite: advancement to doctoral candidacy. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Dermatology

See Medicine, School of

Design

(College of Agricultural and Environmental Sciences)
Patricia Harrison, M. Arch., Chairperson, Design Program
Department Office, 142 Walker Hall (530-752-6223)
http://design.ucdavis.edu

Faculty

Richard Berteaux, B.Arch., M.S., Associate Professor
Dolph Gotelli, M.A., Professor
Patricia Harrison, M.Arch., Professor
Gyöngy Laky, M.A., Professor
Helge B. Olsen, Senior Lecturer
Susan Palmer, M.A., Lecturer
Kathleen L. Plummer, M.F.A., Lecturer
Victoria Z. Rivers, M.A.C.T., S.C.T., Professor
Barbara Shawcroft, M.F.A., Professor
Kathryn Sylva, M.F.A., Assistant Professor
D.R. Wagner, M.F.A., Lecturer
Peter B. Xiques, B.S., Lecturer

Emeriti Faculty

Frances Butler, M.A., Professor Emerita
Katherine W. Rossbach, M.A., Professor Emerita
JoAnn C. Stabb, M.A., Senior Lecturer Emerita

The Major Program

The design program offers a creative, challenging, and flexible approach to the study of design. The philosophy of the program encourages self-direction and independent thinking, not only in design work but also in planning the overall undergraduate education.

The Program. Foundation courses, Design and Visual Culture; Design Drawing; Design Media; and Visual Use of Computers in Design, are required of all design majors. Several foundation courses are offered only during summer sessions. Beyond these, students take courses in their depth subject matter emphasizing their interests. Students select one of three areas of emphasis to focus undergraduate study: *Textile and Costume Design, Interior Architecture,* or *Visual Communication and Presentation.* These areas can also be combined into a fourth area of emphasis, Comprehensive Design, through an individualized study plan developed with a faculty adviser. The selected emphasis determines the required core of courses; all emphases are complemented by classes in design history. A more detailed explanation is available through the Design Advising Office, 152 Walker Hall.

Portfolio. All students are required to submit a portfolio application to be admitted to the Design major. Portfolios are accepted once a year during February. Prospective students must contact the Advising Office at (530) 752-1165 for more information about the portfolio application process. In addition, students are required to keep a continuing portfolio of their creative work to be evaluated by faculty for the purposes of enrolling in overflow courses and requesting independent study, internship, or other similar courses.

Internships, Careers, and Study Abroad. As part of their preparation, design students are encouraged to supplement their education with internships in design firms, museums, art galleries, textile galleries, and in graphic designers', interior designers' and architects' offices. Design graduates go directly from this program into further graduate study, clothing, graphic design, interior design and architectural firms, exhibit and display work in galleries and museums, and theatrical and textile companies. In addition, students have become entrepreneurs through freelance and commissioned work in many related areas. The Design program encourages students to experience design abroad through a variety of sponsored programs. Contact the Education Abroad Program for more information.

B.S. Major Requirements:

UNITS

English Composition Requirement 4-12
See College requirement 0-8
English 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, or 104E 4

Preparatory Subject Matter 18
Select one course from Art History 1A, 1B, 1C or 1D 4
Design 1, 14, 15, 16 14

Breadth/General Education 24
See General Education requirement 24

Depth Subject Matter 54-60
Design 100 (optional) 4
One course from Design 40A or 40B 4
Three additional courses from Design 40A, 40B, 142A, 142B, 143, 144, 145; Art History 25, 110, 168, 184, 188A, 188B, 189 12

Select one area of specialization (option) below 38-40

Interior Architecture option 40
Design 21 (or equivalent) 4
Design 134A-134B-134C, 138, 180A-180B 24
Two courses from Design 121, 135A, 135B, 136, 139, 150A, 150B 8

Textile and Costume Design option 40
Lower division courses selected with adviser approval from Design 18, 23, 24, 77A, 77B 12
Upper division courses selected with adviser approval from Design 122, 124, 125, 127, 131, 132A, 132B, 132C, 160A, 160B, 170A, 170B, 177 28

Visual Communication and Presentation option 38-40
Three courses from Design 13, 18, 21, 22 10-12
Design 152, 153, 154, 156A, 156B, 156C 24
One upper division course from Design 4

Comprehensive Design option 40
Lower division Design courses with adviser approval 12
Upper division Design courses with adviser approval 28

Restricted Electives 32
Two courses from American Studies 1A, Anthropology 2, Communication 1, 3, Geology 1, Psychology 1, Sociology 1, 25 8-9
Courses selected from the list of Restricted Electives with approval of adviser 23-24

Unrestricted Electives 24-48

Total Units for the Degree 180

All classes for the major must be passed with a grade of C- or better. Minimum GPA for graduation is 2.5.

Additional Requirement
Development of a course of study, in consultation with an adviser, upon completion of 90 units or prior to transferring into the major.

Major Adviser. V. Rivers.

Graduate Study. The graduate program in Textile Arts and Costume Design leading to the Master of Fine Arts degree offers students opportunities for independent, creative, innovative interdisciplinary study combining design with anthropology, critical theory, consumer issues, art, engineering, the sciences and theater. Faculty work closely with students to build individual programs based upon a student's specialized goals and interests in textile and costume design. Study in new technologies and experimental approaches are encouraged. Areas of emphasis include constructed textiles (off loom and woven), surface design, computer-integrated textile design, and functional, ethnographic, and aesthetic costumes. The Textile and Costume Study Collection, which houses over 8,500 artifacts, is a valuable resource in enriching studies emphasizing multicultural expression. For information about specific requirements, please contact the Advising Center at (530) 752-1165.

Graduate Adviser. Please contact department at (530) 752-1165.

Courses in Design (DES)

Questions pertaining to the following courses should be directed to the instructor or to the Advising Office for the major, 152 Walker Hall (530-752-1165). Scheduling of classes is subject to change; please contact the Advising Office to confirm when a course is offered. For more courses in Textiles, see Textiles and Clothing.

Lower Division Courses

1. Design and Visual Culture (4)
Lecture—4 hours. Introduction to design awareness; role of designer in contemporary culture; emphasis on visual literacy and perception, creative problem solving, and design vocabulary. GE credit: ArtHum, Wrt.—I, summer. (I, summer.)

13. Photographic Media Studio (2)
Studio—4 hours. Prerequisite: course 1 recommended. Priority enrollment to Design majors. Photographic processes for the documentation of creative work and as the basis of visual communication.—summer. (summer.)

14. Design Drawing (2)
Studio—4 hours. Priority enrollment to Design majors. Students with a background in drawing or Advanced Placement Art Studio units are encouraged to submit a portfolio for review to waive this course. Develop freehand drawing skills to graphically communicate ideas and form. Basic skills in objective observation and representation. Range of media used.—summer. (summer.)

15. Design Media (4)
Lecture—2 hours; studio—4 hours. Priority given to Design majors. Understand color, composition and form as ways of communicating design concepts and content. Media and photography as tools for all design students: color theory and mixing, variety of materials and media, introduction to the camera.—summer. (summer.)

16. Visual Use of Computers in Design (4)
Lecture—2 hours; studio—6 hours. Prerequisite: courses 14, 15. Introduction to the computer as a visual design tool. Use of the Macintosh platform and exploration of specific software used in design. Practical instruction combined with theoretical perspective to investigate the impact of visual computing on the design process.—I, II, summer. (I, II, summer.) Sylva

18. Three-Dimensional Design (4)
Studio—8 hours. Principles of three-dimensional design through creative experimentation in a variety of media. Exploration of structural, perceptual, and spatial properties of form.

21. Drafting and Perspective (4)
Studio—8 hours. Prerequisite: course in drawing recommended. Creation of three-dimensional designs on two-dimensional surfaces.—summer. (summer.) Olsen

22. Visual Communication: Image and Type (4)
Studio—8 hours. Prerequisite: courses 13, 14, 15, 16 or consent of instructor. Priority given to Design majors. Presentation of the fundamentals of design. Specific focus will be on gestalt principles of design; balance and visual hierarchy; integration of text and image on the two-dimensional page; and introduction to typographic exploration using Macintosh platform.—III, summer. (III, summer.)

23. Personal Adornment (4)
Studio—8 hours; field trip. Exploration of the human image altered through ornament and its relation to the human structure.—I.

24. Hand Constructed Textiles (4)
Studio—8 hours; one or two field trips. Prerequisite: courses 14, 15. Contemporary approach to textile techniques of construction such as netting, plaiting, knotting and basketry.—II. (I.) Laky

40A. History of Design: Ancient through Industrial Revolution (4)
Lecture—4 hours. Prerequisite: course 1. Priority to Design majors. A social and stylistic history of design (crafts and industrial products, costume, architecture, landscape, graphics) up to the 19th century. Emphasis on changing methods of design and production in the 19th century. Field trip required. Not open for credit to students who have completed course 40 or course 140. GE credit: ArtHum, Wrt.—I, summer. (I, summer.)

40B. History of Modern Design (4)
Lecture—4 hours. Prerequisite: course 1; course 40A or art history through the 19th century recommended, or consent of instructor. Priority given to Design majors. Social and stylistic history of design (crafts and industrial products, costume, architecture, landscape, visual communication) from the mid-nineteenth century to the present. Emphasis on design reform and the growth of modernism in Europe and America. Field trip required. GE credit: ArtHum, Wrt.—II, summer. (II, summer.)

77A. Soft Product Development (4)
Studio—8 hours. Prerequisite: courses 14, 15 recommended. Basic theories and principles of soft product development from two-dimensional shapes to three-dimensional forms. Approaches include flat pattern, draping, as well as processes of joining and building. Structural development of clothing in relation to bodies is emphasized.—II, summer. (II, summer.)

77B. Soft Product Development (4)
Studio—8 hours. Prerequisite: course 77A. Study and practice of designing clothing for the human body through pattern development, draping, and structural joining sequences. Problems emphasize advanced theories and principles of soft product development.—III. (III.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Design, Creativity, and Fantasy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 and upper division standing or consent of instructor. To explore and develop personal creativity and imagination utilizing fantasy as a methodology for design. Examples of fantasy as found in the designed environment. Use of fantasy as problem solving tool in design. GE credit: ArtHum, Wrt.—III. Gotelli

113. Visual Communication: Digital Imaging (4)
Studio—6 hours; lecture—1 hour. Prerequisite: course 1, 13, 15, 16, and consent of instructor. Fundamentals of digital imaging for the field of design, combining theoretical perspectives with practical applications. Expansion of the use and meaning of the single photographic image through the use of collage techniques, image sequencing and the addition of text to alter the meaning of original photographs.—Sylva

121. Design Delineation (4)
Studio—8 hours; field trip. Prerequisite: courses 14, 15, and 21. Exploration of the process of delineation, including principles of perspective drawing, rapid visualization techniques (the quick sketch), rendering, and graphic presentation methods.—III. (III.) Olsen

122. Textile Structures: Two- and Three-Dimensional Constructions (4)
Studio—8 hours. Prerequisite: course 1, 23 or 24, or consent of instructor. Priority to Design majors. Advanced sculptural projects in hand-constructing textiles using flexible materials. Studio projects in experimental two- and three-dimensional forms addressing issues such as space, volume, movement and scale. Linear elements, textile patterning and modular constructions also included. Field trip required. Not open for credit to students who have completed course 124 prior to fall 2002.—(II.) Laky

124. Textile Structures: Architectural Concepts (4)
Studio—8 hours. Prerequisite: course 1, 18, 23, 24, 100 or 126A or Art 5 or consent of instructor. Priority to Design majors. The art and science of hand building textile structures using flexible and semi-rigid materials related to traditional architectural forms and principles. Sculptural textiles, textile architecture, construction and structure and three-dimensional form. Field trip required.—III. Laky

125. Structures in the Landscape (4)
Studio—8 hours. Prerequisite: course 18 or consent of instructor. Pass 1 restricted to Design and Landscape Architecture majors. Concepts and methods of built constructions in symbiotic relationships with the scale of the landscape. Large-scale geometric structures, using basic principles of design, are created by students. Use of recycled materials explored in detail.—III. (III.) Shawcroft

127. Critical Issues in Design and Art: Environmental Consciousness (4)
Lecture—2 hours; studio—4 hours. Prerequisite: course 1, Art 5 or Landscape Architecture 1 or consent of instructor. Analysis of responsible and sustainable design and art practice. Projects in visual and environmental arts addressing issues in renewable resources; working with nature, reuse/recycling, post-consumer products, reclamation, endangered sources, and new/alternative uses of products and materials. Required field trip.—II. (III.) Laky

131. Ethnographic Inspired Costume Design(4)
Studio—8 hours. Prerequisite: course 77A or consent of instructor; course 23 or 24 recommended. Priority given to Design and Textile and Clothing majors. Exploration of surface embellishments and structural techniques derived from historic and contemporary world cultures. Emphasis on unique qualities of handmade textiles/costumes and individual expression. Topics include mola and applique, piecing and quilting, beadwork, embroidery, and dimensional surfaces. Offered in alternate years.—(III.) Rivers

132A. Loom-Constructed Textile Design (4)
Studio—8 hours. Prerequisite: course 23 or 24. Foundation course in handwoven textile structure and design, emphasizing yarn identification, basic drafting, basic weaves and their derivatives explored in context of original color effects and yarn combinations.—I. (I.) Shawcroft

132B. Loom-Constructed Textile Design (4)
Studio—8 hours. Prerequisite: course 132A. Intermediate level study of complex fabric structure with emphasis on pattern in relation to surface, dimension, and material.

132C. Computer-Aided Textile Design (4)
Studio—8 hours. Prerequisite: course 132B. Microcomputer applications to the structure, design, and weaving of fabrics, emphasizing advanced compositions, drafting, and plotting of multi-dimensional, original weave structures.—II. (II.)

134A. Introduction to Interior Architecture (4)
Studio—8 hours; required field trips. Prerequisite: courses 14, 15, 21 and upper division standing. The design process through simple space planning problems focused on residential and small commercial spaces.—I. (I.) Olsen

134B. Introduction to Interior Architecture (4)
Studio—8 hours; required field trips. Prerequisite: course 134A. Problems in interior architecture emphasizing environmentally conscious design concepts and issues. Includes thermal comfort, issues in sustainable design, reduction of waste, "green materials," and resource recycling.—II. (II.) Berteaux

134C. Introduction to Interior Architecture (4)
Studio—8 hours; required field trips. Prerequisite: course 134B. Focus on technical environments such as laboratories, medical facilities, child care facilities, school facilities, computer installations. Includes instruction in model making and presentations in the form of models or photographic presentations derived from computer modeling.—III. (III.) Harrison

135A. Furniture Design (4)
Studio—8 hours; required field trip. Prerequisite: course 21; course 134A recommended. Development of designs for contemporary furniture. Consideration of behavioral and physical requirements, cultural and historic expression, and structural and aesthetic qualities. Process includes research, drawings, and construction of scale models.—II. (II.) Olsen

135B. Furniture Design (4)
Studio—8 hours; required field trip. Prerequisite: course 135A or consent of instructor. Design and construction of full size prototype furniture based on preliminary work completed in course 135A. Material technology, construction methods, and finishes discussed. Process includes development of shop drawings and furniture construction.—III. (III.)

136. Recording Historic Structures (4)
Studio—8 hours; field trip required. Prerequisite: courses 14, 15, and 21 or the equivalent. A studio course of individual and group projects that introduces students to historic preservation. A major component of the course is on-site study of a historic building and the production of measured drawings. Offered in alternate years.—(III.) Berteaux

138. Materials and Specifications for Interior Architecture (4)
Lecture/discussion—3 hours; fieldwork—1 hour; field trip required. Prerequisite: courses 1, 14, 15, or consent of instructor. Priority to Design majors. The range of construction and finish materials and specifications used in interior architecture, and their specific properties and limitations; provide base of supplemental information for use in studio courses. Offered in alternate years.—I.

139. Contemporary Furnishings (4)
Lecture—4 hours. Prerequisite: courses 1, 14 and 15 or consent of instructor. Priority to Design majors. Investigation of design principles in contemporary furniture for commercial and residential environments; development of contemporary design philosophy as represented in stylistic content; ergonometric and environmental design considerations in furnishings; furnishings for specialized environments. Two field trips required. Offered in alternate years.—(I.) Harrison

142A. World Textiles: Far East and Pacific (4)
Lecture—4 hours. Prerequisite: course 132A, 132B, 160A or 170A (may be taken concurrently); course 1, Art History 1A, 1B, or 1C recommended. Textile arts of Japan, China, Africa, India, Oceania, Indonesia, the Pacific Islands, and Central Asia with emphasis on the aesthetic and stylistic qualities of textiles from these cultures. GE credit: ArtHum, Wrt.—I. (I.) Rivers

142B. World Textiles: Middle East, Europe and the Americas (4)
Lecture—4 hours; two field trips. Prerequisite: course 1; a studio class highly recommended: course 24, 124, 131, 132A, 132B, 160A-160B-160C or 170A-170B-170C (concurrently). Study of concepts and methods significant in the historical, social, aesthetic and stylistic development of the textile arts. GE credit: ArtHum, Wrt.—I. (III.)

143. History of Costume Design (4)
Lecture—4 hours; field trip. Prerequisite: Art History 1A or the equivalent; background in art or design history recommended. History of costume design from the earliest times to the present with emphasis on both aesthetic and functional aspects. GE credit: ArtHum, Wrt.—II. (II.)

144. History of Interior Design (4)
Lecture—4 hours. Prerequisite: course 40A or 40B; Art History 1C recommended. Priority to Design majors. History of interior design in Europe and America from the classical period to modern times. Emphasis on the dwelling in its cultural setting and the development of the theory of modern interior design. One all-day field trip required. GE credit: ArtHum, Wrt.—III. (III.)

145. History of Visual Communication (4)
Lecture—4 hours. Prerequisite: Art History 1A, 1B, or 1C, course 1; course 40 recommended. Priority given to Design majors. Historical developments of visual communication, concentrating on the technological and aesthetic development of graphic design; origins and manifestations of current issues in visual communication; provide framework for analysis of current and future trends in visual communication. Offered in alternate years.

150A. Computer-Assisted Drawing for Designers (4)
Lecture—2 hours; studio—4 hours. Prerequisite: course 21 or consent of instructor. Priority to Design majors. Computer assisted drawing and modeling using a mid-level, multi-use CAD program. Basic architectural drawing and modeling technique in both two-dimensional and three-dimensional CAD environments. Not open for credit to students who have completed course 150.—I, II, summer. (I, II, summer.) Xiques

150B. Computer-Assisted Presentations for Interior Architecture (4)
Lecture—2 hours; studio—4 hours. Prerequisite: course 16 and 150A or consent of instructor. Priority to Design majors. Computer-assisted architectural presentation including the development of complex 3D models, techniques of photo-realistic rendering

and computer simulation of movement through architectural and interior space.—III. (III.) Xiques

152. Visual Communication: Graphic Design Production (4)
Studio—8 hours. Prerequisite: course 22 or consent of instructor. Priority given to Design majors. Symbolism and representation as essential to the development of effective logos and identity systems. The need to incorporate these design strategies within the context of computer-generated prepress limitations. Not open for credit to students who have completed course 152A.—I. (I.) Sylva

153. Visual Communication: Internet and Interactive Design (4)
Studio—8 hours. Prerequisite: course 22 or consent of instructor; course 152B highly recommended. Priority given to Design majors. Introduction to computer-based interactive design for World Wide Web, Intranet systems, CD-ROM, or kiosks. Emphasis in development of strategies for content development; visual cohesiveness between content and interface design; and graphic production techniques using Macintosh platform.—II, summer. (II, summer.)

154. Visual Communication: Message Campaign Design (4)
Studio—8 hours. Prerequisite: course 22 or consent of instructor; course 152 recommended. Priority to Design majors. Exploration of the power of visual media to change public opinion on issues of social concern and human rights through analysis and application of strategies used in advertising. Not open for credit to students who have completed course 152B.—III. (III.) Sylva

156A. Visual Presentation: Exhibition Design (4)
Studio—8 hours; field trips required. Prerequisite: course 14, 15, or consent of instructor. Priority to Design majors. Design and placement of objects in spatial relationships that enhance non-verbal communication. Three-dimensional design in the museum and gallery environment. Not open for credit to students who have completed course 126B.—II. (I.) Gotelli

156B. Visual Presentation: Visual Merchandising (4)
Studio—8 hours; field trips required. Prerequisite: course 14 and 15 or consent of instructor. Priority to Design majors. Design and placement of objects in spatial relationships that enhance non-verbal communication. Three-dimensional design as visual merchandising. Not open for credit to students who have completed course 126A.—I, summer. (II.) Gotelli

156C. Visual Presentation: Installation and Design (4)
Studio—8 hours; field trips. Prerequisite: course 156A and 156B or consent of instructor. Advanced principles and practice of visual communication of ideas through non-verbal presentations. The study of three-dimensional objects in a spatial context with an emphasis on self-expression and alternative exhibition spaces. Not open for credit to students who have completed course 126C.

160A. Textile Design: Patterning and Resists (4)
Studio—8 hours. Prerequisite: course 1, 14, 15 or the equivalent; course 77A recommended. Priority to Design and Textiles and Clothing majors. Exploration of the design, dyeing, and patterning of hand-printed textiles; emphasis on the unique qualities of the individual producer. Techniques include tie dye, direct dyeing and paste resist using indigo and fiber reactive dyes. Up to two field trips required.—I. (I.) Rivers

160B. Textile Design: Screen Printing and Advanced Technique (4)
Studio—8 hours. Prerequisite: course 160A. Priority to Design and Textiles and Clothing majors. Exploration of the designing, dyeing, and patterning of hand-printed textiles; emphasis on the unique qualities of the individual producer and entrepreneurship in textile design. Techniques include silk screen printing, photo silk screen, and advanced dyeing processes. Up to two field trips required.—III. (III.) Rivers

170A. Costume Design (4)
Studio—8 hours; required field trip. Prerequisite: courses 1, 14, 15, 77B (or the equivalent); course 142A taken concurrently recommended. Open to Design and Textiles and Clothing majors. Exploration of costume design as an expression of contemporary and projected individual image. Emphasis on one-of-a-kind garments in relationship to surface design and archetypal forms.—I. (I.)

170B. Apparel Design (4)
Studio—8 hours; required field trip. Prerequisite: courses 77B, 170A. Exploration of apparel design processes for industry within the social and physical context. Emphasis on two-dimensional conceptualization of ideas utilizing commercial textiles for ready-to-wear.—II. (II.)

177. Apparel Design for Consumer Cultures (4)
Studio—8 hours. Prerequisite: course 170B. Principles and processes of designing apparel for various user groups. The relationship among clothing, the body, and the environment is addressed in meeting functional and aesthetic concerns.

180A. Advanced Interior Architecture (4)
Studio—8 hours; field trip. Prerequisite: course 134C and senior standing. Advanced problems in interior architectural design emphasizing re-use of existing buildings. Focus is on commercial and retail environments, code requirements, color and lighting.—I. (I.) Berteaux

180B. Advanced Interior Architecture (4)
Studio—8 hours; field trip. Prerequisite: course 180A. Advanced problems in interior architectural design emphasizing space planning for corporate and institutional environments.—II. (II.) Harrison

180C. Senior Project in Interior Architecture (4)
Studio—8 hours. Prerequisite: course 180B, 193A; course 193B concurrently. A comprehensive design project defined and carried out individually by each student as a senior project, working from a detailed program developed winter quarter of a subject in interior architecture of special interest to the student.

190. Proseminar (1)
Seminar—1 hour. Prerequisite: design major or consent of instructor. Philosophies of design explored through discussion and presentation of research results. May be repeated three times for credit. (P/NP grading only.)

191A-D. Workshops in Design (4-12)
Seminar—1 hour; studio or field experience—3 hours per unit (units determined by instructor and student); field trip. Prerequisite: course 14, 15; upper division standing and consent of instructor. Faculty initiated workshops featuring advanced studies and applications of original work in Design: **(A)** Costume; **(B)** Environment; **(C)** Graphics; **(D)** Textiles. Credit limited to 12 units in one section or a combination of sections. Letter grading by contract.

192. Internship (1-6)
Internship—3–18 hours. Prerequisite: completion of 84 units and consent of instructor. Supervised internship, off and on campus, in areas of design including environmental, costume, textile, museum, display and interior design. Enrollment limited to 3 units per quarter or 6 units per summer session. (P/NP grading only.)

197T. Tutoring in Design (1-5)
Discussion—3-15 hours. Prerequisite: upper division standing and consent of instructor. Leading of small discussion groups or studio meetings affiliated with one of the department's regular courses. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

199. Special Study of Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

221. Experimental Approaches to Textile and Costume Design Media and Methods (4)
Lecture/discussion—2 hours; seminar—1 hour; term paper required. Prerequisite: graduate standing in Textile Arts and Costume Design or consent of instructor. Covers perspectives on theoretical and aesthetic issues such as methodology in historical, contemporary and ethnographic fiber/fabric media. Students apply theories to their creative explorations for presentation and discussion.

222. Seminar in Costume and Textile Design Criticism (4)
Seminar—3 hours; independent study. Prerequisite: course 221, graduate standing in Textile Arts and Costume Design or consent of instructor. Criticism and communication in relation to creative work in textile arts and costume design through seminar, readings, field trips and discussion. May be repeated twice for credit.—II.

224. Seminar in Textile and Costume Design Research (4)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 222; to be taken concurrently with course 142A (fall), 142B (spring) or 143 (winter) with separate discussion section; graduate standing in Textile Arts and Costume Design or consent of instructor. Required of first-year students. Students utilize existing historical and ethnographic materials as a point of departure for creative work through research and examination of textile/costume specimens with oral and written presentation of findings. May be repeated for credit.—III. (I.) Rivers

290. Seminar in Design (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Selected topics in design methodology, research, communication, and education. May be repeated for credit.—III. (III.)

292. Practicum in Textile Arts/Costume Design (1-12)
Prerequisite: graduate standing in Textile Arts and Costume Design or consent of instructor. Interaction with a working professional in the student's field of interest to apply theories and concepts to working practice. (S/U grading only.)

298. Directed Group Study for Graduate Students (1-5)
Studio. Prerequisite: consent of instructor. (S/U grading only.)

299. Individual Focused Study (1-12)
Prerequisite: graduate standing in Textile Arts and Costume Design or consent of instructor. Advanced study in studio practice on independent projects with faculty consultation. May be repeated for credit.

299D. Project Concentration (1-12)
Prerequisite: graduate standing in Textile Arts and Costume Design or consent of instructor. A minimum of 22 units must be taken in Project Concentration and Individual Focused Study. Student creates a body of original work at a professional level, with written and visual documentation of process and concepts underlying the project, culminating in public presentation. May be repeated for credit. (S/U grading only.)—III. (III.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Dietetics

See Clinical Nutrition

Dramatic Art

See Theatre and Dance

Earth Sciences

See Environmental and Resource Sciences; Geology; Hydrologic Sciences (A Graduate Group); Hydrology; Soil and Water Science; and Soil Science

East Asian Languages and Cultures

(College of Letters and Science)

————, Chairperson of the Department

Department Office, 522 Sproul Hall (530-752-0830)

http://chinese.ucdavis.edu
http://japanese.ucdavis.edu

Faculty

Robert Borgen, Ph.D., Professor *(Japanese, History)*
Chia-ning Chang, Ph.D., Associate Professor *(Japanese)*
Xiaomei Chen, Ph.D., Professor *(Chinese)*
Mark Halperin, Ph.D., Assistant Professor *(Chinese)*
Noriko Iwasaki, Ph.D., Assistant Professor *(Japanese)*
Kyu Hyun Kim, Ph.D., Assistant Professor *(Japanese, History)*
Michelle Yeh, Ph.D., Professor *(Chinese)*

Emeriti Faculty

Donald A. Gibbs, Ph.D., Professor Emeritus
Key H. Kim, Ph.D., Professor Emeritus
Benjamin E. Wallacker, Ph.D., Professor Emeritus

Affiliated Faculty

Kazue Chavez, Lecturer *(Japanese)*
David Fahy, Lecturer *(Japanese)*
Steve Liu, Lecturer *(Chinese)*
Haruko Sakakibara, Lecturer *(Japanese)*
Ritsuko Shigeyama, Coordinator *(Japanese)*
Miyo Uchida, Lecturer *(Japanese)*

The Major Program

The department offers a core language program in both Chinese and Japanese and courses in literature and culture. The core language program in Chinese has two tracks: one for students who have no background whatsoever and one for students with prior language background.

The Program. A student elects to major in either Japanese or Chinese. Practical language skills are taught using the most modern methods so that upon entering the upper division a student will have attained substantial fluency in the spoken language (hearing and speaking) and the written language (reading and writing). Upper division courses balance the need to further language skills with the need to understand and appreciate the cultural richness of either Chinese or Japanese civilization. All students are encouraged to combine their study of Japan's or China's language and literature with courses in related fields, and to study abroad through the Education Abroad Program, the UC International Summer Session programs, or through internships.

Career Opportunities. UC Davis graduates have learned that a major in Chinese or Japanese is a genuine, earned distinction that facilitates entrance to graduate programs and professional schools. In addition, job opportunities abound in virtually all career paths, especially for those who have completed study abroad.

Chinese

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 19/34
Chinese 1, 2, 3, 4, 5, 6; or 1BL, 2BL, 3BL; or 1CN, 2CN, 3CN; and one 4-unit lower division Chinese literature course.

Recommended:
Chinese 10, 11, 50, Comparative Literature 14, Japanese 10, Linguistics 1, History 9A.

Depth Subject Matter..... 36
Chinese 106, 107, 111, 112, 113, 114 24
Three courses selected from Chinese 104, 105, 108, 109A-I, 110, 115, 116, 120, 130, 131, 132, 140, 160 12

Recommended:
Japanese 101, 102, 103, 104, 105, 106; Anthropology 148A-148B; Art History 163A-163B; East Asian Studies 113; History 191A-F; Religious Studies 172; or other advanced literature and culture courses selected in consultation with the undergraduate adviser.

Total Units for the Chinese Major 55/70

Japanese

A.B. Major Requirements:

Preparatory Subject Matter 15/30
Japanese 1, 2, 3, 4, 5, 6

Recommended:
Japanese 10, 15, 25, Chinese 10, 11, 50, Linguistics 1, History 9B.

Depth Subject Matter..... 40
Japanese 101, 102, 103, 111, 112, 113... 24
Eight units selected from Japanese 104, 105, 106, 107, 108, 109, 115, 131, 132, 133, 134, 135, 136, 141 8
Eight units selected from Chinese 104, 105, 106, 107, 108, 109A–I, 110; Anthropology 149A-149B; Art History 164; Comparative Literature 153; History 194A-194B-194C; Religious Studies 170, 172; or other advanced literature and culture courses selected in consultation with the undergraduate adviser 8

Total Units for the Japanese Major 55/70

Major Advisers. C.N. Chang, R. Borgen *(Japanese),* M. Yeh *(Chinese).*

Minor Program Requirements:

Minors are offered in Chinese and in Japanese for students wishing to follow a formally recognized program of study in those languages and their literatures.

UNITS

Chinese..... 20

Japanese 20
All upper division courses, including both language courses and literature in translation courses, may be used to meet this requirement. One approved lower division course (Chinese 10, 11, 50; Japanese 10, 25, 50) may also be used. In addition, students must demonstrate their language proficiency, normally through completion of Chinese 111 or Japanese 111. Only four units from 192, 197T, 198, and 199 may be applied to the minor. For details, consult the undergraduate advisers.

Education Abroad Program. The university maintains study abroad programs in China, Japan, Hong Kong, and Taiwan. They offer excellent opportunities for students to polish their language skills and experience Asian cultures firsthand. Students are encouraged to participate. Appropriate courses taken abroad can be applied toward the major or the minor. For details, see the department's undergraduate adviser and the Education Abroad Program office.

Related Courses. See East Asian Studies course list.

Prerequisite Credit. No student may repeat a course if that course is a prerequisite for a course that has already been completed with a grade of *C–* or better.

Placement. Chinese 1 and Japanese 1 are intended for beginning students with no prior knowledge of those languages. Students who do have some knowledge but wish to improve their skills should meet with one of the advisers to discuss appropriate placement. Students must follow departmental guidelines for placement in all language courses and instructor approval is required for enrollment.

Backtracking. Satisfactory completion of a language course is evidence that a student's language skills are beyond the level of those expected in its prerequisite courses. Accordingly, students who have completed a language course cannot go back and take its prerequisites. If the prerequisite courses are required for the major, students may substitute other courses. Students who are not sure how this requirement applies to them should speak to the undergraduate adviser.

Waived Language Courses. Students with exceptional language ability may waive required language course. If lower division courses have been waived, students will not have to take courses in their place. If upper division courses have been waived, students can use other appropriate courses to earn the units they need to complete the major. Consult the undergraduate adviser regarding selection of appropriate courses.

Courses in Chinese (CHN)

Lower Division Courses

1. Elementary Chinese (5)
Lecture/discussion—5 hours. Introduction to Chinese grammar and development of all language skills in a cultural context with special emphasis on communication. (Students who have successfully completed Chinese 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.)—I. (I.)

1BL. Accelerated Written Chinese I (5)
Lecture—5 hours. Prerequisite: ability to speak and understand oral Chinese (Mandarin or dialect). Designed for students who already have some degree of fluency in spoken Chinese, but who cannot read Chinese characters. Concentrates on developing reading ability and accelerates progress to upper division. Not open for credit to students who have completed course 8. (Former course 8.)—I. (I.)

1CN. Mandarin for Cantonese Speakers I (5)
Lecture—5 hours. Prerequisite: ability to read and write Chinese characters at the elementary school level. Accelerated training in spoken Mandarin, particularly in the phonetic transcription system known as pinyin, for students who already can read and write Chinese. Course assumes no knowledge of spoken Mandarin Chinese. Not open for credit to students who have completed course 7. (Former course 7.)—I. (I.)

2. Elementary Chinese (5)
Lecture/discussion—5 hours. Prerequisite: course 1. Continuation of course 1 in the areas of grammar and basic language skills.—II. (II.)

2BL. Accelerated Written Chinese II (5)
Lecture—5 hours. Prerequisite: course 1BL. Continuation of course 1BL. Designed to accelerate the progress of students who already know spoken Mandarin or a dialect but cannot read or write Chinese characters. Not open for credit to students who have completed course 18. (Former course 18.)—II. (II.)

2CN. Mandarin for Cantonese Speakers II (5)
Lecture—5 hours. Prerequisite: course 1CN. Continuation of course 1CN. Training in spoken Mandarin for students who already can read and write Chinese. Not open for credit to students who have completed course 17. (Former course 17.)—II. (II.)

3. Elementary Chinese (5)
Lecture/discussion—5 hours. Prerequisite: course 2. Continuation of course 2. Completion of grammar sequence and continuing practice of all language skills.—III. (III.)

3BL. Accelerated Written Chinese III (5)
Lecture—5 hours. Prerequisite: course 2BL. Advanced written styles and syntax in Chinese. Students completing this course proceed to course 111, which starts the third-year Chinese, or to some other appropriate upper-division course. Not open for credit to students who have completed course 28. (Former course 28.)—III. (III.)

3CN. Mandarin for Cantonese Speakers III (5)
Lecture—5 hours. Prerequisite: course 2CN. Continuation of course 2CN. Prepares students for entering upper division courses in Chinese. Not open for credit to students who have completed course 27. (Former course 27.)—III. (III.)

4. Intermediate Chinese (5)
Lecture/discussion—5 hours. Prerequisite: course 3 or the equivalent. Intermediate-level training in spoken and written Chinese in cultural contexts, based on language skills developed in course 3.—I. (I.)

5. Intermediate Chinese (5)
Lecture/discussion—5 hours. Prerequisite: course 4 or the equivalent. Intermediate-level training in spoken and written Chinese in cultural contexts, based on language skills developed in course 4.—II. (II.)

6. Intermediate Chinese (5)
Lecture/discussion—5 hours. Prerequisite: course 5 or the equivalent. Intermediate-level training in spoken and written Chinese in cultural contexts, based on language skills developed in course 5.—III. (III.)

10. Modern Chinese Literature (In English) (4)
Lecture—3 hours; discussion—1 hour. Introductory course requiring no knowledge of Chinese language or history. Reading and discussion of short stories and novels and viewing of two films. Designed to convey a feeling for what China has experienced in the twentieth century. GE credit: ArtHum, Div, Wrt.—II. (II.)

11. Great Books of China (in English) (4)
Lecture—3 hours; discussion—1 hour. Selected readings in English translation are supplemented with background information on periods, authors and the interrelationships of culture, literature and social change. Methods of analysis are introduced and applied in class discussions. GE credit: ArtHum, Div, Wrt.—II. (II.)

50. Introduction to the Literature of China and Japan (3)
Lecture—3 hours. Methods of literary analysis and their application to major works from the various genres of Chinese and Japanese literature (in translation), including film. East Asian cultural traditions will also be introduced. (Same course as Japanese 50.) GE credit: ArtHum, Div, Wrt.—II. (II.) Yeh

98. Directed Group Study (1-5)
(P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

104. Twentieth-Century Chinese Fiction (in English) (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or a course in Chinese history recommended. English language survey of Chinese fiction as it evolved amidst the great historical, social and cultural changes of the twentieth century. Thorough study of the most influential writers and genres. GE credit: ArtHum, Div, Wrt.—I. (I.)

105. Western Influences on Twentieth-Century Chinese Literature (in English) (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or History 9A recommended. Introduction of Western literary thought into modern China, the experimentation with Western literary forms and techniques, and the development of Marxism in contemporary literary writing. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—III.

106. Chinese Poetry (in English) (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: History 9A or any course on traditional China recommended. Organized topically and chronologically, the lyric tradition is explored from the dawn of folk songs down to modern expressions of social protest. Topics include friendship, love, oppression, war, parting, death, ecstasy and beauty. All readings are in English. GE credit: ArtHum, Div, Wrt.—III. (III.) Yeh

107. Traditional Chinese Fiction (in English) (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or a course in Chinese history. English-language course studying the dawn of Chinese fiction and its development down to modern times. Combines survey history with close reading of representative works such as The Story of the Stone and famous Ming-Qing short stories. GE credit: ArtHum, Div, Wrt.—I. (I.)

108. Poetry of China and Japan (in English) (4)
Lecture—3 hours; discussion—1 hour. A comparative approach to Chinese and Japanese poetry, examining poetic practice in the two cultures; includes a general outline of the two traditions, plus study of poetic forms, techniques, and distinct treatments of universal themes: love, nature, war, etc. Offered in alternate years. (Same course as Japanese 108.) GE credit: ArtHum, Div, Wrt.—II. (II.) Yeh

109A-I. Topics in Chinese Literature (in English) (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: depending on topic, course 10, 11, 104, 106, 107, or a course in Chinese history. Topics in Chinese literature may include: **(A)** crime and punishment; **(B)** love in poetry; **(C)** women writers; **(D)** the knight-errant; **(E)** the city in fiction; **(F)** the recluse; **(G)** the literature of twentieth-century Taiwan; **(H)** popular literature; **(I)** the scholar and the courtesan. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(III.)

110. Great Writers of China: Texts and Context (in English) (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: any course from the General Education Literature Preparation List, or consent of instructor. Examination of major theoretical concepts and interpretive methods in the study of literature by using examples from the Chinese tradition; discussions of classical and modern works with an emphasis on the relations between literature, author, society, and culture. GE credit: ArtHum, Div, Wrt.—I, II. (I, II.)

111. Modern Chinese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 6 or the equivalent. Readings in modern Chinese newspaper articles, essays, and short stories, based on language skills developed in courses 1 through 6.—I. (I.)

112. Modern Chinese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 111. Readings in modern Chinese newspaper articles, essays, and short stories, based on language skills developed in course 111.—II. (II.)

113. Modern Chinese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 112. Readings in modern Chinese newspaper articles, essays, and short stories, based on language skills developed in course 112.—III. (III.)

114. Introduction to Classical Chinese: Confucius (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 6 or consent of instructor. Texts from the Confucian canon are read with the assistance of prepared word glossaries so that while learning to read classical Chinese, the students also experience the most influential books in the history of China in their original texts.—I. (I.)

115. Introduction to Classical Chinese: Mencius (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 114. Continues course 114 by reading selections from the text of the Mencius.—II. (II.)

116. Introduction to Classical Chinese: Narrative Styles (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 115. Continues course 115 by reading selections from the Records of the Grand Historian and other early, influential works.—III. (III.)

120. Advanced Chinese (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or consent of instructor. Selected readings from all genres to develop advanced skills in reading, writing, aural comprehension, and translation. May be repeated once for credit.—I, III. (I, III.)

130. Readings in Traditional Chinese Fiction (4)
Lecture—1 hour; discussion—3 hours. Prerequisite: course 112 or the equivalent; course 114 recommended. Close reading in Chinese of representative works from the Tang Dynasty (618-907) to modern times. May be repeated once for credit when content varies.—II. (II.)

131. Readings in Traditional Chinese Poetry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 6 or consent of instructor. Traditional Chinese poetry from its beginnings to the golden ages of Tang and Song, surveying forms and poets that best reveal the Chinese poetic sensibility and the genius of the language of Chinese poetry.—I. (I.)

132. Readings in Modern Chinese Poetry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 6 or consent of instructor. Chinese poetry from the Literary Revolution of 1917 to the present, surveying works that embody exciting innovations and reflect the modernity of twentieth-century Chinese society and culture.—II. (II.) Yeh

140. Readings in Classical Chinese (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Study and philological analysis of selected texts from the first millennium of Imperial China. May be repeated twice for credit.—I, II, III. (I, II, III.)

160. The Chinese Language (4)
Lecture/discussion—4 hours. Prerequisite: course 6 (may be taken concurrently); Linguistics 1 recommended. The Chinese language viewed in its linguistic context, synchronically and diachronically. Historical phonology, classical and literary language, rise of written vernacular, descriptive grammar of modern standard Chinese, dialectal variation, and sociolinguistic factors.—III. (III.)

192. Chinese Internship (1-12)
Internship—3-36 hours to be arranged. Prerequisite: upper division standing and consent of instructor. Work experience in the Chinese language, with analytical term paper on a topic approved by instructor. (P/NP grading only.)

197T. Tutoring in Chinese (1-5)
Tutoring—1-5 hours. Prerequisite: consent of Department chairperson. Leading of small voluntary discussion groups affiliated with one of the Department's regular courses. May be repeated for credit, but only 2 units may be applied to the minor. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Course

299. Research (1-12)
(S/U grading only.)

Courses in Japanese (JPN)

Lower Division Courses

1. Elementary Japanese (5)
Lecture/discussion—5 hours. Introduction to spoken and written Japanese in cultural contexts, with em-phasis on communication. (Students who have successfully completed Japanese 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.)—I. (I.)

2. Elementary Japanese (5)
Lecture/discussion—5 hours. Prerequisite: course 1 or the equivalent. Continuation of training in basic spoken and written skills.—II. (II.)

3. Elementary Japanese (5)
Lecture/discussion—5 hours. Prerequisite: course 2 or the equivalent. Continuation of training in basic spoken and written skills.—III. (III.)

4. Intermediate Japanese (5)
Lecture/discussion—5 hours. Prerequisite: course 3 or the equivalent. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 3.—I. (I.)

5. Intermediate Japanese (5)
Lecture/discussion—5 hours. Prerequisite: course 4 or the equivalent. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 4.—II. (II.)

6. Intermediate Japanese (5)
Lecture/discussion—5 hours. Prerequisite: successful completion (C– or better) of course 5 or the equivalent. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 5.—III. (III.)

10. Masterworks of Japanese Literature (in English) (4)
Lecture—3 hours; discussion—1 hour. An introduction to Japanese literature: readings and discussion in English of important works from earliest times to the present. GE credit: ArtHum, Div, Wrt.—III. (III.)

25. Japanese Language and Culture (in English) (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Linguistics 1 or Anthropology 4 recommended. Classification and communication of experience in Japanese culture; principles of language use in Japanese society. Speech levels and honorific language, language and gender, minority languages, literacy. Role of Japanese in artificial intelligence and computer science. Offered in alternate years.—I. (I.) Smith

50. Introduction to the Literature of China and Japan (3)
Lecture—3 hours. Methods of literary analysis and their application to major works from the various genres of Chinese and Japanese literature (in translation), including film. East Asian cultural traditions will also be introduced. (Same course as Chinese 50.) GE credit: ArtHum, Div, Wrt.—II. (II.) Borgen

98. Directed Group Study (1-5)
(P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

101. Japanese Literature in Translation: The Early Period (4)
Lecture—3 hours; discussion—1 hour. Early Japanese literature from the Nara to the end of the Heian period through a broad survey of the major literary genres such as lyric poetry, court diaries, prose narratives, poem-tales, and classical Chinese writings. GE credit: ArtHum, Div, Wrt.—I. (I.) Borgen

102. Japanese Literature in Translation: The Middle Period (4)
Lecture—3 hours; discussion—1 hour. The major literary genres from the twelfth century to the second half of the nineteenth century including poetry, renga, military chronicles, no drama, Buddhist literature, haiku, haibun, kabuki, bunraku, plays and Edo prose narratives. GE credit: ArtHum, Div, Wrt.—II. (II.) Borgen

103. Japanese Literature in Translation: The Modern Period (4)
Lecture—3 hours; discussion—1 hour. Modern Japanese literature from the 1870s to the 1970s. Surveys representative literary works and ideas against the social and intellectual background of the Meiji, Taisho, and Showa periods. GE credit: ArtHum, Div, Wrt.—III. (III.) Chang

104. Modern Japanese Literature: War and Revolution (3)
Lecture/discussion—3 hours. Perspectives and sensibilities with which major modern Japanese writers have interpreted the traumatic and often poignant experiences of war and socio-political upheavals from the late nineteenth century to the 1970s. Lectures, discussions, and readings in English. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I. Chang

105. Modern Japanese Literature: Hero and Anti-hero (4)
Lecture/discussion—4 hours. The ways in which representative hero and anti-hero protagonists in modern Japanese literature perceive, confront, challenge, and resolve a wide array of social, political, and moral problems of their times. Course taught in English. GE credit: ArtHum, Div, Wrt.—I. (I.) Chang

106. Japanese Culture Through Film (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing. Aspects of Japanese culture such as love, the family, position of women, growing up, death, and the supernatural as portrayed in films by Kurosawa, Mizoguchi, Ichikawa, Ozu, and Itami. Lectures, discussion, and readings in English. Films with English subtitles. GE credit: ArtHum, Div, Wrt.—II. (II.)

107. Modern Japanese Autobiographies (in English) (4)
Lecture—3 hours; term paper/discussion—1 hour. Prerequisite: upper division standing. Exploring the modern and contemporary Japanese social and cultural landscape through critical analysis of modern Japanese autobiographies by prominent and other authors in the 19th and 20th centuries. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I. Chang

108. Poetry of China and Japan (in English) (4)
Lecture—3 hours; discussion—1 hour. A comparative approach to Chinese and Japanese poetry, examining poetic practice in the two cultures; includes a general outline of the two traditions, plus study of poetic forms, techniques, and distinct treatments of universal themes: love, nature, war, etc. Offered in alternate years. (Same course as Chinese 108.) GE credit: ArtHum, Div, Wrt.—II. Borgen

109. Japanese Popular Culture (5)
Lecture—3 hours; discussion—1 hour; film viewing—3 hours. Japanese popular culture, from its medieval/early modern precedents to contemporary incarnations. Emphasis on the major forms of twentieth-century popular culture, including genre films, popular theater, TV manga (cartoons), animation and science fiction. GE credit: ArtHum, Div.—III. Kim

111. Modern Japanese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 6. Readings in modern Japanese short stories, newspaper articles, and essays; conversation practice based on these readings.—I. (I.)

112. Modern Japanese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 111. Continuation of course 111.—II. (II.)

113. Modern Japanese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 112. Continuation of course 112.—III. (III.)

114A. Spoken Japanese (2)
Discussion—2 hours. Prerequisite: course 6 or the equivalent. Training in spoken Japanese for students with a basic working knowledge of the language. (P/NP grading only.)—I. (I.)

114B. Spoken Japanese (2)
Discussion—2 hours. Prerequisite: course 114A or consent of instructor. Continuation of course 114A. Training in spoken Japanese for students with a basic working knowledge of the language. (P/NP grading only.)—II. (II.)

114C. Spoken Japanese (2)
Discussion—2 hours. Prerequisite: course 114B or consent of instructor. Continuation of course 114B. Training in spoken Japanese for students with a basic working knowledge of the language. (P/NP grading only.)—III. (III.)

115. Japanese Composition (2)
Lecture—2 hours. Prerequisite: course 6 or consent of instructor. Development of skills in the techniques of writing Japanese. Practice in short essay writing with an aim toward mastery of the vocabulary and syntax of written style Japanese.—I. (I.)

131. Readings in Modern Japanese Literature: 1920-1945 (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or the equivalent. Fourth-year level reading of representative works of modern Japanese literature including short stories, novellas, diaries, memoirs, poetry and excerpts from novels and plays from 1920 through the militaristic era, to the end of the war years in 1945.—III. (III.) Chang

132. Readings in Modern Japanese Literature: 1945-1970 (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or the equivalent. Continuation of course 131, but may be taken independently. Covers selected texts from the immediate post-war years beginning in 1945 down to 1970 and the post-war recovery.—III. (III.) Chang

133. Readings in Modern Japanese Literature: 1970 to Present (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or the equivalent. Continuation of course 132, but may be taken independently. Covers selected texts from 1970 to the present. Offered in alternate years.—II. Chang

134. Readings in the Humanities: Traditional Culture (4)
Lecture—3 hours; discussion—1 hour or term paper. Prerequisite: course 113. Fourth-year level reading of modern works by major specialists on traditional Japanese culture: history, religion, thought, art, international relations, and literary history and criticism. Focus is equally on developing reading skills and learning about Japanese culture.—II. (II.) Borgen

135. Readings in the Humanities: The Modern Period (4)
Lecture—3 hours; term paper. Prerequisite: course 113. Fourth-year level reading of authentic modern writings on Japanese culture, history, philosophy, society, religion, law, politics, international relations, aesthetics, and comparative culture by prominent critics, commentators, and scholars.—III. (III.) Chang

136. Readings in Newspapers and Magazines (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or the equivalent. Fourth-year level reading of newspaper and magazine reports, articles, and editorials on domestic and international affairs relating to contemporary Japan. Offered in alternate years.—(I.)

141. Introduction to Classical Japanese (4)
Lecture/discussion—4 hours. Prerequisite: one advanced Japanese reading course such as Japanese 131, 132, or the equivalent reading knowledge of Japanese. The basic features of classical Japanese grammar through careful reading of selected literary texts such as Hojoki or Tsurezuregusa. Offered in alternate years.—III. Borgen

192. Japanese Internship (1-12)
Internship—3-36 hours to be arranged. Prerequisite: upper division standing and consent of instructor. Work experience in Japanese language, with analytical term paper on a topic approved by instructor. (P/NP grading only.)

197T. Tutoring in Japanese (1-5)
Tutoring—1-5 hours. Prerequisite: consent of Department chairperson. Leading of small voluntary discussion groups affiliated with one of the Program's regular courses. May be repeated for credit, but only 2 units may be applied to the minor. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

291. Seminar in Modern Japanese Literature: Major Writers (4)
Seminar—4 hours. Prerequisite: any one of courses 131, 132, 133, 134, 135, or the equivalent. In-depth reading and critical analyses of major works by and critical literature on one or two prominent modern or contemporary writers such as Natsume Soseki, Mori Ogai, Shimazaki Toson, Akutagawa Ryunosuke, Tanizaki Junichiro, Abe Kobo and Oe Kenzaburo. Offered in alternate years.—III. Chang

299. Research (1-12)
(S/U grading only.)

East Asian Studies

(College of Letters and Science)

Li Zhang, Ph.D., Program Director

Program Office, 108 Sproul Hall (530-752-4001)

http://eastasian.ucdavis.edu

Committee in Charge

Kyu Hyun Kim, Ph.D. *(East Asian Languages and Cultures, History)*
Susan Mann, Ph.D. *(History)*
Scott Rozelle, Ph.D. *(Agricultural and Resource Economics)*
Xiaoling Shu, Ph.D. *(Sociology)*
Janet S. Smith, Ph.D. *(Anthropology)*
Michelle Yeh, Ph.D. *(East Asian Languages and Cultures)*
Li Zhang, Ph.D. *(Anthropology)*

Faculty

Robert Borgen, Ph.D., Professor *(East Asian Languages and Cultures, History)*
Beverly Bossler, Ph.D., Associate Professor *(History)*
Katharine P. Burnett, Ph.D., Assistant Professor *(Art History)*
Chia-ning Chang, Ph.D., Associate Professor *(East Asian Languages and Cultures)*
Xiaomei Chen, Ph.D., Professor *(East Asian Languages and Cultures)*
Xiaojia Ge, Ph.D., Professor *(Human and Community Development)*
Mark Halperin, Ph.D., Assistant Professor *(East Asian Languages and Cultures)*
Noriko Iwasaki, Ph.D., Assistant Professor *(East Asian Languages and Cultures, Japanese)*
Kyu Hyun Kim, Ph.D., Assistant Professor *(East Asian Languages and Cultures, History)*
Whalen W. Lai, Ph.D., Professor *(Religious Studies)*
Ming-cheng Lo, Ph.D., Associate Professor *(Sociology)*
Sheldon Lu, Ph.D., Professor *(Comparative Literature)*
Susan Mann, Ph.D., Professor *(History)*
Don C. Price, Ph.D., Professor *(History)*
Scott Rozelle, Ph.D., Professor *(Agricultural and Resource Economics)*
Barbara Sellers-Young, Ph.D., Professor *(Theatre and Dance)*
Xiaoling Shu, Ph.D., Assistant Professor *(Sociology)*
G. William Skinner, Ph.D., Professor *(Anthropology, Center for Comparative Research)*
Janet S. Shibamoto Smith, Ph.D., Professor *(Anthropology)*
Stanley Sue, Ph.D., Professor *(Psychology, Psychiatry, Asian American Studies)*
Wing Thye Woo, Ph.D., Professor *(Economics)*
Michelle Yeh, Ph.D., Professor *(East Asian Languages and Cultures)*
Nolan Zane, Ph.D., Professor *(Psychology, Asian American Studies)*
Li Zhang, Ph.D., Associate Professor *(Anthropology)*

Emeriti Faculty

Mary H. Fong, Ph.D., Professor Emerita
Donald Gibbs, Ph.D., Professor Emeritus
Joyce K. Kallgren, Ph.D., Professor Emerita
Kwang-Ching Liu, Ph.D., Professor Emeritus
Benjamin Wallacker, Ph.D., Professor Emeritus

Affiliated Faculty

Margaret Swain, Ph.D., Adjunct Associate Professor *(Anthropology)*

The Major Program

The East Asian Studies major gives the student an understanding of East Asia (especially China and Japan) through interdisciplinary studies that combine sustained work in an East Asian language with courses on East Asian countries.

The Program. The program offers core courses in East Asian history, humanities, social sciences, and languages. After taking the core courses in conjunction with two years or more of either Chinese or Japanese language study, the student chooses additional courses focusing on a special field of interest, such as anthropology or history. Since six quarters of language work are required, students normally should apply to the East Asian studies program no later than their sophomore year.

Programs, Internships, and Career Alternatives. One program of interest to East Asian Studies majors is the education abroad program, which gives students the opportunity to live and experience the culture of their focus country. At UC Davis, the Internship and Career Center helps students obtain legislative, legal, and business internships. Additionally, the UC Davis Washington Center arranges internships and runs a full-credit academic program in Washington D.C. with a full range of opportunities for East Asian Studies majors. East Asian Studies graduates are prepared for employment in government agencies (such as Foreign Service), state agencies, international or non-governmental (such as United Nations), foundations, journalism, teaching, counseling and companies having an interest in international business, trade, finance. The stringent language requirement of the major program enhances career prospects in jobs that demand knowledge of language and culture of the focus country.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 41-42
History 9A and 9B 8
One course from Art History 1D, Chinese 10, 11, Comparative Literature 53A, Japanese 10, 25, Religious Studies 70, 75 3-4
Two years (or the equivalent) of Chinese or Japanese language study (Chinese 1-2-3-4-5-6; Japanese 1-2-3-4-5-6)..... 30

Depth Subject Matter..... 36
Must include at least 8 units of core courses from each of the following three categories.

History:
History 191A, 191B, 191C, 191D, 191E, 191F; 194A-194B or 194B-194C

Social Science:
Anthropology 148A, 148B, 149A, 149B; Economics 171; Geography 127; Political Science 148A, 148B; Sociology 147

Humanities:
Art History 163A, 163B, 163C, 164; Chinese 104, 106, 107, 109, 131, 132; Japanese 101, 102, 103; Religious Studies 172

At least 12 additional units must be selected from the above courses, or from the following: Anthropology 110, 112, 117, 119, 120, 122, 123, 124, 128; Chinese (any upper division course); Economics 115A, 115B, 116, 160A, 160B, 162; Geography 143; History 102G, 102H, 102N; Japanese (any upper division course); Linguistics 100; Political Science 127, 133, 138, 145, 148C; Sociology 118, 141, 170, 183 (or other appropriate courses, including individual and group study courses (198, 199), as approved by the Committee in charge).

Total Units for the Major 77-78

Recommended
Students are strongly urged to take a substantial number of courses in Euro-American civilization as a basis for comparison for a deeper understanding of America's relations with East Asia.

Major Adviser. Program Director.

Minor Program Requirements:

Courses taken for the minor are expected to reflect a predominant interest in either China or Japan, but also to provide some exposure to the other of the two countries. All courses counting towards the East Asian Studies major, including individual and group study courses (198, 199), may be used to fulfill the requirements for the minor program, as long as they deal predominantly with China, Japan, or both.

UNITS

East Asian Studies 22
History 9B and 18 upper division units, of which at least 12 must be in courses focusing on China; OR History 9A and 18 upper division units, of which at least 12 must be in courses focusing on Japan 22

Courses in East Asian Studies. The following courses count toward the major and are open to students throughout the campus. Refer to departmental listings for course descriptions.

Anthropology
148A. Culture and Political Economy in Contemporary China
149B. Contemporary Japanese Society

Art History
1D. Asian Art
163A. Chinese Art
163B. Chinese Painting
163C. Painting in the People's Republic of China
164. The Arts of Japan

Chinese
All courses

Comparative Literature
53A. Literature of China and Japan
153. The Forms of Asian Literature

Economics
171. Economy of East Asia

History
9A. History of East Asian Civilization (China)
9B. History of East Asian Civilization (Japan)
102G. Undergraduate Proseminar: China to 1800
102H. Undergraduate Proseminar: China since 1800
102N. Undergraduate Proseminar: Japan
191A. Classical China

191B. High Imperial China
191C. Late Imperial China
191D. Nineteenth-Century China
191E. The Chinese Revolution
191F. History of the People's Republic of China, 1949 to the Present
194A. Aristocratic and Feudal Japan through 16th Centuries
194B. Early Modern Japan, 17th-19th Centuries
194C. Modern Japan 20th Centuries
194D. Business and Labor in Modern Japan
194E. Education and Technology in Modern Japan
195B. History of Modern Korea

Japanese
All courses.

Political Science
148A. Government and Politics in East Asia: China
148B. Government and Politics in East Asia: Pacific Rim
148C. Government and Politics in East Asia: Southeast Asia

Religious Studies
75. Chinese Philosophy: An Introduction
170. Introduction to Buddhism
172. Ch'an (Zen) Buddhism

Sociology
147. Sociological Perspectives on East Asia
188. Social Stratification in China

Courses in East Asian Studies (EAS)

Lower Division Courses

88. Korean Society: Late 19th Century to the Present (4)
Lecture/discussion—4 hours. Modern Korean society (late 19th Century to contemporary period), emphasizing the perseverance and transformations of traditional social and cultural patterns. GE credit: ArtHum, Div, Wrt.—II. Kim

Upper Division Courses

113. Cinema and Society in China (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course from History 190C, 193, or consent of instructor. Knowledge of Chinese not required. Viewing and analysis of one Chinese film with English subtitles each week, followed by discussion and short essays. Cinematic technique, social values and film topics from 1930s to today. Not open for credit to students who have completed Chinese 113. GE credit: ArtHum, Div, Wrt.—III. (III.)

192. East Asian Studies Internship (1-12)
Internship—3-36 hours; term paper. Prerequisite: upper division standing and consent of instructor. Work experience in the East Asian Studies field, with analytical term paper on a topic approved by the instructor. (P/NP grading only.)

194H. Special Study for Honors Students (1-5)
Independent study—1-5 hours. Prerequisite: open only to majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in East Asian Studies culture, society, or language. (P/NP grading only.)

196A-196B. Honors Seminar (4-4)
Seminar—2 hours; conference—2 hours. Prerequisite: a GPA of 3.5 in the major, senior standing, and consent of instructor. A two-quarter research project culminating in an Honors thesis. A grade of B or higher must be earned to qualify the student for honors distinction at graduation. (Deferred grading only, pending completion of sequence.)—I-II. (I-II.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Ecology (A Graduate Group)

E.P. Caswell-Chen, Ph.D., Chairperson of the Group
Group Office, 2148 Wickson Hall (530-752-6752)
http://ecology.ucdavis.edu

Faculty

Daniel W. Anderson, Ph.D., Professor *(Wildlife, Fish, and Conservation Biology)*
Michael G. Barbour, Ph.D., Professor *(Environmental Horticulture)*
Alison Berry, Ph.D., Professor *(Environmental Horticulture)*
Robert L. Bettinger, Ph.D., Professor *(Anthropology)*
Caroline Bledsoe, Ph.D., Professor *(Land, Air and Water Resources)*
Monique Borgerhoff Mulder, Ph.D., Professor *(Anthropology)*
Louis W. Botsford, Ph.D., Professor *(Wildlife, Fish, and Conservation Biology)*
Walter M. Boyce, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
David J. Boyd, Ph.D., Associate Professor *(Anthropology)*
Patrick H. Brown, Ph.D. Professor *(Pomology)*
Stephen Brush, Ph.D., Professor *(Human and Community Development)*
Tim Caro, Ph.D., Professor *(Wildlife, Fish, and Conservation Biology)*
Edward P. Caswell-Chen, Ph.D., Professor *(Nematology)*
Joseph J. Cech, Jr., Ph.D., Professor *(Wildlife, Fish, and Conservation Biology)*
Ernest S. Chang, Ph.D., Professor *(Bodega Marine Laboratory)*
Peter L. Chesson, Ph.D., Professor *(Evolution and Ecology)*
Douglas E. Conklin, Ph.D., Associate Professor *(Animal Science)*
Richard G. Coss, Ph.D., Professor *(Psychology)*
James C. Cramer, Ph.D., Professor *(Sociology)*
Peter S. Cranston, Ph.D., Professor *(Entomology)*
Randy A. Dahlgren, Ph.D., Professor *(Land, Air and Water Resources)*
Christyann M. Darwent, Ph.D., Assistant Professor *(Anthropology)*
Montague W. Demment, Ph.D., Professor *(Agronomy and Range Science)*
R. Ford Denison, Ph.D., Professor *(Agronomy and Range Science)*
Holly Doremus, Ph.D., Acting Professor of Law *(School of Law)*
Serge I. Doroshov, Ph.D., Professor *(Animal Science)*
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Deborah L. Elliott-Fisk, Ph.D., Professor *(Wildlife, Fish, and Conservation Biology)*
Y. Hossein Farzin, Ph.D., Associate Professor *(Agricultural and Resource Economics)*
Howard Ferris, Ph.D., Professor *(Nematology)*
Albert Fischer, Ph.D., Assistant Professor *(Vegetable Crops)*
Theodore C. Foin, Ph.D., Professor *(Agronomy and Range Science)*
Shu Geng, Ph.D., Professor *(Agronomy and Range Science)*
Paul Gepts, Ph.D., Professor *(Agronomy and Range Science)*
Charles R. Goldman, Ph.D., Professor *(Environmental Science and Policy)*
Steven E. Greco, Ph.D., Assistant Professor *(Environmental Design)*
Richard K. Grosberg, Ph.D., Professor *(Evolution and Ecology)*
Susan L. Handy, Ph.D., Associate Professor *(Environmental Science and Policy)*
Alexander H. Harcourt, Ph.D., Professor *(Anthropology)*
Susan Harrison, Ph.D., Professor *(Environmental Science and Policy)*
Alan Hastings, Ph.D., Professor *(Environmental Science and Policy)*
Marcel Holyoak, Ph.D., Associate Professor *(Environmental Science and Policy)*
William Horwath, Ph.D., Associate Professor *(Land, Air and Water Resources)*
Silas S. O. Hung, Ph.D., Professor *(Animal Science)*
Louise E. Jackson, Ph.D., Professor *(Vegetable Crops)*
Bruce Jaffee, Ph.D., Professor *(Nematology)*
Marie A. Jasieniuk, Ph.D., Assistant Professor *(Vegetable Crops)*
Robert A. Johnston, M.S., Professor *(Environmental Science and Policy)*
Richard Karban, Ph.D., Professor *(Entomology)*
Douglas A. Kelt, Ph.D., Associate Professor *(Wildlife, Fish, and Conservation Biology)*
Emilio A. Laca, Ph.D., Associate Professor *(Agronomy and Range Science)*
Douglas M. Larson, Ph.D., Professor *(Agricultural and Resource Economics)*
Sharon P. Lawler, Ph.D., Assistant Professor *(Entomology)*
J. Heinrich Lieth, Ph.D., Professor *(Environmental Horticulture)*
Mark Lubell, Ph.D., Assistant Professor *(Environmental Science and Policy)*
Jay R. Lund, Ph.D., Professor *(Civil and Environmental Engineering)*
Richard L. McElreath, Ph.D. Assistant Professor *(Anthropology)*
Steven G. Morgan, Ph.D., Associate Professor *(Bodega Marine Laboratory)*
Peter B. Moyle, Ph.D., Professor *(Wildlife, Fish, and Conservation Biology)*
Steven A. Nadler, Ph.D., Professor *(Nematology)*
Debbie A. Niemeier, Ph.D., Associate Professor *(Civil and Environmental Engineering)*
Benjamin S. Orlove, Ph.D., Professor *(Environmental Science and Policy)*
Kyaw Tha Paw U, Ph.D., Professor *(Land, Air and Water Resources)*
Robert W. Pearcy, Ph.D., Professor *(Evolution and Ecology)*
Wolfgang Pittroff, Ph.D., Assistant Professor *(Animal Science)*
Richard E. Plant, Ph.D., Professor *(Agronomy and Range Science)*
Dan Potter, Ph.D., Associate Professor *(Pomology)*
James F. Quinn, Ph.D., Professor *(Environmental Science and Policy)*
D. William Rains, Ph.D., Professor *(Agronomy and Range Science)*
Marcel Rejmanek, Ph.D., Professor *(Evolution and Ecology)*
Eliska Rejmankova, Ph.D., Professor *(Environmental Science and Policy)*
Kevin J. Rice, Ph.D., Professor *(Agronomy and Range Science)*
James H. Richards, Ph.D., Professor *(Land, Air and Water Resources)*
Peter J. Richerson, Ph.D., Professor *(Environmental Science and Policy)*
David Rizzo, Ph.D., Associate Professor *(Plant Pathology)*
Jay A. Rosenheim, Ph.D., Professor *(Entomology)*
Paul A. Sabatier, Ph.D., Professor *(Environmental Science and Policy)*
Roberto D. Sainz, Ph.D., Associate Professor *(Environmental Science and Policy)*
Thomas W. Schoener, Ph.D., Professor *(Evolution and Ecology)*
Mark W. Schwartz, Ph.D., Professor *(Environmental Science and Policy)*
Kate M. Scow, Ph.D., Professor *(Land, Air and Water Resources)*
Kenneth A. Shackel, Ph.D., Professor *(Pomology)*
H. Bradley Shaffer, Ph.D., Professor *(Evolution and Ecology)*
Arthur M. Shapiro, Ph.D., Professor *(Evolution and Ecology)*
Andrew Sih, Ph.D., Professor *(Environmental Science and Policy)*

David R. Smart, Ph.D., Assistant Professor *(Viticulture and Enology)*
Howard Spero, Ph.D., Professor *(Geology)*
Jay Stachowicz, Ph.D., Assistant Professor *(Evolution and Ecology)*
Sharon Y. Strauss, Ph.D., Professor *(Evolution and Ecology)*
Donald Strong, Ph.D., Professor *(Animal Science)*
J. Edward Taylor, Ph.D., Professor *(Agricultural and Resource Economics)*
Ron Tjeerdema, Ph.D., Professor *(Environmental Toxicology)*
Catherine A. Toft, Ph.D., Professor *(Evolution and Ecology)*
Susan L. Ustin, Ph.D., Professor *(Land, Air and Water Resources)*
Chris Van Kessel, Ph.D., Professor *(Agronomy and Range Science)*
Dirk Van Vuren, Ph.D., Professor *(Wildlife, Fish, and Conservation Biology)*
Geraat J. Vermeij, Ph.D., Professor *(Geology)*
Peter C. Wainwright, Ph.D., Professor *(Evolution and Ecology)*
Philip S. Ward, Ph.D., Professor *(Entomology)*
Wesley W. Weathers, Ph.D., Professor *(Avian Sciences)*
Steven Weinbaum, Ph.D., Professor *(Pomology)*
Susan L.Williams, Ph.D., Professor *(Environmental Science and Policy)*
Barry W. Wilson, Ph.D., Professor *(Animal Science, Environmental Toxicology)*
Bruce Winterhalder, Ph.D. Professor *(Anthropology)*
Rosemarie B. Woodroffe, Ph.D., Assistant Professor *(Wildlife, Fish and Conservation Biology)*
Truman P. Young, Ph.D., Professor *(Environmental Horticulture)*

Affiliated Faculty

M. Kat Anderson, Ph.D. *(Environmental Horticulture)*
William Bennett, Ph.D., Assistant Researcher Ecologist *(John Muir Institute of the Environment)*
Christopher M. Dewees, Ph.D., Marine Fishery Specialist *(Wildlife, Fish, and Conservation Biology)*
Edwin DeHaven Grosholz, Ph.D., Assistant Cooperative Extension Specialist *(Environmental Science and Policy)*
Janet E. Foley, Ph.D., Research Veterinarian *(Veterinary Medicine)*
James E. Hill, Ph.D., Cooperative Extension Specialist *(Agronomy and Range Science)*
Michael L. Johnson, Ph.D., Associate Research Ecologist *(John Muir Institute of the Environment)*
Peter Klimley, Ph.D., Associate Research Biologist *(Bodega Marine Laboratory)*
Bernie May, Ph.D., Adjunct Professor *(Animal Science)*
Brenda McGowan, Ph.D., Assistant Research Professor *(Veterinary Medicine Teaching and Research Center)*
Keith A. Miles, Ph.D., Wildlife Biologist *(Wildlife, Fish, and Conservation Biology)*
Malcolm North, Ph.D., Associate Forest Ecologist *(Environmental Horticulture)*
Deborah L. Rogers, Ph.D., Assistant Research Geneticist *(Agricultural and Natural Resources)*
Terrell P. Salmon, Ph.D., Specialist in Cooperative Extension *(Wildlife, Fish, and Conservation Biology)*
Kenneth W. Tate, Ph.D., Assistant Rangeland Specialist *(Agronomy and Range Science)*
Steve R. Temple, Ph.D., Extension Agronomist *(Agronomy and Range Science)*
Swee The, Ph.D., Staff Research Associate *(Anatomy, Physiology and Cell Biology)*
Lisa C. Thompson, Ph.D., Assistant Specialist in Cooperative Extension *(Wildlife, Fish, and Conservation Biology)*
Inge Werner, Ph.D., Assistant Researcher/Aquatic Toxicologist *(Anatomy, Physiology and Cell Biology)*

Graduate Study. The Graduate Group in Ecology offers the M.S. and Ph.D. degrees in several areas of specialization within the spectrum of ecology. The Ecology program is one of the most diverse on the Davis campus. In order to accommodate varied student interests, the Group depends on close consultation between students and faculty for program development. Several curricular plans are now available in the following areas of emphasis: agricultural ecology, conservation ecology, ecosystems and landscape ecology, ecotoxicology, environmental policy analysis, human ecology, integrative ecology, marine ecology, physiological ecology, and restoration ecology. For further details, contact the Group office.

Preparation. Appropriate preparation is undergraduate work in any of the biological, social or behavioral, and physical sciences, mathematics or engineering. Applicants will normally be expected to have completed two courses each in introductory biology and general chemistry and physical science; one course each in calculus, an upper division ecology course and introductory statistics, are also required. Applicants in the human ecology area may substitute quantitative social science courses for up to two courses of chemistry. Each of the three broad areas requires certain advanced preparation appropriate to the option. Details can be found in the Group Web page.

Graduate Advisers. E. Caswell-Chen, C. Toft

Courses in Ecology (ECL)

Graduate Courses

200A. Principles and Application of Ecological Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: first course in ecology; Statistics 102; Mathematics 16A, 16B. Critical evaluation of ecological theory and applications to ecological management. Historical development of ecological theory is emphasized. Critical evaluation of ecological principles pertaining to the structure and dynamic properties of ecological systems, their organization and evolution.—I. (I.) Holyoak

200B. Principles and Application of Ecological Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A. Continuation of course 200A. Critical evaluation of theory and application in the areas of ecological adaptation and system plasticity, spatial and temporal scales, ecological energetics, and system dynamics. Synthesis of ecological theory into testable principles.—II. (II.) Foin

201. Ecosystems and Landscape Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A and 200B. Overview of ecosystem and landscape principles (structure, energy, nutrient flow, species diversity, landscape heterogeneity, change and stability), building on ecological principles and theory. Introduction to analysis tools (remote sensing, geographic information systems, modeling) applied to landscape systems. Offered in alternate years.—(III.) Greco

203. Physiological Ecology (3)
Lecture—3 hours. Prerequisite: Evolution and Ecology 101 or Environmental Studies 100; Neurobiology, Physiology and Behavior 110 or Plant Biology 111 or Environmental Studies 129; elementary calculus. A comparative examination of several animal groups addressing fundamental physiological mechanisms that shape the ecology of each animal group. Offered in alternate years—III. Wainwright, Cech

204. Population and Community Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Environmental Studies 100 or Evolution and Ecology 101, Mathematics 21A-21B or consent of instructor; Mathematics 22B recommended. Review of major concepts of population ecology and community ecology, with emphasis on the rationale of theory and use of theory as applied in the ecology of natural and managed systems. Offered in alternate years.

205. Community Ecology (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: Environmental Studies 100, Evolution and Ecology 101, or Plant Biology 117. Introduction to literature and contemporary research into processes structuring ecological communities.—(II.) Karban, Lawler

206. Concepts and Methods in Plant Community Ecology (4)
Lecture—3 hours; laboratory—4 hours. Prerequisite: introductory courses in statistics and plant ecology; consent of instructor. Principles and techniques of vegetation analysis, including structure, composition, and dynamics. Emphasis given to sampling procedures, association analysis, ordination, processes and mechanisms of succession, and classification. Most techniques are demonstrated or conducted during field trips and laboratories.—I. (I.) Rejmanek, Barbour

207. Plant Population Biology (3)
Lecture—2 hours; laboratory/discussion—1 hour. Prerequisite: advanced undergraduate ecology course (e.g., Environmental Science and Policy 100, Evolution and Ecology 101, Entomology 104 or Plant Biology 117), and advanced undergraduate course in genetics and/or evolution (e.g., Biological Sciences 101 or Evolution and Ecology 100). Introduction to theoretical and empirical research in plant population biology. Emphasis placed on linking ecological and genetic approaches to plant population biology. (Same course as Population Biology 207.) Offered in alternate years.—(II.) Rice

208. Issues in Conservation Biology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one of Environmental Studies 100, Zoology 125, Botany 117, or Entomology 106. Graduate-level introduction to current research in conservation biology. Course will emphasize reading and discussing primary literature. Specific topics will reflect the research interests of UCD conservation biology faculty.—II. (II.)

210. Advanced Topics in Human Ecology (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: graduate standing. Course stresses the commonalities that human ecologists have as social scientists who specialize in problems relating human populations and environmental variables. General epistemological issues and theoretical models are reviewed. Similarities and differences of human and biological ecology are examined. Offered in alternate years.—(II.) Richerson

211. Advanced Topics in Cultural Ecology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Environmental Science and Policy 133/Anthropology 133 and graduate standing in Ecology or Anthropology. Topics of current analytical and methodological importance in cultural ecology. Examination of general issues in cultural ecology through study of human response to and influences on climate. (Same course as Anthropology 211.) Offered in alternate years.—(I.) Orlove

212A. Environmental Policy Process (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course in public policy (e.g., Environmental Studies 160) or environmental law (e.g., Environmental Studies 161); course in bureaucratic theory (e.g., Political Science 187 or Environmental Studies 166); course in statistics (e.g., Sociology 106 or Agricultural and Resource Economics 106). Introduction to selected topics in the policy process, applications to the field of environmental policy. Develops critical reading skills, understanding of frameworks of the policy process and political behavior, and an ability to apply multiple frameworks to the same phenomena. Offered in alternate years. (Same course as Environmental Science and Policy 212A.)—(III.) Sabatier

212B. Environmental Policy Evaluation (4)
Lecture—1 hour; discussion—1 hour; seminar—2 hours. Prerequisite: intermediate microeconomics (e.g., Economics 100); Statistics 108 or Agricultural and Resource Economics 106; policy analysis (e.g., Environmental Studies 168A or the equivalent); Agricultural and Resource Economics 176. Methods and practices of policy analysis; philosophical and intel-

lectual bases of policy analysis and the political role of policy analysis. (Same course as Environmental Science and Policy 212B.)

213. Population, Environment, and Social Structure (4)
Seminar—3 hours; term paper. Prerequisite: at least one course in population or human ecology, or in environment and resources. Relationships among population dynamics, resource scarcity and environmental problems, and social structure; focus on demographic content of global ecological models and simulations, ecological content of modern demographic theories, and debates about scarcity, inequality, and social conflict and change. Offered in alternate years.—III. Cramer

214. Marine Ecology: Concepts and Practice (3)
Lecture—1 hour; discussion—1.5 hours; fieldwork—1.5 hours. Prerequisite: graduate standing or one course in ecology, one course in evolution or genetics, consent of instructor; survey course in marine ecology recommended. Critical review and analysis of concepts and practices in modern marine ecology at the interface of several fields of study including oceanography, evolution, behavior, and physiology. Emphasis on critical thinking, problem solving, and hands-on study. Three field trips required. Offered in alternate years.—III. Morgan, Stachowicz

216. Ecology and Agriculture (3)
Lecture/discussion—3 hours. Prerequisite: Plant Biology 142 or consent of instructor. Ecological principles and relationships as applied to agriculture. Integration of ecological approaches into agricultural research to develop environmentally sound management practices. Topics include crop autoecology, biotic interactions among crops and pests, and crop systems ecology. (Same course as Vegetable Crops 216.)—I. (I.) Jackson

217. Conservation and Sustainable Development in Third World Nations (4)
Lecture/discussion—3 hours; fieldwork—2 hours. Prerequisite: at least one course from two of these three groups: (a) Environmental Studies 160, 161, 168A, 168B; (b) Environmental Studies 101, 133, International Agricultural Development 103, Geography 142; (c) Anthropology 126, 131, Geography 141, Sociology 144, 145A, 145B. Examination of the patterns of resource ownership, control and management in agricultural lands, extractive zones (fisheries, forests) and wildlands, with emphases on conservation and sustainability. Comparison of industrial democracies and poorer nations. (Same course as International Agricultural Development 217.) Offered in alternate years.—Orlove

219. Ecosystem Biogeochemistry (4)
Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: introductory courses in ecology/biology and soils are recommended; undergraduates accepted with consent of instructor. Multi-disciplinary analysis of energy and nutrient transfers within terrestrial ecosystems. Examination of processes and inter- and intra-system interactions between the atmosphere, biosphere, lithosphere, and hydrosphere. Laboratory section uses biogeochemical simulation models to examine case studies. (Same course as Soil Science 219.) Offered in alternate years.—III. Dahlgren

220. Spatio-Temporal Ecology (2)
Lecture/discussion—2 hours. Prerequisite: Population Biology 200B or course 204 or Evolution and Ecology 104 or Environmental Science and Policy 121 or consent of instructor. Spatio-temporal ecological theory focusing on population persistence and stability, predator-prey and host-parasitoid interactions, species coexistence and diversity maintenance, including effects of environmental variation, spatial and temporal scale, life-history traits and nonlinear dynamics. Topics vary. (Same course as Population Biology 220.) May be repeated once for credit. (S/U grading only.)—II. Chesson

222. Human Ecology of Agriculture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division course work in environmental sciences, cultural anthropology, economics, international agricultural development or sociology, or consent of instructor. Social and cultural factors relating to agricultural adaptation and evolution. Ethnobiological knowledge systems, rules and customs of resource allocation, impact of population growth, technological change, states and markets. Social and cultural contexts of biological diversity and agricultural resource conservation.—I. Brush

225. Terrestrial Field Ecology (4)
Seminar—1 hour; field work—12 hours. Prerequisite: introductory ecology and introductory statistics or consent of instructor. A field course conducted over spring break and four weekends at Bodega Bay, emphasizing student projects. Ecological hypothesis testing, data gathering, analysis, and written and oral presentation of results will be stressed. (Same course as Entomology 225/Population Biology 225.)—III. (III.) Karban

231. Mathematical Methods in Population Biology (3)
Lecture—3 hours. Prerequisite: Mathematics 16C or 21C or the equivalent. Mathematical methods used in population biology. Linear and nonlinear difference equation and differential equation models are studied, using stability analysis and qualitative methods. Partial differential equation models are introduced. Applications to population biology models are stressed. (Same course as Population Biology 231.)—I. (I.) Hastings

232. Theoretical Ecology (3)
Lecture—3 hours. Prerequisite: course 204 or the equivalent, and Mathematics 16C or 21C; or one of courses 100 or 121 or Evolution and Ecology 101, and a strong mathematics background (Mathematics 22A-22B-22C or the equivalent). Examination of major conceptual and methodological issues in theoretical ecology. Model formulation and development will be emphasized. Topics will vary from year to year. May be repeated for credit. Offered in alternate years.—(II.) Hastings

280. Current Anthropology Journal Editorial Workshop (4)
Workshop—1 hour; independent study—3 hours. Students must enroll for all three quarters. Reading and offering workshop critiques of manuscripts submitted for publication, and reading and discussion of other relevant work in anthropology and human ecology. Track and edit published comments and authors' replies that accompany major features. Participation in the development of new sections for the electronic edition of the journal, including a "news and views" section and a debate section. (Same course as Anthropology 280.) May be repeated for 12 units of credit with consent of instructor. (S/U grading only)—I, II, III. Orlove

290. Seminar in Ecology (1-4)
Seminar—1-4 hours. Prerequisite: consent of instructor. Topics in biological, human, physical, and chemical ecology. Students are expected to present an oral seminar on a particular aspect of the general topic under consideration. (S/U grading only.)—I, II, III. (I, II, III.)

296. Topics in Ecology and Evolution (1)
Seminar—1 hour. Prerequisite: graduate standing. Seminars presented by visiting lecturers, UCD faculty, and graduate students. May be repeated for credit. (Same course as Population Biology 292.) (S/U grading only.)—I, II, III. (I, II, III.)

297T. Tutoring in Ecology (1-4)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing in ecology; consent of instructor. Teaching ecology including conducting discussion groups for regular departmental courses under direct guidance of staff. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
Prerequisite: graduate standing. (S/U grading only.)

Economics

(College of Letters and Science)

Kevin D. Hoover, Ph.D., Chairperson of the Department

Department Office, 1113 Social Sciences and Humanities Building (530-752-0741)

http: www.econ.ucdavis.edu

Faculty

Paul Bergin, Ph.D., Associate Professor
Giacomo Bonanno, Ph.D., Professor
Colin Cameron, Ph.D., Professor
Elizabeth Cascio, Ph.D., Assistant Professor
Gregory Clark, Ph.D., Professor
Timothy W. Cogley, Ph.D., Associate Professor
Robert C. Feenstra, Ph.D., Professor
L. Jay Helms, Ph.D., Associate Professor
Kevin D. Hoover, D.Phil., Professor
Hilary Hoynes, Ph.D., Associate Professor
Oscar Jorda, Ph.D., Assistant Professor
Christopher R. Knittel, Ph.D., Assistant Professor
Peter H. Lindert, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Louis Makowski, Ph.D., Professor
Douglas Miller, Ph.D., Assistant Professor
Klaus Nehring, Ph.D., Associate Professor
Alan L. Olmstead, Ph.D., Professor
Marianne E. Page, Ph.D., Associate Professor
Giovanni Peri, Ph.D., Assistant Professor
James Prieger, Ph.D., Assistant Professor
Martine Quinzii, Ph.D., Professor
Kevin D. Salyer, Ph.D., Professor
Steven M. Sheffrin, Ph.D., Professor
Joaquim Silvestre, Ph.D., Professor
Ann Huff Stevens, Ph.D., Associate Professor
Deborah Swenson, Ph.D., Associate Professor
Alan Taylor, Ph.D., Professor
Gary M. Walton, Ph.D., Professor
Wing T. Woo, Ph.D., Professor

Emeriti Faculty

Andrzej Brzeski, Ph.D., Professor Emeritus
W. Eric Gustafson, Ph.D., Senior Lecturer Emeritus, *Academic Senate Distinguished Teaching Award*
Hiromitsu Kaneda, Ph.D., Professor Emeritus
Thomas Mayer, Ph.D., Professor Emeritus
T. Y. Shen, Professor Emeritus
Elias H. Tuma, Ph.D., Professor Emeritus
Leon L. Wegge, Ph.D., Professor Emeritus

The Major Program

Economics is the study of how individuals, organizations, and societies choose among alternative uses of resources and how these resources are turned into the things people want.

The Program. Economics majors complete an introductory course sequence in economics, in addition to several courses in quantitative methods. Intermediate theory and economic history are taken on the upper division level and then students are free to concentrate the remainder of their units in various areas of interest, including more courses in economic theory or history, international economics, labor, industry, alternative economic systems, economic development, public finance, econometrics, or mathematical economics.

Internships and Career Alternatives. Internships for economics majors have been arranged at banks, brokerages, other business enterprises, and governmental units. The internships must complement the student's course work. A degree in economics is excellent preparation for students who want to go on to law school, business school, advanced work in economics, or graduate work in international relations. It is also a good background for careers in management and positions with the government.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**17-20**
Economics 1A-1B	8
Statistics 13, 32, or 102	3-4
Mathematics 16A-16B or 21A-21B	6-8
Depth Subject Matter	**44**
Economics 100, 101	8
Economics 102	4
One course from Economics 110A, 110B, 111A, 111B	4
Select 16 units from Economics 103, 116, 121A, 121B, 122, 130, 131, 132, 134 (or Agricultural and Resource Economics 171A), 135, 136, 137, 140, 145, 151A, 151B, 160A, 160B, 194HA, 194HB, Agricultural and Resource Economics 106, 139, 156, 175, 176	16
Additional upper division Economics courses	12
Total Units for the Major	**61–64**

Recommended

Students considering graduate study in economics are strongly urged to take Mathematics 21A-21B-21C and 22A.

The Economics Department suggests that Economics 100 and 101 be taken as soon as possible after the introductory courses.

Major Advisers. Contact Department Office.

Minor Program Requirements:

	UNITS
Economics	**20**
Economics 100, 101	8
Select 8 units from Economics 103, 116, 121A, 121B, 122, 130, 131, 132, 134 (or Agricultural and Resource Economics 171A), 135, 136, 137, 140, 145, 151A, 151B, 160A, 160B; Agricultural and Resource Economics 106, 139, 156, 175, 176	8
Select 4 units from upper division Economics courses	4

Preparation. Economics 1A and 1B; Statistics 13, 32, or 102; Mathematics 16A and 16B or 21A and 21B. Mathematics 16A and 16B or 21A and 21B should be completed before taking Economics 100 and 101. Students need to complete Economics 100 and 101 before taking the advanced courses.

Course Limits. Except under extraordinary circumstances, not more than three economics courses may be taken in any one quarter. In special cases, the department will accept a limited number of related upper division courses from other departments in satisfaction of the economics upper division course requirements. Approval from a departmental adviser is required in all such cases.

Graduation with High or Highest Honors. To be eligible for departmental recommendation for High or Highest Honors in Economics at graduation, a student must take all upper division courses in Economics for a letter grade, earn at least a 3.5 grade-point average in those courses, and complete at least eight units of course work that result in the submission of an Honors project. Consult the College of Letters and Science section of this catalog and contact the Department for more information.

Study Abroad. The economics department wishes to accommodate students who would like to complement their economics degree with a study abroad experience. Up to 20 units of upper division credit from foreign campuses (excluding Economics 100 and 101) may be used towards the completion of the degree. To ensure that foreign courses will apply towards the economics degree, students need to select courses from the pre-approved list at EAP or seek pre-approval in the economics department for the foreign courses they wish to complete.

Graduate Study. Students who meet the admission requirements of Graduate Studies and the Department of Economics may pursue studies leading to the M.A. and Ph.D. degrees. Fields of emphasis for graduate study include: Economic Theory, Monetary Economics, Economic Development, Economic History, International Economics, Labor Economics, Industrial Organization, Economic Systems, Public Finance, Mathematical Economics, and Quantitative Methods (Econometrics). For information on admission to graduate study, degree requirements, and financial aid, consult the Graduate Announcement and the following Web page: www.econ.ucdavis.edu.

Graduate Advisers. Contact Department Office.

American History and Institutions. This University requirement can be satisfied by completion of Economics 111A, 111B. (See also under University requirements.)

Courses in Economics (ECN)

Lower Division Courses

1A. Principles of Microeconomics (4)
Lecture—3 hours; discussion—1 hour. Course 1A and 1B may be taken in either order. Analysis of the allocation of resources and the distribution of income through a price system; competition and monopoly; the role of public policy; comparative economic systems. GE credit: SocSci.—I, II, III. (I, II, III.)

1B. Principles of Macroeconomics (4)
Lecture—3 hours; discussion—1 hour. Course 1A and 1B may be taken in either order. Analysis of the economy as a whole; determinants of the level of income, employment and prices; money and banking, economic fluctuations, international trade, economic development; the role of public policy. GE credit: SocSci.—I, II, III. (I, II, III.)

90X. Lower Division Seminar (1-2)
Seminar—1-2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Economics through shared readings, discussions, and written assignments. May not be repeated for credit. Limited enrollment.

92. Internship and Field Work (1-12)
Internship—3-36 hours; term paper. Prerequisite: junior or senior standing; availability of internship position or approved field work project; stock-brokerage interns must have completed Management 11A-11B; consent of instructor. Intensive study of practical application of concepts in economics, stressing research methods and empirical analysis. (P/NP grading only.)

98. Group Study for Undergraduates (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Individual Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Intermediate Micro Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A, 1B, Mathematics 16A-16B or 21A-21B, with grade of C- or better in each. Price and distribution theory under conditions of perfect and imperfect competition. General equilibrium and welfare economics. Only 2 units of credit allowed to students who have completed course 104. Not open for credit to students who have completed Agricultural and Resource Economics 100A or 100B.—I, II, III. (I, II, III.)

101. Intermediate Macro Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A, 1B, Mathematics 16A-16B or 21A-21B, with grade of C- or better in each. Theory of income, employment and prices under static and dynamic conditions, and long term growth. Only 2 units of credit allowed to students who have completed course 105.—I, II, III. (I, II, III.)

102. Analysis of Economic Data (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A, 1B, Statistics 13 or 32, Mathematics 16A-16B or 21A-21B, with grade of C- or better in each, or consent of instructor. Analysis of economic data to investigate key relationships emphasized in introductory microeconomics and macroeconomics. Obtaining, transforming, and displaying data; statistical analysis of economic data; and basic univariate and multivariate regression analysis. Only 2 units of credit allowed to students who have completed course 140 or Agricultural and Resource Economics 106.—I, II, III. (I, II, III.) Cameron, Cascio, Miller

103. Economics of Uncertainty and Information (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or 104, Mathematics 16A and 16B or Mathematics 21A and 21B. Optimal decisions under uncertainty, expected utility theory, economics of insurance, asymmetric information, signalling in the job market, incentives and Principal-Agent theory, optimal search strategies and the reservation price principle.—I., II. (I, II.) Quinzii, Bonanno

104. Intermediate Microeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A, 1B and Mathematics 16A or 21A. Price and distribution theory under conditions of perfect and imperfect competition. Not open for credit to students who have completed course 100 or Agricultural and Resource Economics 100A or 100B. Intended for non-majors. GE credit: SocSci.

105. Intermediate Macroeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A, 1B and Mathematics 16A or 21A. Theory of income, employment and prices, with policy implications. Not open for credit to students who have completed course 101. Intended for non-majors. GE credit: SocSci.

110A. World Economic History Before the Industrial Revolution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A and 1B. Development and application of analytical models to explain the nature and functioning of economies before the Industrial Revolution. Examples will be drawn from a variety of societies, including England, China, Polynesia, and Pre-Columbian America. GE credit: SocSci.—I, II, III. (I., II, III.) Clark

110B. World Economic History Since the Industrial Revolution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A, 1B and 110A. Development and application of analytical models to explain the nature and functioning of economies since the Industrial Revolution. Examples will be drawn from a variety of societies, including England, China, Germany, and India. GE credit: SocSci.—II, III. (II, III.) Clark

111A. Economic History (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A-1B or consent of instructor. Survey of economic change in the United States from Colonial times to 1865; reference to other regions in the Western Hemisphere. GE credit: SocSci.—I, II, III. (I, II, III.) Walton

111B. Economic History (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A-1B, or consent of instructor. Survey of economic change in the United States from 1865 to the post World War II era. GE credit: SocSci.—I, II, III. (I, II, III.)

115A. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B. Major issues encountered in emerging from international poverty, including problems of growth and structural change, human welfare, population growth and health, labor markets and internal migration. Important issues of policy concerning international trade and industrialization. (Same course as Agricultural and Resource Economics 115A.) GE credit: SocSci, Div.—I, II, III. (I, II, III.) Boucher, Rozelle

115B. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B. Major macroeconomic issues of developing countries. Issues include problems in generating capital, conduct of monetary and fiscal policies, foreign aid and investment. Important

issues of policy concerning international borrowing and external debt of developing countries. (Same course as Agricultural and Resource Economics 115B.) GE credit: SocSci.—I, II, III. (I, II, III.) Woo

116. Comparative Economic Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or 104, Mathematics 16A and 16B, or 21A and 21B. Economic analysis of the relative virtues of capitalism and socialism, including welfare economics. Marxian exploitation theory, the socialist calculation debate (Hayek and Lange), alternative capitalist systems (Japan, Germany, U.S.) and contemporary models of market socialism. GE credit: SocSci.

121A. Industrial Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A-1B, 100 or 104, or consent of instructor. An appraisal of the role of competition and monopoly in the American economy; market structure, conduct, and economic performance of a variety of industries. GE credit: SocSci.—I, II, III. (I, II, III.) Bonanno, Knittel

121B. Industrial Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A, 1B, 100, or 104, or consent of instructor. The study of antitrust and economic regulation. Emphasis on applying theoretical models to U.S. industries and case studies, including telecommunications, software, and electricity markets. Topics include natural monopoly, optimal and actual regulatory mechanisms, deregulation, mergers, predatory pricing, and monopolization. GE credit: SocSci.—I, II, III. (I, II, III.) Prieger

122. Theory of Games and Strategic Behavior (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or 104, Mathematics 16B or 21B or consent of instructor. Introduction to game theory. Explanation of the behavior of rational individuals with interacting and often conflicting interests. Noncooperative and cooperative theory. Applications to economics, political science and other fields.—I, II. (I, II.) Bonanno

130. Public Microeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or 104, or consent of instructor. Public expenditures; theory and applications. Efficiency and equity of competitive markets; externalities, public goods, and market failures; positive and normative aspects of public policy for expenditure, including benefit-cost analysis. Topics include consumer protection, pollution, education, poverty and crime.—I, II, III. (I, II, III.) Page

131. Public Finance (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or 104. Assessing the economic burden of taxation; equity and efficiency considerations in tax design; structure and economic effects of the U.S. tax system (including personal income tax, corporation income tax, and property tax); tax loopholes; recent developments; tax reform proposals.—I, II, III. (I, II, III.) Helms, Stevens

132. Health Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or consent of instructor. The health care market, emphasizing the role and use of economics. Individual demand, provision of services by doctors and hospitals, health insurance, managed care and competition, the role of government access to health care.—II, III. (II, III.) Cameron

134. Financial Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A, 1B, and 100 or 104; Mathematics 16A; Statistics 13. General background and rationale of corporation; finance as resource allocation over time; decision making under uncertainty and the role of information; capital market and interest rate structure; financial decisions. Students who have completed Agricultural and Resource Economics 171A may not receive credit for this course.—I, II, III. (I, II, III.) Nehring, Quinzii

135. Money, Banks and Financial Institutions (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 101 or 105. Monetary institutions, the banking system, money creation, the Federal Reserve System, the tools of monetary policy.—I, II, III. (I, II, III.)

136. Topics in Macroeconomic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 101 or 105. Advanced topics in macroeconomic theory. Possible topics include money demand, financial intermediation, rational expectations, growth theory.—I, II, III. (I, II, III.) Makowski

137. Macroeconomic Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 101 or 105. Theory and practice of macroeconomic policy, both monetary and fiscal.—I, III. (I, III.) Salyer

140. Econometrics (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 100 or 104 and course 101 or 105, Mathematics 16A and 16B or 21A and 21B, Statistics 13, course 102 or any upper division statistics course. Introduction of problems of observation, estimation and hypotheses testing in economics through the study of the theory and application of linear regression models, critical evaluation of selected examples of empirical research and exercises in applied economics. Not open for credit to students who have completed Agricultural and Resource Economics 106.—I, II, III. (I, II, III.) Jorda

145. Transportation Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100, Mathematics 16A, 16B, Statistics 13 or consent of instructor. Intended for advanced economics undergraduates. Examination of fundamental problems of planning and financing transportation "infrastructure" (roads, ports, airports). The economics of the automobile industry, as well as the impact of government regulation and deregulation in the airlines and trucking industries.—II. (II.) Feenstra

151A. Economics of the Labor Market (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or 104. Theory of labor supply and demand; determination of wages and employment in the labor market. Economic theories of labor unions. Policy issues: labor force participation by married women; minimum wages and youth unemployment; effect of unions on wages.—I, II, III. (I, II, III.) Hoynes, Miller

151B. Economics of Human Resources (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 151A. Human resource analysis; introduction to human capital theory and economics of education; the basic theory of wage differentials, including theories of labor market discrimination; income distribution; poverty. Policy issues; negative income tax; manpower training programs; incomes policy.—I, II, III. (I, II, III.) Page, Cascio

160A. International Microeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A, 1B, 100 or 104, or consent of instructor. International trade theory: impact of trade on the domestic and world economies; public policy toward external trade. Only 2 units of credit allowed to students who have completed course 162.—I, II, III. (I, II, III.) Swenson

160B. International Macroeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A, 1B, and 100 or 104, and course 101 or 105, or consent of instructor. Macroeconomic theory of an open economy. Balance of payments adjustment mechanism, international monetary economics issues; international financial institutions and their policies. Only 2 units of credit allowed to students who have completed course 162.—I, II, III. (I, II, III.) Taylor

162. International Economic Relations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A-1B or consent of instructor. International trade and monetary relations, trade policy, exchange rate policy, policies toward international capital migration and investment. Emphasis on current policy issues. Course intended especially for nonmajors. Not open for credit to students who have completed course 160A or 160B. GE credit: SocSci.—I, II, III. (I, II, III.)

171. Economy of East Asia (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A-1B or consent of instructor. Intensive reading, discussion and research on selected topics from the economies of the countries of East Asia. Consult department for course scheduling.

190. Topics in Economics (4)
Lecture/discussion-seminar—4 hours. Selected topics in economic analysis and public policy. Variable content. May be repeated for credit.—I, II, III. (I, II, III.)

190X. Upper Division Seminar (1-4)
Seminar—1-4 hours. Prerequisite: courses 100 or 104; and 101 or 105; and consent of instructor. In-depth examination at an upper division level of a special topic in Economics. Emphasis on focused analytical work. May not be repeated for credit. Limited enrollment.

192W. Internship in the Davis-in-Washington Program (6-8)
Internship—18-24 hours. Prerequisite: junior or senior standing in Economics; completion of 84 units of credits with a minimum grade-point average of 3.00; admission to the Davis-in-Washington Program. Internship in Washington, DC with associated research project. Students must arrange for a faculty sponsor before embarking on the internship. Maximum of 3 units will count toward satisfying Economics major requirements. (P/NP grading only.)

194HA-194HB. Special Study for Honors Students (4-4)
Independent study—3 hours; seminar—1 hour. Prerequisite: major in Economics with senior standing; consent of instructor and completion of 135 units with a minimum GPA of 3.5 in courses counted toward the major. A program of research culminating in the writing of a senior honors thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of course.)

197T. Tutoring in Economics (1-5)
Tutorial—3-15 hours. Prerequisite: consent of instructor and chairperson. Undergraduates assist the instructor by tutoring students in one of the department's regularly scheduled courses. May be repeated for up to 10 units of credit. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200A. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: graduate standing. Linear and non-linear optimization theory applied to develop the theory of the profit-maximizing firm and the utility-maximizing consumer. (Same course as Agricultural and Resource Economics 200A.)—I. (I.) Silvestre

200B. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 200A. Characteristics of market equilibrium under perfect competition, simple monopoly and monopsony. Emphasis on general equilibrium and welfare economics; the sources of market success and market failure. (Same course as Agricultural and Resource Economics 200B.)—II. (II.) Quinzii

200C. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 200B. Uncertainty and information economics. Individual decision making under uncertainty. Introduction to game theory, with emphasis on applications to markets with firms that are imperfect competitors or consumers that are imperfectly informed. (Same course as Agricultural and Resource Economics 200C.)—III. (III.) Makowski

200D. Macroeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 101, Mathematics 21A, 21B, and 21C. Macro static theory of income, employment, and prices.—II. (II.) Cogley

200E. Macroeconomic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200B (may be taken concurrently) and 200D. Macrodynamic theory of income, employment, and prices.—III. (III.) Salyer

201A. History of Economic Thought (4)
Lecture—3 hours; discussion—1 hour. Economic thought from the classical Greece era to modern times. Offered in alternate years.

201B. History of Economic Thought II (4)
Lecture—3 hours; discussion—1 hour. Origins and emergence of modern economic analysis. Offered in alternate years.

203A. Advanced Economic Theory (4)
Lecture—4 hours. Prerequisite: course 200A, 200B. Advanced topics in general equilibrium theory and welfare economics: existence, determinateness and efficiency; intertemporal economies; uncertainty.

203B. Advanced Economic Theory: Game Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A, 200B, 200C. Covers the most recent developments in game theory, with the focus changing from year to year. Main topics are: refinements of Nash equilibrium, repeated games, evolution, social situations, bounded rationality, and bargaining theory.

203C. Topics in Economic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A, 200B, 200C. Selected topics in contemporary microeconomic theory. May be repeated for credit with the consent of the Graduate Studies Committee.

204. Microeconomic Analysis (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A-100B; Mathematics 21A, 21B and 21C (or Mathematics 16A, 16B and 16C); open to advanced undergraduates with consent of instructor. Economic reasoning and social choice: behavior of firms and households, theory of markets, partial and general equilibrium analysis, welfare economics, illustrations and applications. (Same course as Agricultural and Resource Economics 204.)—I. (I.) Sexton

207. Contemporary Economics Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing in Economics. Seminar series on topics of current interest. May be repeated for credit. (S/U grading only.)—I, III. (I, III.)

209A. Economics of Distributive Justice (4)
Lecture—4 hours. Prerequisite: course 200B. Introduction to social choice theory; envy-free allocations; axiomatic bargaining theory; axiomatic characterizations of resource allocation. Applications to modeling of the distributive theories of political philosophers J. Rawls, R. Dworkin, R. Nozick, and G.A. Cohen. Offered in alternate years.

209B. Public Ownership Economics (4)
Lecture—4 hours. Prerequisite: course 200B. Public ownership from the viewpoint of microeconomics, in particular general equilibrium and welfare economics. Topics include returns to scale and firm ownership, common-pool resources, externalities, and solution concepts for economies with public and private ownership. Offered in alternate years.

209C. Foundations of Decision Theory (4)
Lecture—4 hours. Prerequisite: course 200B. Rigorous exposition of subjective expected utility theory; foundations, normative and empirical challenges. Topics include intertemporal decision; learning; incompleteness and ambiguity; individual and social choice; game theory as interactive decision theory; bounded rationality. Offered in alternate years.

210A. Economic History (4)
Lecture/discussion—4 hours. Economic history of the eastern hemisphere in the modern period. Medieval Europe or other regions may be studied, depending on student interest.—I. (I.) Clark

210B. Economic History (4)
Lecture/discussion—4 hours. The United States from Colonial times to the present. Other areas of the western hemisphere may be studied, according to student interest.—II. (II.) Olmstead

210C. Economic History (4)
Seminar—4 hours. Prerequisite: a graduate course in economic history. Selected topics and issues, emphasis on current research. (Quarter offered to be flexible.)—III. (III.) Lindert

214. Development Economics (4)
Lecture—4 hours. Prerequisite: Agricultural and Resource Economics 100A, 100B, course 101; Agricultural and Resource Economics/Economics 204 and course 160A-160B recommended. Review of the principal theoretical and empirical issues whose analysis has formed development economics. Analysis of economic development theories and development strategies and their application to specific policy issues in developing country contexts. (Same course as Agricultural and Resource Economics 214.)—II. (II.) Boucher

215A. Microdevelopment Theory and Methods I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A or 204; course 240A recommended. Agricultural development theory, with a focus on microeconomics. Agricultural household behavior with and without market imperfections and uncertainty. Analysis of rural land, labor, credit and insurance markets, institutions, and contracts. (Same course as Agricultural and Resource Economics 215A.)—I. (I.) Taylor

215B. Open Macroeconomics of Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics/Economics 200A or 204, 200D or 205, and 214 or 215A. Models and policy approaches regarding trade, monetary and fiscal issues, capital flows and debt are discussed in the macroeconomic framework of an open developing country. The basic analytical focus is real exchange rate and its impact on sectoral allocation of resources. (Same course as Agricultural and Resource Economics 215B.)—II. (II.) Boucher

215C. Microdevelopment Theory and Methods II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 215A. Extension of development theory and microeconomic methods. Agricultural growth and technological change; poverty and income inequality; multisectoral, including village and regional models. Computable general equilibrium methods and applications. (Same course as Agricultural and Resource Economics 215C.)—III. (III.) Rozelle

215D. Environment and Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200A, 204 or Agricultural and Resource Economics 275. Interdisciplinary course drawing on theoretical and empirical research on interactions between environmental resource use and economic development processes. Analysis of issues emerging at the interface of environmental and development economics. (Same course as Agricultural and Resource Economics 215D.)—III. (III.) Farzin

221A. The Theory of Industrial Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A, 200B, 200C. Game theory is used to analyze strategic interaction of firms in industries. Topics include models of competition, product differentiation, entry-deterring strategies, contractual arrangements, vertical control and antitrust issues.—I. (I.) Bonanno

221B. Empirical Analysis in Industrial Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 221A and 240B. Recent empirical work in industrial organization. Topics include empirical analysis of cartels, product differentiation, innovation and technological change, and imperfect competition in international markets.—II. (II.) Knittel

221C. Industrial Organization and Regulation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 221A and 240B. Optimal regulation of natural monopoly. Topics include regulatory mechanisms for single and multiple output firms under symmetric and asymmetric information, optimality without regulation, the economic theory of regulation, and empirical studies of regulation and deregulation.—III. (III.) Prieger

230A. Public Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200C. Measures of deadweight loss and consumer surplus; optimal commodity and income taxation; tax incidence; policy issues in personal taxation, corporate taxation, and social insurance; the evaluation of effective tax rates.—II. (II.) Helms

230B. Public Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 230A, 240A, 240B. Effects of government policies on economic behavior; labor supply, program participation, investment, consumption and savings.—I. (I.) Miller

230C. Public Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200C and 240B. Advanced topics in economics of the public sector, with emphasis on current research. Topics may vary from year to year.—III. (III.) Hoynes

235A. Alternative Approaches to Monetary Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D (may be taken concurrently). Focuses on relation between changes in money supply and changes in nominal GNP. Also discusses the effect of changes in money supply on interest rates.—I. (I.) Salyer

235B. Monetary Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 235A. Emphasizes problem of finding an appropriate place for money in microeconomic/general equilibrium models. Consideration given to meaning of money, its relation to inflation and the real economy and to its role in models of finance.—II. (II.) Jorda

235C. Monetary Policy (4)
Lecture—3 hours; discussion—1 hour. Organization of the Federal Reserve Bank, the definition of money, goals and tools of monetary policy, alternative targets for monetary policy, impact of monetary policy, the problem of lags, alternative policies.—III. (III.) Cogley

240A. Econometric Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 133 and a course in linear algebra or the equivalent. Least squares, instrumental variables, and maximum likelihood estimation and inference for single equation linear regression model; linear restrictions; heteroskedasticity; autocorrelation; lagged dependent variables. (Same course as Agricultural and Resource Economics 240A.)—II. (II.) Cameron

240B. Econometric Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240A. Topics include asymptotic theory and instrumental variables, pooled time-series cross-section estimation, seemingly unrelated regression, classical hypothesis tests, identification and estimation of simultaneous equation models, cointegration, error-correction models, and qualitative and limited dependent variable models. (Same course as Agricultural and Resource Economics 240B.)—III. (III.) Havenner

240C. Econometric Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240B. Finite sampling theory; nonlinear and dynamic econometric models; asymptotic distribution theory. (Same course as Agricultural and Resource Economics 240C.)—II. (II.) Jorda

240D. Topics in Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240B. Advanced topics in nonlinear econometric modelling. Contents may vary from year to

year. (Same course as Agricultural and Resource Economics 240D.)—I. (I.) Cameron

240E. Topics in Applied Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 240A and 240B. Examination of modern econometric techniques used in applied fields of economic research, such as demand analysis, environmental economics, macroeconomics/finance, etc. Emphasis on selection of appropriate tools for individual fields. Course focus will expand topics covered in Economics 240A and 240B. (Same course as Agricultural and Resource Economics 240E.)—III. (III.) Smith

250A. Labor Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 150A-150B or the equivalent. Philosophy, theory and history of American and foreign labor movements; union structure, organization and collective bargaining under changing labor market conditions; current labor market issues.—II. (II.) Stevens

250B. Labor Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 151A or consent of instructor; course 204 or 200A recommended. Microeconomic theory of labor supply and labor demand, estimation of labor supply and demand functions; human capital theory; labor market analysis.—III. (III.) Page

256. Applied Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 106 or Economics 140, or the equivalent. Application of statis-tical tools to economic and business analysis. Emphasis on regression analysis, problems of specification, and model development. (Same course as Agricultural and Resource Economics 256.)—II. (II.) Heien

260A. International Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A or 204. Theory of trade determinants; gains from trade; tariffs and effective protection; economic unions.—I. (I.) Feenstra

260B. International Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200D and 200E. Balance of payments adjustment mechanisms; foreign exchange markets' theories of balance of payments policy and international monetary mechanisms.—II. (II.) Woo

260CN. International Investment and Trade (4)
Seminar—4 hours. Prerequisite: course 260A. Analysis of foreign investment and its links to trade; theories of the firm as they relate to firm's export and investment decisions; and an introduction to the political economy of trade policies.—II. (II.) Swenson

260D. Topics in International Macroeconomics (4)
Seminar—4 hours. Prerequisite: course 260B or consent of instructor. Survey of current literature in international macroeconomic theory.—III. (III.) Bergin

260E. Topics in International Trade (4)
Seminar—4 hours. Prerequisite: course 260A, 260B. Current literature in international trade theory.

270A. Economics of Growth (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D and 200E. Modern theories and empirics of economic growth beginning with the neoclassical theories up to current endogenous growth models. Emphasis on the analysis of human capital and growth, technological innovation, its diffusion and empirical evidence on growth.—I. (I.) Peri

270B. Economics of Growth (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D and 200E. Empirical analysis of growth patterns and growth models. Emphasis on the relationship between macroeconomic management and long-term growth; the use of foreign capital in accelerating growth and its occasional mishaps; the comparison of growth performance in East Asia and Latin America since WW2; the experiences of centrally-planned economies and transitions to market-based growth; and the transformation from an industrial economy to a knowledge economy.—II. (II.) Woo

270C. Economics of Growth (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D and 200E. Institutional bases; politics; contracts and commitment; money and finance; malthusian dynamics; modern economic growth; transition of industrialization; dual economies, core and periphery; sources of convergence and divergence; openness and growth; resources, demography, and geography; institutions, imperialism, and class conflicts.—III. (III.) Taylor

280. Orientation to Economic Research (2)
Discussion—2 hours. Course tries to bridge the gap between students' classwork and their subsequent research. It deals with topics such as the origination of a research project, some mechanics of empirical research and hints on the submission of research papers. (S/U grading only.)

290. Topics in Economics (4)
Seminar—4 hours. Prerequisite: consent of instructor. Selected topics in economic analysis and public policy, focusing on current research. May be repeated for credit.

298. Group Study (1-5)
Discussion—1-5 hours. Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

299. Individual Study (1-12)
Prerequisite: consent of instructor and graduate standing. (S/U grading only.)

299D. Dissertation Research (1-12)
(S/U grading only.)

Professional Course

397. Teaching of Economics (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing in economics. Teaching of economics: methods of instruction, organization of courses, examination and evaluation procedures. (S/U grading only.)—I. (I.) Salyer

Economy, Justice, and Society

Joaquim Silvestre, Ph.D., Program Director

Program Office, 1135 Social Sciences and Humanities Building (530-752-0743)

http://ejs.ucdavis.edu

Committee in Charge

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Scott S. Gartner, Ph.D. *(Political Science)*
Hilary W. Hoynes, Ph.D. *(Economics)*
Robert W. Jackman, Ph.D. *(Political Science)*
Marianne E. Page, Ph.D. *(Economics)*
Kimberlee A. Shauman, Ph.D. *(Sociology)*
Xiaoling Shu, Ph.D. *(Sociology)*

Graduate Study. The Program in Economy, Justice, and Society offers a designated emphasis in Economy, Justice, and Society open to students pursuing a doctoral degree in philosophy, political science, or economics. The designated emphasis provides interdisciplinary training in related aspects of economic theory, political theory, and political philosophy. Students take one or two core courses offered by the program, a designated field in their home department, a choice of two designated courses in the other two departments, and attend an advanced workshop/seminar run by the program. For students choosing the emphasis, these requirements will be in lieu of some requirements for the Ph.D. in the participating departments. Upon graduation, students receive a Ph.D. in their major with a designated emphasis in Economy, Justice, and Society.

Graduate Adviser. Consult program office or a program graduate adviser in one of the three departments listed above.

Courses in Economy, Justice, and Society (EJS)

Upper Division Course

100. Microeconomic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A or graduate standing. Basic concepts, modes of reasoning and fundamental results in modern microeconomics. Emphasis on, first, Utility Theory; second, the logic of the equilibrium method; third, welfare economics and public policy.

Graduate Courses

207. Interdisciplinary Social Analysis (3)
Lecture—2 hours; term paper. Prerequisite: graduate standing in Economics, Philosophy, or Political Science; course 100, Philosophy 117, or the equivalents. Analysis of practical and theoretical social problems with tools of economic theory, philosophy, and political theory, e.g., the welfare state, risk and public policy, equality of opportunity, individual rationality and cooperation.

209A. Economic Models of Distributive Justice (4)
Lecture—4 hours. Prerequisite: course 100 or the equivalent, and graduate standing. Introduction to social choice theory; envy-free allocations; axiomatic bargaining theory; axiomatic characterizations of resource allocation. Applications to modeling of the distributive theories of political philosophers. Offered in alternate years.

209B. Economic Models of Public Ownership (4)
Lecture—4 hours. Prerequisite: course 100 or the equivalent and graduate standing. Public ownership from the viewpoint of microeconomics, in particular, general equilibrium and welfare economics. Topics include returns to scale and firm ownership, common-pool resources, externalities, and solution concepts for economies with public and private ownership. Offered in alternate years.

209C. Foundations of Decision Theory (4)
Lecture—4 hours. Prerequisite: course 100 or the equivalent and graduate standing. Rigorous exposition of subjective expected utility theory; foundations, normative and empirical challenges. Topics include intertemporal decision; learning; incompleteness and ambiguity; individual and social choice; game theory as interactive decision theory; bounded rationality. Offered in alternate years.

Education, School of

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Hugh C. Black, Ph.D., Professor Emeritus
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Janet Papale, M.A., M. Phil., Coordinator, Publications and Teacher Research
Lisa, Villarreal, M.A., Executive Director, CRESS Center
Peggy Watterson, B.A., Co-Director, Reading and Writing in the Content Areas
Jill Wilson, Ph.D., Executive Director, CRESS Center

Graduate Study. See the "School of Education" chapter in this catalog.

Graduate Study Program Advisers. K. Bray, C. Kosmitzki.

Teacher Education-—Credentialing Program Advisers. C. Kosmitzki, J. MacDonald

Teacher Education Faculty Advisers—Elementary. J. Galli-Banducci, A. Kato.

Bilingual Emphasis. B.J. Merino.

Teacher Education Faculty Advisers—Secondary. A. Bellman, P. Holmes, J.R. Pomeroy.

Graduate Adviser. B. Merino, B. Goldman *(Teaching Credential Program).*

UCD/CSU Sacramento Collaborative Elementary Credential Program
Barbara Goldman (UC Davis) and Jose Cintron (CSU Sacramento), Program Directors

Program Office, 2078 Academic Surge
530-752-0757
e-mail: eduadvising@ucdavis.edu

Collaborative Adviser. J. Johnson

UCD/CSU Fresno Joint Doctoral Program (Ed.D.)
Phillip Young, Ph.D., Co-Director, UC Davis

Sharon Brown-Welty, Ph.D., Co-Director, CSU Fresno

UC Davis Office, 2078 Academic Surge
(530-752-0761; Fax, 530-752-5411);
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CSU Fresno Program Office
(559-278-0427; Fax: 559-278-0457);
e-mail: dianer@csufresno.edu

Minor Program Requirements:

The Minor in Education is considered a foundation for undergraduates who wish to obtain a teaching credential, obtain a master's degree in education or a related field, pursue a doctoral degree in education, enter a profession that focuses on work with people, or develop a better understanding of issues confronting education today.

At least 16 units of the 20-unit minimum for the minor must be in Education. One course in a related field is acceptable for the minor.

	UNITS
Education	**20**
Education 100, 110, 120	12
Elective courses	8

The remaining 8 units may be taken from the following courses in Education, with the option of selecting one course from the list of approved elective courses outside of Education:

Education:
Education 115, 122, 130, 151, 152, 153, 163, 192*, 199 (with approval)*

Approved courses outside of Education:
African American and African Studies 130, American Studies 152, Asian American Studies 101, Biological Sciences 195A or B, English 197TC, 104D, Human Development 100A, 100B, 101, Linguistics 173, Mathematics 197TC, Psychology 130, 132, Sociology 124, Spanish 116, 117

* Internship (192, 195TC, 197TC) and Independent Study (199) or a combination of both, may not exceed a total of 4 units. Elective course may include only one internship.

Minor Advisers. A designated faculty member in the School of Education may advise students and give final approval on the minor. For additional advising and information, contact R. Figueroa, or the Student Services Office, 2078 Academic Surge.

Courses in Education (EDU)

Lower Division Course

92. Internship (1-3)
Internship—3-9 hours. Prerequisite: consent of instructor. Enrollment dependent on availability of intern placements. Internship as a teacher's aide or tutor in K-12 classrooms under the supervision of a faculty member. May be repeated for credit. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

Upper Division Courses

100. Introduction to Schools (4)
Lecture—3 hours; field work—3 hours. Prerequisite: upper division standing. Study of occupational concerns of teachers; skills for observing classroom activities; school organization and finance; school reform movement; observing, aiding, and tutoring in schools.—I, II, III. (I, II, III.) Galli-Banducci

110. Educational Psychology: General (4)
Lecture/discussion—4 hours. Prerequisite: Psychology 1; upper division standing. Learning processes, cognitive development, individual differences, testing and evaluation. GE credit: SocSci, Wrt.—I, II, III. (I, II, III.) Gandara

114. Quantitative Methods in Educational Research (4)
Lecture/discussion—4 hours. Prerequisite: two years of high school algebra. Problems and methods in data analysis. Design of research projects. Some consideration of procedures suited to digital computers.—I. (I.) Sandoval

115. Educating Children with Disabilities (2)
Lecture—2 hours. Prerequisite: upper division standing. Educational issues and processes involved in teaching children with disabilities. The course will focus on the structure of special education, with an emphasis on meeting the educational needs of children who are mainstreamed in regular classes.—II, III. (II, III.) Figueroa

120. Philosophical and Social Foundations of Education (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: upper division standing. Philosophical, historical, and sociological study of education and the school in our society. GE credit: SocSci, Wrt.—I, II, III. (I, II, III.) Wagner, Timar

122. Children, Learning and Material Culture (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour; fieldwork. Prerequisite: upper division standing or consent of instructor. How material artifacts shape what and how children learn in school, at home, and in the community. Artifacts examined include books, computers, household appliances, toys and games, entertainment media, collectibles, sports equipment, clothing, folk arts and crafts, and neighborhood space. Offered in alternate years. GE credit: SocSci, Div, Wrt.—(III.) Wagner

130. Issues in Higher Education (4)
Discussion—3 hours; field work—3 hours. Prerequisite: upper division standing or consent of instructor. Analysis of current issues in higher education and of some practical implications of varying philosophical approaches to the role of the university.—III.

151. Language Development in the Chicano Child (3)
Lecture/discussion—3 hours. Prerequisite: some knowledge of Spanish and linguistics recommended. Bilingualism, first and second language acquisition, bilingual education, language assessment, Chicano Spanish and the role of dialect varieties in the classroom. Not open for credit to students who have completed course 151T.—I. (I.) Merino

151T. Language Development in the Chicano Child (3)
Lecture/discussion—3 hours. Prerequisite: some knowledge of Spanish and linguistics recommended. Bilingualism, first and second language acquisition, bilingual education, language assessment, Chicano Spanish and the role of dialect varieties in the classroom. Not open for credit to students who have completed course 151.—I. Merino

152. Communication Skills for Bilingual Teachers (3)
Lecture—2 hours; field work—3 hours. Prerequisite: course 151; Spanish 2, 8A-8B. The development of communication skills of prospective educators with an emphasis on the study and use of standard Spanish and Southwest Spanish dialects in teaching science, mathematics, social science, music, art, and language arts to bilingual elementary school pupils.—III. (III.)

153. Cultural Diversity and Education (2)
Lecture/discussion—2 hours. Prerequisite: upper division standing. Analysis of research on learning styles among culturally diverse students with review and evaluation of responsive curricula and classroom teaching techniques. The ethnographic interview as a research tool. Not open for credit to students who have completed course 153T.—I, II, III. (I, II, III.) Athanases

153T. Cultural Diversity and Education (2)
Lecture/discussion—2 hours. Prerequisite: upper division standing. Analysis of research on learning styles among culturally diverse students with review and evaluation of responsive curricula and classroom teaching techniques. The ethnographic interview as a research tool. Not open for credit to students who have completed course 153.—I, II, III. Merino

160A. Introduction to Peer Counseling (2)
Lecture/discussion—2 hours. Prerequisite: upper division standing and consent of instructor. Introduction to peer counseling techniques and development of peer counseling skills. (P/NP grading only.)—I, II. (I, II.) Zeh

160B. Issues in Peer Counseling (2)
Lecture/discussion—2 hours. Prerequisite: upper division standing and consent of instructor; course 160A recommended. In-depth review and development of skills for specific counseling topics. May be repeated once for credit when topic differs. (P/NP grading only.)—I, II, III. (I, II, III.)

163. Guidance and Counseling (4)
Lecture—4 hours. Prerequisite: course 110 (may be taken concurrently). Nature and scope of pupil personnel services; basic tools and techniques of guidance; theory and practice of counseling psychology, with emphasis on educational and vocational adjustment.—III. (III.) Figueroa

180. Computers in Education (3)
Lecture—1 hour; seminar—1 hour; laboratory—3 hours. Prerequisite: upper division or graduate standing. Applications of computers in education as instructional, intellectual, and communication tools. Not open for credit to students who have completed course 180T, 181, or 182.—I, II, III. (I, II, III.) Pomeroy

180T. Computers in Education (3)
Lecture—1 hour; seminar—1 hour; laboratory—3 hours. Prerequisite: upper division or graduate standing. Applications of computers in education as instructional, intellectual, and communication tools. Not open for credit to students who have completed course 180, 181, or 182.—I, II, III. Pomeroy

182. Computer Project for Curricular Integration (1)
Seminar—1 hour. Prerequisite: Agricultural Systems and Environment 21 or appropriate microcomputer course, experience with instructional computing and consent of instructor. Design and implementation of a curricular unit to integrate computer technology into a K-12 classroom setting. A project-based seminar intended for students with substantial prior experience with instructional use of computers and related technologies. Not open for credit to students who have completed course 180 or 181.

192. Internship (1-3)
Internship—2-8 hours; discussion—1 hour. Prerequisite: upper division standing and consent of instructor. Internship as a tutor, teacher's aide, or peer counselor in a school or educational counseling setting under the supervision of a faculty member. May be repeated for credit. (P/NP grading only.)

197T. Tutoring in Education (1-2)
Tutoring—1-2 hours. Prerequisite: upper division standing and consent of instructor. Leading of small voluntary discussion groups affiliated with the School's upper division courses under the supervision of, and at the option of, the course instructor, who will submit a written evaluation of the student's work. May be repeated once for credit for a total of 4 units. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Courses

200. Educational Research (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: introductory statistics and graduate standing in education or consent of instructor. Defining educational research questions, reviewing relevant literature, developing research designs, developing research instruments, selecting appropriate data analysis procedures, and writing research projects. A case problem will provide practice in designing and reporting research.—I. (I.) Young

201. Qualitative Research in Education (4)
Seminar—2 hours; lecture—2 hours. Prerequisite: graduate standing or consent of instructor. Examines the design and conduct of educational research using non-numerical data (e.g., text, discourse, imagery and artifacts). Focuses on issues (e.g., validity, reliability, generalizability, ethics) and reporting genres (e.g., narrative accounts, case studies, and arguments). (Former course 203.)—II. (II.) Wagner

202N. Computer Analysis of Qualitative Data (4)
Seminar—3 hours; laboratory—2 hours. Prerequisite: graduate standing or upper division standing with consent of instructor. Critical and practical understanding of how to use computer software programs to analyze qualitative data (text, images, and videotape) in conducting social research. Offered in alternate years.—III. (III.) Wagner

203. Educational Testing and Evaluation (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Introduces the theoretical assumptions underlying traditional test construction, as well as the basic statistical principles involved in the design, evaluation, and interpretation of standardized tests. Also introduces the debates surrounding the uses of different kinds of tests and evaluation tools.—III. (III.) Figueroa

204A. Quantitative Methods in Educational Research: Analysis of Correlational Designs (4)
Discussion—2 hours; laboratory/discussion—2 hours. Prerequisite: course 114 or the equivalent. Methods for analysis of correlation data in educational research. Topics include multiple correlation and regression, discriminant analysis, logistic regression, and canonical correlation. Emphasis on conceptual understanding of the techniques and use of statistical software. Offered in alternate years.—II. Sandoval

204B. Quantitative Methods in Educational Research: Experimental Designs (4)
Discussion—2 hours; discussion/laboratory—2 hours. Prerequisite: course 114 or the equivalent. Methods for analysis of experimental data in educational research. Topics include ANOVA, fixed v. random effects models, repeated measures ANOVA, analysis of co-variance, MANOVA, chi square tests, small sample solutions to t and ANOVA. Offered in alternate years.—III. Sandoval

205A. Ethnographic Research in Schools I: Current Theory and Practice (4)
Lecture—4 hours. Prerequisite: graduate standing. Current literature from anthropology and society related to schools. Emphasis on the organizational structure of institutions, and the analysis of face-to-face interaction. Will explore the relationship between field-based research and theory development on the acquisition of knowledge in specific social and cultural contexts. (Former course 201A.)—I. (I.) Watson-Gegeo

205B. Ethnographic Research in Schools II: Field-Based Research Projects (4)
Discussion—4 hours. Prerequisite: graduate standing and course 205A. Student research projects in specific schools with cooperative critical analysis of the design, data collection, and inferencing by researchers. Students will continue to meet with instructor as a group throughout the quarter to discuss specific projects. (Former course 201B.)—II. (II.) Watson-Gegeo

206A. Inquiry into Classroom Practice: Traditions and Approaches (2)
Lecture/discussion—2 hours. Prerequisite: enrollment in teacher credential program. Introduction to traditions and approaches of teachers conducting research in their own classrooms: purposes, focal areas, methods of data collection and analysis, and written genre conventions.—I.

206B. Inquiry into Classroom Practice: Intervention and Data Collection (4)
Lecture/discussion—2 hours; fieldwork—2 hours. Prerequisite: course 206A. Analysis and application of teacher research through the development, implementation and evaluation of a classroom research-based intervention. Particular attention to research that enhances learning of English language learners and under-performing students.—II.

206C. Inquiry into Classroom Practice: Data Analysis, Interpretation, and Reporting (4)
Seminar—1 hour; fieldwork—3 hours. Prerequisite: course 206B. Procedures of data analysis. Continuous collaborative inquiry resulting in preparation of a research portfolio.—II.

207. Concepts of the Curriculum (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: graduate standing or consent of instructor. Development of the skills of philosophical analysis and argument for the establishment of a point of view, in the consideration of curriculum theory and practice. Classical and contemporary approaches to subject matter and activity emphases, hidden curriculum, and moral education.—I. (I.) Murphy

208. Presenting Educational Research in Written Reports (4)
Seminar—3 hours; extensive writing. Prerequisite: graduate standing or consent of instructor. Rhetorical and substantive challenges of presenting educational research through written reports; research rhetoric and genres; competing discourse conventions of educational research, policy, and practice; the social organization of publishing educational research. May be repeated once for credit. Offered in alternate years.—(III.) Wagner

209. Image-based Field Research (4)
Lecture/discussion—3 hours; fieldwork—2 hours. Prerequisite: graduate standing or upper division standing with consent of instructor. Critical and practical understanding of video tape and still photography as resources for enhancing field research in schools and other social setting. Offered in alternate years.—I. (I.) Wagner

210. The Psychology of School Learning (4)
Lecture/discussion—4 hours. Study of human learning theory and research related to learning in school. Classical approaches of scholars such as Ausubel, Bruner, Gagne, Piaget, Vygotsky, Skinner. Review of contemporary issues of constructivism, metacognition, problem solving, learning strategies, science and mathematics learning.—I. (I.) Sandoval

213. Individual Assessment (4)
Lecture—4 hours. Prerequisite: courses 114 and 219, admission to school psychology credential program. Theories of intellectual functioning and the measurement of cognitive abilities in school-aged children. Supervised practice in administration and scoring of contemporary tests for children including the WISC-R, the WAIS-R, the Stanford Binet, the McCarthy Scales of Children's Ability.—III. (III.) Sandoval

215. Research on Achievement Motivation in Education (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing in Education or consent of instructor. Analysis and critique of recent research on cognitive processes related to achievement motivation in school settings. Topics include self-determination theory, attribution theory, goal theory, intrinsic and extrinsic motivation, learned helplessness. psychological reactance, gender and culture, and research design.

216. School-Based Prevention Programs (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Promotion of health and mental health in schools. Topics include the theoretical base, prevention models, specific examples of techniques and programs designed to prevent learning and adjustment problems, and evaluation issues. Offered in alternate years.—III. Sandoval

218. Testing Minority Children (4)
Lecture—3 hours; fieldwork—3 hours. Prerequisite: admission to school psychology program or to M.A. bilingual education program or consent of instructor. Emphasizing tests and techniques that are appropriate for use with Hispanic students. The use of multicultural pluralistic assessment. Review studies and guidelines on use of tests with minority children. Offered in alternate years.—I. Figueroa

221. Culture and Social Organization of Schools (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Culture and social organization of schools. Examines perspectives of social researchers, educational policy-makers, and school members and their implications for educational research, policy and practice.—I. (I.) Wagner, Gandara

222. School Change and Educational Reform (4)
Lecture/discussion—2 hours; seminar—2 hours. Prerequisite: graduate standing in Education with course 120 or the equivalent. Analysis of models, processes, and case studies of school change and educational reform with respect to variable characteristics of schools and schooling, planned and unplanned change, the moral evaluation of school change, and the role of educational research. (Former course 204.)—II. (II.) Wagner

223. Education and Social Policy (4)
Seminar—4 hours. Prerequisite: graduate standing in Education or consent of instructor. Focuses on understanding the social and political context of education in the U.S. and California and how education policy is formed in the broader public arena. Develops skills in educational policy analysis. (Former course 237.)—III. Gandara

226. Culture and Social Organization of Higher Education (4)
Seminar—3 hours; field work—1 hour. Prerequisite: graduate standing or consent of instructor. Critical study of culture and social organization of higher education institutions policies and functions in the U.S., with some attention to other countries.—Wagner, Gandara

231. Culture and Learning (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with course 120 or the equivalent, or consent of instructor. Analysis of major theories of relationships between learning and the sociocultural context in which learning takes place, issues related to the academic achievement of different language groups, and implications for research and pedagogical reform.

233. Anthropology of Education (4)
Seminar—3 hours; term paper. Prerequisite: one of the following courses: Anthropology 117, 127, 129, or 222, or course 231, 201A, or 201B, or consent of instructor. Uses concepts of anthropology to examine education in such settings as family, community, and formal institutions of schooling. Course goal is to raise questions about educational issues often taken for granted and provide a perspective from which problems may be analyzed. (P/NP grading only).

235. Critical Pedagogy (4)
Seminar—4 hours. Prerequisite: Critical Theory 200A and graduate standing. A socio-cultural critique, from an interdisciplinary perspective, of educational reform and change. The critique will include an analysis of the influence of text content on the perpetuation of social power differences.

242. Research on Text Comprehension (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Analysis of recent research related to cognitive processing of written texts. Topics include word decoding, schema theory, background knowledge, assimilation, accommodation, working memory, processing depth, vocabulary acquisition, sentence-level processes, text-level processes, text structure, implications for curriculum and instruction.—III. (I.)

243. Research on the Teaching and Learning of Writing (4)
Seminar—4 hours. Prerequisite: graduate standing in Education or consent of instructor. Study of issues in research on composition; history of composition studies; data analysis techniques; product and process approaches; cognitive and social perspectives. Offered in alternate years.—III. Murphy

244. Topical Seminar in Language, Literacy and Culture (4)
Seminar—3 hours; project—1 hour. Prerequisite: graduate standing. Critical study of selected issues of language, literacy, and culture as they relate to education. May be repeated twice for credit when topic differs.—II. (II.) Athanases

249. Discourse Analysis in Educational Settings (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing and at least one previous course in linguistics or sociolinguistics, or consent of instructor. Examines form and type in discourse (e.g., narration, conversation, routines), approaches to discourse analysis, and research on classroom discourse (lessons, teaching/learning interactional sequences). Final term paper is an analysis of discourse data tape-recorded by student in a field setting. (Former course 239.)—II. (II.)

251. Research in Bilingual and Second Language Education (3)
Seminar—3 hours. Prerequisite: course 151; knowledge of a foreign language. Discussion and analysis of recent research in bilingual and second language education. Topics include: language acquisition in second language learners and bilinguals, second language teaching methods, language-use models in bilingual education, interaction analysis in bilingual/cross-cultural classrooms, use of the vernacular in classrooms. Offered in alternate years.—III. Merino

252. Multicultural Teaching and Curriculum (3)
Seminar—2 hours; field work—3 hours. Prerequisite: graduate standing or consent of instructor. Cross-cultural research on socialization, motivation, language acquisition and cognition and its application to effective classroom strategies and curriculum development for minority students. Students will develop and implement multicultural curriculum as well as use ethnographic research techniques in an educational setting. Offered in alternate years.—III. Merino

253. Language and Literacy in Linguistic Minorities (3)
Seminar—2 hours; field work—3 hours. Prerequisite: familiarity with another language and culture; graduate standing. Analysis and application of research on oral language development and literacy in language minority students, through the development, implementation, and evaluation of research-based language arts curriculum.—II. (II.) Merino, Watson-Gegeo

255. Curriculum Development and Evaluation in Mathematics (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with upper division course work in mathematics or consent of instructor. Analysis of curricular issues and goals in mathematics education, including long-term trends, current status and influences, proposed changes, and evaluation issues. Selected curriculum projects will be examined.—II. (I.) Ambrose

256A. Research in Mathematics Education (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with upper division course work in mathematics, or consent of instructor. Examination of re-search process in mathematics education; review of critical productive problems identified by researchers; evolution of trends, issues, theories and hypotheses in various areas of mathematics education research. Course emphasizes foundations. Offered in alternate years.—II. Ambrose

256B. Research in Mathematics Education (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with upper division course work in mathematics, or consent of instructor. Current research issues and activities in mathematics education: status, trends, theories and hypotheses. Formulation of research questions and design of studies. Projection of future directions for research. Offered in alternate years.—(II.) Ambrose

257. Computer Technology in Mathematics Education (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with mathematics course work; or consent of instructor. The roles of calculators, computers, and graphing calculators in mathematics education will be addressed, with emphasis on the impact of these technologies on curriculum reform. Selected efforts to integrate technology into mathematics instruction will be examined. Offered in alternate years.—(III.) Dugdale

260. The Modern History of Science Education (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with upper division coursework in science, or consent of instructor. History of curricular issues and goals in science education from the late 19th century forward, including long-term trends, current status and influences, proposed changes, and evaluation issues. National science standards and curriculum projects. Offered in alternate years.—(I.) Passmore

262A. Research Topics in Science Education I (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with upper division coursework in science, or consent of instructor. Research process and product in science education; review of critical science education issues; evolution of trends, theories and hypotheses in various areas of science education research. Survey of current major research in science education. Offered in alternate years.—(I.)

262B. Research Topics in Science Education II (4)
Seminar—4 hours. Prerequisite: course 262A and graduate standing in Education with upper division coursework in science. Current research issues and activities in science education: status, trends, theories and hypotheses. Formulation of research questions, design of studies and critical, in-depth review of literature related to the student's research interests. Offered in alternate years.—(II.)

264. Scientific Literacy and Science Education Reform (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with upper division coursework in science, or consent of instructor. Current trends in science education reform locally, regionally, and nationally focusing on scientific literacy. Equity, access and "science for all." Offered in alternate years.—(III.) Trexler

270. Research on Teacher Education and Development (4)
Seminar—3 hours; project. Prerequisite: graduate standing. Experience with formal or informal teaching recommended. Research on teacher preparation in university credential programs and on professional development of in-service teachers, with special attention to teacher preparation for work with culturally and linguistically diverse youth.—III. (III.) Athanases

275. Effective Teaching (4)
Seminar—4 hours. Review of research on the relationship of effective teacher behavior and student learning. Use of research on teacher effectiveness to develop teaching strategies. Ways to decide on the most appropriate instructional strategies in specific teaching situations.—I. (I.)

290C. Research Conference in Education (1)
Discussion—1 hour. Prerequisite: graduate standing. Presentations and critical discussions of research

in education by graduate students with their major professor. May be repeated twice for credit. (S/U grading only.)

291. Proseminar in Education (3)
Seminar—3 hours. Prerequisite: admission to the Ph.D. graduate program in Education. Seminar for first-year education doctoral students. The study of multi-disciplinary research approaches to educational issues. Reports and discussions of recent advances in education . Speakers from the graduate group faculty in Education. May be taken twice for credit.—I, II. (I, II.) Dugdale

292. Special Topics in Education (2-4)
Variable—2-4 hours. Prerequisite: completion of doctoral core courses in Education or consent of instructor. Selected topics in education. Designed to facilitate preparation for the qualifying examination or dissertation. Students will critically analyze scholarly work including their own works in progress. May be repeated for credit.—(I, II, III.)

293. Topical Seminar in School Psychology (3)
Seminar—3 hours. Prerequisite: graduate standing in Education and consent of instructor. Critical study of selected issues in education and school psychology related to the learning and mental health of children and adolescents in schools. May be repeated once for credit.

298. Group Study (1-5)
(S/U grading only.)

299. Individual Study (1-6)
Independent study—3-18 hours. Individual study under the direction of a faculty member. (S/U grading only.)

299D. Research (1-12)
Independent study—3-36 hours. Research for individual graduate students. (S/U grading only.)

Professional Courses

300. Reading in the Elementary School (4)
Lecture—3 hours; fieldwork—3 hours. Prerequisite: graduate standing. Principles, procedures, and curriculum materials for teaching of reading. Includes decoding skills with a special emphasis on phonics, comprehension skills, study skills, and reading in the content areas.—III. (I.) Galli-Banducci

301. Reading in the Secondary School (4)
Discussion—4 hours. Prerequisite: graduate standing, enrollment in the secondary credential program, or consent of instructor. Principles, procedures, and materials to help secondary school teachers improve the reading competence of students. Strategies for enhancing learning through reading and writing in all disciplines, with special attention to linguistically diverse populations.—I, II. (I, II.) Murphy

302. Language Arts in the Elementary School (2)
Lecture—2 hours. Prerequisite: graduate standing. Principles, procedures, and materials for the teaching of oral and written expression, listening skills, drama, and children's literature in elementary schools.—I. (I.) Galli-Banducci, Leonard-Fortes

303. Art Education (3)
Lecture/discussion—2 hours; laboratory—2 hours. Prerequisite: admission to multiple subject credential program. Understanding the principles of education in the arts through participation. Development of concepts, introduction to media, and techniques suitable for the elementary school with emphasis on cross-discipline exploration.—III. (III.)

304A. Teaching in the Elementary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance into a teacher education program. Supervised teaching in regular classrooms in elementary schools. Selection and organization of teaching materials. Introduction to techniques of diagnosing school achievement of children.—I. (I.)

304B. Teaching in the Elementary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance into a teacher education program. Supervised teaching in regular classrooms in elementary schools. Current conceptions of elementary school curriculum, emphasis on contributions from the social, biological, and physical sciences. Emphasis on effective teaching methods.—II. (II.)

304C. Teaching in the Elementary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance into a teacher education program. Supervised teaching in regular classrooms in elementary schools. Evaluation of teaching materials including instructional technology. Current elementary school curriculum with emphasis on contributions from fine arts and humanities.—III. (III.)

305A. Teaching in the Middle Grades (5-8)
Lecture—2 hours; seminar—2 hours; student teaching—15-30 hours. Prerequisite: acceptance into a teacher education program. Supervised teaching in regular or special education classrooms in middle grades. Current conceptions of the middle-grades curriculum with emphasis on social, biological, and physical sciences. Effective teaching methods.—I. (I.)

306A–306B–306C. Teaching in the Secondary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance into a teacher education program. Supervised teaching in regular secondary classrooms. Techniques for classroom communications; constructing goals and objectives; assessment of learning; special problems of adolescents; instructional technology.—I-II-III. (I-II-III.)

307. Methods in Elementary Science (2)
Lecture/discussion—2 hours. Prerequisite: acceptance into teacher education program. Principles, procedures, and materials for teaching the biological and physical sciences in elementary schools.—III. (III.)

308. Methods in Elementary Social Studies (2)
Lecture/discussion—2 hours. Prerequisite: acceptance into a teacher education program. Principles, procedures, and materials for teaching history and the social sciences in elementary schools.—III. (III.)

309. The Teaching of Mathematics, K–9 (3)
Lecture/discussion—3 hours. Prerequisite: acceptance into a teacher education program. Mathematics curriculum and teaching methods for K–9 reflecting the needs of California's diverse student populations.—I. (I.) Mendle

322A. Pedagogical Preparation for Secondary Social Science I (3)
Lecture/discussion—2 hours; discussion—1 hour. Prerequisite: acceptance into the Teacher Education Program. Introduction to teaching methods and curriculum approaches for secondary social science teaching. State and national curriculum standards; application of learning theory to effective instruction; interdisciplinary teaching and active learning approaches; effective teaching strategies for English Learners.—I. (I.) O'Brien

322B. Pedagogical Preparation for Secondary Social Science II (3)
Lecture/discussion—1 hour; discussion—2 hours. Prerequisite: course 322A. Intermediate teaching methods and curriculum approaches for secondary social science teaching. Interdisciplinary approaches to teaching major themes across social science content areas; teaching potentially controversial social science topics; teaching democratic civic values, student assessment and evaluation.—II. (II.) O'Brien

323A. Physical Science in the Secondary School (3)
Laboratory/discussion—2 hours; discussion/laboratory—1 hour. Prerequisite: acceptance into a teacher education program. Activity-based overview of concepts and processes in secondary school physical sciences. Emphasis upon philosophy, appropriate teaching methods, materials, assessment and evaluation of learning.—I. (I.) Pomeroy

323B. Life Sciences in the Secondary School (3)
Laboratory/discussion—2 hours; discussion/laboratory—1 hour. Prerequisite: acceptance into a teacher education program. Activity-based overview of concepts and processes in secondary school biology and life sciences. Emphasis on philosophy, appropriate teaching methods, materials, assessment and evaluation of learning, and issues.—II. (II.) Pomeroy

324A. Methods and Technology in Secondary Mathematics I (4)
Lecture/discussion—4 hours. Prerequisite: admission into a teacher education program or consent of instructor. Introduction to methods and curriculum for teaching mathematics at the secondary level. Introduction to applications of computer technology as instructional, intellectual, and communication tools for mathematics teachers.—I. (I.) Dugdale, Bellman

324B. Methods and Technology in Secondary Mathematics II (4)
Lecture/discussion—4 hours. Prerequisite: admission into a teacher education program or consent of instructor. Expansion of methods and curriculum for teaching mathematics at the secondary level. Intermediate applications of computer technology as instructional, intellectual, and communication tools in mathematics teaching.—II. (II.) Dugdale, Bellman

325. Research and Methods in Secondary English Language Arts (4)
Discussion—4 hours. Prerequisite: admission to graduate standing or credential program in Education or consent of instructor. Research on teaching and learning in the language arts. Principles, procedures and materials for improving the writing, reading and oral language of secondary students, with special attention to students from culturally and linguistically diverse populations.—III. (III.) Holmes

326. Teaching Language Minority Students in Secondary Schools: Methods and Research (4)
Seminar—3 hours; field work—3 hours. Prerequisite: graduate standing in Education of consent of instructor. Research on principles, procedures and curricula for teaching discipline-specific concepts to language-minority students in secondary schools. Second-language acquisition principles and instructional strategies.—II. (II.) Holmes

398. Group Study (1-5)
(S/U grading only.)

399. Individual Study (1-5)
(S/U grading only.)

Education (A Graduate Group)

Tom Sallee, Chairperson of the Group

Group Office, 2078 Academic Surge (530-752-0761; Fax: 530-752-5411); e-mail: kbray@ucdavis.edu

Faculty

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Brenda Bryant, Ph.D., Professor *(Human Development)*
Pamela Castori, Ph.D., Education Extension Specialist for Science, Coordinator of CRESS Teacher Research Program
Cecelia Colombi, Ph. D., Assistant Professor *(Spanish)*
Sharon S. Dugdale, Ph.D., Professor *(Education)*
Richard A. Figueroa, Ph.D., Professor *(Education)*
Patricia Gandara, Ph.D., Professor *(Education)*
Barbara Goldman, Ph.D., Associate Director of Teacher Education
Cristina Gonzalez, Senior Advisor to the Chancellor
Eric Grodsky, Ph.D., Assistant Professor *(Sociology)*

Joyce Gutstein, Acting Director, Public Service Research Program
Suad Joseph, Ph.D., Professor *(Anthropology)*
Harold Levine, Ph.D., Professor, *(Education)*
Ross MacDonald, Ph.D., Director, Special Projects *(Agricultural and Environmental Sciences)*
Ann Mastergeorge, Ph.D., Assistant Developmental Psychology and Education Researcher (M.I.N.D), Institute Investigator *(Human Development and Family Studies)*
Marco Molinaro, Ph.D., Chief Education Officer, Center for Biophotonics Science and Technology
Barbara J. Merino, Ph.D., Professor *(Education)*
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Evelyn Silvia, Ph.D., Professor *(Mathematics)*
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Jessica Utts, Ph.D., Professor *(Statistics)*
Stefano Varese, Ph.D., Professor *(Native American Studies)*
Kenneth Verosub, Ph.D., Professor *(Geology)*
Jon Wagner, Ph.D., Professor *(Education)*
Karen Watson-Gegeo, Ph.D., Professor *(Education)*

Emeriti Faculty

Donald G. Arnstine, Professor Emeritus
Concha Delgado-Gaitan, Professor Emeritus
Kurt Kreith, Professor Emeritus
Douglas L. Minnis, Lecturer Emeritus
Susan A. Ostergard, Lecturer Emeritus
Julius M. Sassenrath, Professor Emeritus
Carl J. Spring, Professor Emeritus
Richard Walters, Professor Emeritus
David R. Wampler, Ph.D., Lecturer Emeritus
George Yonge, Professor Emeritus

Graduate Study. The Graduate Group in Education offers programs of study and research leading to the Ph.D. degree. Students may concentrate in educational psychology; language, literacy and culture; mathematics education; school organization and educational policy; and science education. Students may also combine these fields of study with designated emphasis areas such as critical theory, second language acquisition, and women's studies. Detailed information regarding graduate study may be obtained from the program Web page at http://education.ucdavis.edu/gradgroup, or by writing the Graduate Coordinator.

Preparation. Students should have earned an M.A. degree or the equivalent in a discipline relevant to their proposed emphasis program. For example, students applying for the mathematics education emphasis should have earned the M.A. or M.A.T. degree in mathematics or mathematics education; students applying to the educational psychology program should have an M.A. in psychology or educational psychology.

Graduate Adviser. P. Gandara, J. Wagner

Graduate Coordinator. K. Bray

Courses. See Education for courses.

Education Abroad Program

————, E.A.C. Campus Director

Education Abroad Center, 207 Third Street, Suite 130
(530-297-4633; Fax: 530-758-8472)

http://eac.ucdavis.edu

Programs of Study

The Education Abroad Program (EAP) is one of the premiere study abroad programs in the nation. EAP offers international study programs in association with nearly 140 host universities and colleges in some 35 countries around the world. Participating students remain registered at UC Davis while studying abroad and receive full academic credit for their work. EAP students maintain their financial aid and scholarship eligibility while abroad. Students may apply as early as their freshman year and participate during their senior year. EAP opportunities are also available to qualified graduate students who have completed at least one full year of graduate work and have support of their graduate program and graduate dean.

Academic Programs. EAP offers study programs for all majors. Some programs are for a full year, some are for a quarter or semester, and some are for the summer. Half of the programs are offered in English, not only in English-speaking countries such as the United Kingdom, Australia, New Zealand, and South Africa, but also at universities in Hong Kong, Budapest, the Netherlands, and Japan, among many others. Several programs make it possible for students to learn a language while experiencing the culture first hand (e.g., Spain, Italy, France, Germany, China, and Japan). Most programs include the possibility of internships. There are field research programs in Australia and Mexico, as well as two tropical biology programs in Costa Rica, a marine biology program in Australia, and a design program in Denmark. We also offer a Global Security and Economic Development Studies program and a spring quarter engineering program in Japan. In most situations, students from the University of California live as the students of the host country do, and in some cases students attend the same courses, taught by the faculty of the host country. Language skills are only required for about half of the countries.

Because new programs are added every year, it is important to consult the Education Abroad Center Web site located at http://eac.ucdavis.edu. Additionally, country and discipline specific brochures are available at the Education Abroad Center.

UC faculty members serve as directors at most Study Centers, providing academic advising to students while abroad. Full UC credit is granted for courses satisfactorily completed, and courses and grades are recorded on official UC transcripts. With careful planning, most EAP students make normal progress toward their UC degrees, even those students who study abroad for a full year. With approval of their major or college advisers, students may earn credit towards their major, minor and general education requirements.

Finances. Participants pay the same fees as at UC Davis. Estimated budgets include room and board, books, round-trip transportation, on-site orientation, intensive language program (where applicable), and miscellaneous expenses. The cost of studying abroad is often comparable to that of studying at UC Davis, although living costs vary from country to country. In many cases, studying abroad is less expensive than studying at UC Davis.

Financial assistance is available to EAP students. Those already receiving UC financial aid maintain their eligibility for grants, loans and scholarships while studying on EAP. Financial aid is based on the cost of studying at each EAP location. Students who might not normally be eligible for financial aid may qualify for the period they are in EAP. In addition to UC financial aid, EAP provides support through various scholarships and grants. Campus scholarships may also be available based on the country, academic merit, or academic field of study. Students should contact the Education Abroad Center and Financial Aid Office for additional information.

Graduation Requirements. All prospective applicants, particularly students who intend to study abroad during their senior year, should carefully plan their course programs for Davis and abroad in order to satisfy university, college, and major/minor requirements for their degree.

Although units and grade points earned in the EAP are incorporated into the University transcript and GPA, departments and majors retain the right to determine which EAP courses will be accepted in satisfaction of major and minor requirements. Academic advisers should be consulted early so that the pre-departure program at Davis will be planned appropriately.

All degree candidates must meet the University residence requirement. Recognizing the special value of study abroad, the faculty have approved two exceptions to the usual residence requirement for students participating in the Education Abroad Program:

- Students planning to graduate immediately upon completion of participation in the EAP may satisfy the University residence requirement by completing at least 35 of their final 45 units on the Davis campus preceding entry into the EAP,

or

- Students who have not finished all of their degree requirements following completion of their participation in the EAP may satisfy the University residence requirement by completing at least 35 units, including at least 12 units after returning from the EAP, on the Davis campus within the final 90 units earned toward the degree. With this option, as many as 55 units taken abroad may be applied toward the unit requirement for graduation.

Students should consult with their college dean's office early during the EAP planning process for information on the university residence requirement.

Students may satisfy GE requirements while on EAP, but should consult with the Education Abroad Center and their college dean's office prior to departure for information on the certification process.

Participants in programs that conclude in May or June who satisfy all degree requirements while abroad and expect to graduate upon completion of the year abroad should file for candidacy to receive their degree in September (candidacy filing dates are established by the Office of the University Registrar). In some cases, transcripts from abroad may not be received in time to be posted on the student's Davis transcript for EAP returnees to be included on the June degree list. Such returning students may register to participate in the June commencement ceremony; however, their graduation date will be in September. Participants in programs that conclude in November or December should file for candidacy to receive their degree in March. Such returning students may register to participate in either the December or subsequent June commencement ceremony. Their graduation date will be in March.

Courses in Education Abroad Program (EAP)

Lower Division Course

90X. International Education Seminar (1)
Seminar—1 hour. Prerequisite: open to lower division applicants for EAP or UC Davis study abroad and international internship programs. Seminar examines the academic, cultural, and personal issues of study abroad, including academic programs abroad, country-specific history and culture, cross-cultural experiences, culture shock, racial and gender issues. May be repeated for credit. (P/NP grading only.)—I, III. (I, III.)

Upper Division Course

190X. International Education Seminar (1)
Seminar—1 hour. Prerequisite: open to upper division applicants for EAP or UC Davis study abroad and international internship programs. Seminar examines the academic, cultural, and personal issues of study abroad, including academic programs abroad, country-specific history and culture, cross-cultural experiences, culture shock, racial and gender issues. May be repeated for credit. (P/NP grading only.)—I, III. (I, III.)

192. Internship in Education Abroad (1-4)
Internship—3-12 hours. Prerequisite: participation in a study abroad program. Internship related to education abroad. May take place at or away from the university. May be repeated up to 12 units of credit. (P/NP grading only.)—I, II, III, summer. (I, II, III, summer.)

Endocrinology (A Graduate Group)

Judith Turgeon, Ph.D., Chairperson of the Group

Group Office, 4136 Tupper Hall (Human Physiology, 752-3230)

Faculty

Thomas Adams, Ph.D., Professor *(Animal Science)*
Marylynn Barkley, Ph.D., Associate Professor *(Neurobiology, Physiology, and Behavior)*
Chris Calvert, Ph.D., Professor *(Animal Science)*
Ernest S. Chang, Ph.D., Professor *(Bodega Marine Laboratory)*
Bruce Hammock, Ph.D., Professor *(Entomology)*
Robert Hansen, Ph.D., Professor *(Molecular Biosciences)*
Larry Hjelmeland, Ph.D., Professor *(Ophthalmology)*
Bill L. Lasley, Ph.D., Professor *(Public Health and Reproduction)*
Harry Matthews, Ph.D., Professor *(Biological Chemistry)*
Stanley Meizel, Ph.D., Professor *(Cell Biology and Human Anatomy)*
James R. Millam, Ph.D., Associate Professor *(Animal Science)*
Marty Privalsky, Ph.D., Professor *(Microbiology)*
Jan F. Roser, Ph.D., Professor *(Animal Science)*
Judith Stern, Sc.D., Professor *(Nutrition)*
Dennis M. Styne, M.D., Professor *(Pediatrics)*
Judith L. Turgeon, Ph.D., Professor *(Human Physiology)*
Donal A. Walsh, Ph.D., Professor *(Biological Chemistry)*
Dorothy E. Woolley, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*

Courses in Endocrinology (EDO)

Graduate Courses

218. Mammalian Endocrinology and Homeostasis (4)
Lecture—4 hours. Prerequisite: Biological Sciences 102 and 103, Neurobiology, Physiology and Behavior 101, and consent of instructor. Biochemical, physiological, and regulatory properties of the mammalian endocrine system, at the molecular, cellular and systemic level. Signal transduction mechanisms and hormonal actions. Principles that regulate homeostasis, especially in organ–organ interrelationships, metabolism and minerals, fluids and electrolytes. Reproductive endocrinology.—III. (III.) Turgeon

220. Endocrinology Literature Critique (1)
Discussion—1 hour. Prerequisite: consent of instructor. Critical reading and evaluation of current original publications in endocrinology. Selected papers will be presented and discussed in detail by faculty and students. May be repeated for credit. (S/U grading only.)—I, II. (I, II.) Turgeon

240. Biochemical Endocrinology (3)
Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Examination of recent advances in biochemical endocrinology and molecular and cell biology of endocrine systems with emphasis on processes of hormone and receptor synthesis, second messenger phenomena, and hormonal control of gene expression.—III. (III.) Adams

298. Group Study (1-5)
Prerequisite: consent of instructor.

299. Research (1-12)
(S/U grading only.)

Endocrinology and Metabolism

See Internal Medicine in Medicine, School of

Engineering

(College of Engineering)

Enrique J. Lavernia, Ph.D., Dean

Bruce R. White, Ph.D., Associate Dean—Academic Personnel and Planning

Karen A. McDonald, Ph.D., Associate Dean—Research and Graduate Studies

Gary E. Ford, Ph.D., Associate Dean—Undergraduate Studies

Billy Sanders, Ph.D., Assistant Dean—Academic Affairs

College Office, 1050 Engineering II (530-752-0553)

http://www.engineering.ucdavis.edu

Undergraduate Study

The four-year undergraduate program is divided into two parts: the Lower Division Program and the Upper Division Program. If you enter the College of Engineering with fewer than 90 quarter units of credit, follow the lower division program specified for your major.

If you enter the College with 90 or more quarter units of credit, you must fulfill the upper division requirements outlined in the Undergraduate Education chapter of this catalog, under "College of Engineering, Unit Requirements."

Graduate Study

Graduate degrees are offered in the following engineering disciplines:

Applied Science
Biological Systems Engineering
Chemical Engineering
Civil and Environmental Engineering
Electrical and Computer Engineering
Materials Science and Engineering
Mechanical and Aeronautical Engineering

For additional information, refer to the *College of Engineering Bulletin,* available from the UC Davis Bookstore, or phone the Graduate Study Office (530-752-0592). See also the Graduate Studies chapter of this catalog.

The Major Programs

The college has eight departments: Applied Science Engineering, Biological and Agricultural Engineering, Biomedical Engineering, Chemical Engineering and Materials Science, Civil and Environmental Engineering, Computer Science Engineering, Electrical and Computer Engineering, Mechanical and Aeronautical Engineering.

Thirteen majors, leading to the B.S. degree, are open to students

Aeronautical Science and Engineering
Biochemical Engineering
Biological Systems Engineering
Biomedical Engineering
Chemical Engineering
Civil Engineering
Computational Applied Science
Computer Engineering
Computer Science and Engineering
Electrical Engineering
Materials Science and Engineering
Mechanical Engineering
Optical Science and Engineering

Four double majors are offered leading to the B.S. degree:

Chemical Engineering/Materials Science and Engineering
Civil Engineering/Materials Science and Engineering
Electrical Engineering/Materials Science and Engineering
Mechanical Engineering/Materials Science and Engineering

Courses in Engineering (ENG)

Lower Division Courses

4. Engineering Graphics in Design (3)
Lecture—2 hours; laboratory—3 hours. Engineering design, descriptive geometry, pictorial sketching, computer-aided graphics, and their application in the solution of engineering problems.—I, III. Yamazaki

6. Engineering Problem Solving (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16B or 21B (may be taken concurrently). Methodology for solving engineering problems. Engineering computing and visualization based on MATLAB. Engineering examples and applications.—I, II, III. (I, II, III.)

7. Technology and Culture of the Internet (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: basic computer experience recommended. Technology and culture of networked computing and the Internet. Topics include the history and development of networked computing; Internet architecture and services; basics of Web page design and hypertext markup language; political, social, cultural, economic and ethical issues related to the Internet. GE credit: SciEng.—II, III.

10. The Science Behind the Technology in Our Lives (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: high school algebra. Understanding of how the technology in our lives works using only basic concepts and rudimentary mathematics. GE credit: SciEng, Wrt.—I, II, III. Parikh

11. Issues in Engineering (1)
Lecture—1 hour. Prerequisite: Participation in the MESA Engineering Program or consent of instructor. Designed to broaden student's understanding of the engineering profession, its methods, principles, design and development process, career opportunities, and professional resources.—I. (I.) Ford

17. Circuits I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 22B (may be taken concurrently); Physics 9C. Basic electric circuit analysis techniques, including electrical quantities and elements, resistive circuits, transient and steady-state responses of RLC circuits, sinusoidal excitation and phasors, and complex frequency and network functions.—I, III. (I, III.)

35. Statics (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Physics 9A, Mathematics 21D (may be taken concurrently); Engineering 6 recommended. Force systems and equilibrium conditions with emphasis on engineering problems.—I, II, III. (I, II, III.)

45. Properties of Materials (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16C or 21C and Chemistry 2A. Introductory course on the properties of engineering materials and their relation to the internal structure of materials. GE credit: Wrt.—I, II, III. (I, II, III.)

98. Directed Group Study (1-4)
Restricted to College of Engineering students only. (P/NP grading only.) May be repeated for credit up to 3 times.

Upper Division Courses

100. Electronic Circuits and Systems (3)
Laboratory—3 hours; lecture—1 hour; discussion—1 hour. Prerequisite: course 17. Introduction to analog and digital circuit and system design through hands-on laboratory design projects. Students who have completed Electrical and Computer Engineering 100 may receive only 1.5 units of credit.—II, III. (II, III.)

102. Dynamics (4)
Lecture—4 hours. Prerequisite: course 35, Mathematics 22B; open to College of Engineering students only. Kinematics and kinetics of particles, of systems of particles, and of rigid bodies applied to engineering problems. Only 2 units of credit allowed to students who have previously taken Engineering 36.—I, II, III. (I, II, III.) Hess, Schaaf, Velinsky

103. Fluid Mechanics (4)
Lecture—4 hours. Prerequisite: course 102 (may be taken concurrently). Open to majors in hydrology or the College of Engineering. Fluid properties, fluid statics, continuity and linear momentum equations for control volumes, flow of incompressible fluids in pipes, dimensional analysis and boundary-layer flows. Not open for credit to students who have completed Chemical Engineering 150A.—I, II, III. (I, II, III.)

104. Mechanics of Materials (4)
Lecture—4 hours. Prerequisite: course 35, Mathematics 22B. Open to Engineering majors only. Uniaxial loading and deformation. General concepts of stress-strain-temperature relations and yield criteria. Torsion of shafts. Bending of beams. Deflections due to bending. Introduction to stability and buckling.—I, II, III. (I, II, III.)

104L. Mechanics of Materials Laboratory (1)
Laboratory—3 hours. Prerequisite: course 104. Experiments which illustrate the basic principles and verify the analysis procedures used in the mechanics of materials are performed using the basic tools and techniques of experimental stress analysis.—II, III. (II, III.)

105. Thermodynamics (4)
Lecture—4 hours. Prerequisite: Mathematics 22B and Physics 9B. Open to Engineering majors only. Fundamentals of thermodynamics: heat energy and work, properties of pure substances, First and Second Law for closed and open systems, reversibility, entropy, thermodynamic temperature scales. Applications of thermodynamics to engineering systems.—I, II, III. (I, II, III.)

106. Engineering Economics (3)
Lecture—3 hours. Prerequisite: upper division standing in Engineering. The analysis of problems in engineering economy; the selection of alternatives; replacement decisions. Compounding, tax, origins and cost of capital, economic life, and risk and uncertainty are applied to methods of selecting most economic alternatives.—II. (II.) Hartsough, Slaughter

111. Electric Power Equipment (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 17. Principles of AC and DC electric motors and generators, their control systems and power sources. Selection of electric power equipment components based on their construction features and performance characteristics.—I. (II.) Delwiche Hartsough

122. Introduction to Mechanical Vibrations (4)
Lecture—4 hours. Prerequisite: course 102. Free and forced vibrations in lumped-parameter systems with and without damping; vibrations in coupled systems; electromechanical analogs; use of energy conservation principles.—I. (I.) Frank

160. Environmental Physics and Society (3)
Lecture—3 hours. Prerequisite: Physics 9D, 5C, or 10 or 1B and Mathematics 16B or the equivalent. Impact of humankind on the environment will be discussed from the point of view of the physical sciences. Calculations based on physical principles will be made, and the resulting policy implications will be considered. (In the College of Engineering, students may receive only one unit of credit towards the Technical Electives requirement.) (Same course as Physics 160.) GE credit: SciEng or SocSci.—I. (I.) Jungerman, Craig

180. Engineering Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21D, 22B, and course 6 or Mechanical Engineering 5. Solutions of systems of linear and nonlinear algebraic equations; approximation methods; solutions of ordinary differential equations; initial and boundary value problems; solutions of partial differential equations of Elliptic, parabolic, and hyperbolic types; Eigen value problems.—I. (I.) Hafez

190. Professional Responsibilities of Engineers (3)
Lecture—3 hours; laboratory—1 hour. Prerequisite: upper division standing. Organization of the engineering profession; introduction to contracts, specifications, business law, patents, and liability; discussion of professional and ethical issues; oral presentations on the interactions between engineering and society.—II, III. (II, III.) Sanders

191. Effective Communication Strategies in Engineering (1)
Lecture—1.5 hours. Prerequisite: upper division standing in an engineering major. Interpersonal communication strategies in various organizational situations. Topics include leadership theory, conflict resolution, ethics, and negotiating strategies. (P/NP grading only.)—II. (II.)

198. Directed Group Study (1-5)
May be repeated for credit up to 3 times. (P/NP grading only.)

Graduate Courses

250. Technology Management (3)
Lecture—3 hours. Prerequisite: consent of instructor. Management of the engineering and technology activity. Functions of design, planning, production, marketing, sales, and maintenance. Technological product life cycle. Research and development activity. Project planning and organization. Manufacturing issues. Case studies.—I. (I.)

Engineering: Applied Science

(College of Engineering)

Ann E. Orel. Ph.D., Chairperson of the Department

Hector A. Baldis, Ph.D., Vice Chairperson of the Department

Department Office, Engineering III (530-752-0360)

http://www.das.ucdavis.edu

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David Q. Hwang, Ph.D., Professor
Niels GrønbechJensen, Ph.D., Professor
Brian H. Kolner, Ph.D., Professor *(Applied Science, Electrical and Computer Engineering)*
Denise M. Krol, Ph.D., Professor
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Garry Rodrigue, Ph.D., Professor
Rao Vemuri, Ph.D., Professor *(Applied Science, Computer Science)*
Yin Yeh, Ph.D., Professor

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Paul P. Craig, Ph.D., Professor Emeritus
Richard R. Freeman, Ph.D., Professor Emeritus
John S. De Groot, Ph.D., Professor Emeritus
William G. Hoover, Ph.D., Professor Emeritus
John Killeen, Ph.D., Professor Emeritus
Richard F. Post, Ph.D., Professor Emeritus
Wilson K. Talley, Ph.D., Professor Emeritus
Frederick Wooten, Ph.D., Professor Emeritus

Affiliated Faculty

Rod Balhorn, Ph.D., Adjunct Professor
Farid U. Dowla, Ph.D., Adjunct Associate Professor
James S. Felton, Ph.D., Adjunct Professor
Dennis L. Matthews, Ph.D., Adjunct Professor

The Major Program

The Department of Applied Science administers two programs: Optical Science and Engineering and Computational Applied Science.

Mission Statement. The mission of the Department of Applied Science is to foster the use of fundamental mathematical and scientific knowledge to improve the quality of life. We provide the profession and academia with outstanding Computational Applied Science and Optical Science and Engineering graduates who advance both engineering practice and fundamental knowledge.

We challenge students to develop attributes that lead to professional growth throughout their careers: a sense of community, ethical responsibility, an expectation for lifelong learning and continuing education, the ability to think independently and perform creatively and effectively in teams, and the ability to communicate effectively both orally and in written media.

Upon graduation, we challenge our students to understand the fundamentals and the application of mathematics and sciences, to have an ability to design, conduct, and understand experiments, as well as to analyze and interpret data; to have a proficiency in the design of components and systems to meet desired performance specifications; an ability to function effectively on multi-disciplinary teams; a proficiency in the use of techniques, skills, and modern engineering tools to identify, formulate, and solve scientific and engineering problems; an understanding of professional and ethical responsibility; a proficiency in oral and written communication; the broad education necessary to understand the impact of engineering solutions in a global and societal context; an ability to engage in graduate education and life-long learning; and a knowledge of contemporary issues that have an impact on society and the profession.

Computational Applied Science Major Program

Computational Applied Science (CAS) encompasses the interplay between the mathematics of models, arising from physical science and engineering, and the numerical techniques for their computational implementation and subsequent solution. With a comprehensive background in mathematics and physical sciences, the major has, as its specific objective, to enable students in the major to construct practical numerical solutions to problems in science and engineering. A strong component of the

program is the development, analysis, and integration of numerical algorithms and an appreciation for the interaction between numerical simulation, theoretical models, and experiment. Students who complete the Computational Applied Science program will receive a Bachelor of Science degree in Computational Applied Science.

Objectives. The objective of the Computational Applied Science program is to provide a basic education in the fundamental principles of computational applied science combined with key courses in mathematics, engineering, and the sciences. This will enable an integrated understanding of all components leading to practical and efficient computational solutions to problems. The major prepares students for careers in computational applied science professions as well as for graduate study in related fields.

Lower Division Required Courses

	UNITS
Applied Science Engineering 2	4
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22AL-22B	7
Physics 9A-9B-9C-9D	19
Chemistry 2A	5
Engineering 17	4
Computer Science Engineering 30 and 40	8
Computer Science Engineering 20 or 50 or Electrical Engineering 70	4
English 1 or 3 or Comparative Literature 1, 2, 3, or 4 or Native American Studies 5	4
Communication 1 or 3	4
General Education electives	12
Unrestricted electives	3
Minimum Lower Division Units	**90**

Upper Division Required Courses

Applied Science Engineering 115, 116,117A, 117B, 117C, 118, 119	31
Statistics 131A or Civil Engineering 114 or Mathematics 131	4
Physics 104A	4
Civil Engineering 119A, 119B	8
Computational Applied Science electives*	28
Applied Science Engineering 137 or Engineering 190	3
General Education electives	12
Minimum Upper Division Units	**90**
Minimum Units Required for Major	**180**

* Computational Applied Science Electives must be chosen in consultation with a faculty adviser. You may receive CAS elective credit, up to a maximum of 4 units, for any combination of engineering courses numbered 190C, 192, 198, and 199. With the exception of the following courses, all upper-division courses in chemistry, engineering, mathematics, physics, and statistics may be taken as CAS electives. The courses that may not be used are Chemistry 194HA, 194HB, 194HC, 197, 198, 199; Electrical and Computer Engineering 101; Engineering 160 (restricted to one unit of CAS elective); Mathematics 192, 194, 197TC, 198, 199; Physics 160 (restricted to one unit of CAS elective), 194HA, 194HB, 195, 197T, 198, 199; Statistics 102

The Minor in Computational Applied Science

A minor in Computational Applied Science will follow a logical composition of courses requiring prerequisites of basic courses equivalent to Mathematics 21A-21B-21C-21D and 22A-22B, Physics 9A-9B-9C-9D, and Computer Science and Engineering 30. Students considering the possibility of earning a Computational Applied Science minor should consult a major adviser before beginning coursework.

Computational Applied Science	**22**
Applied Science Engineering 115, 116, 117A, 117B, 119	22

Optical Science and Engineering

Optical Science and Engineering encompasses the physical phenomena and technologies associated with the generation, transmission, manipulation, detection, and applications of light. The Optical Science and Engineering curriculum prepares students to design, analyze, and fabricate effective optical systems. Much of the nation's high-technology infrastructure is based upon optics and its applications, the most prominent being optical digital information transmission. Optical systems play a central role in nearly all aspects of modern life including health care and the life sciences, remote optical sensing, lighting, cameras, space, and national defense.

Students who complete the Optical Science and Engineering curriculum will receive a Bachelor of Science degree in Optical Science and Engineering.

Objectives. Our fundamental program objective is to educate students in the basics required for optical science and engineering: mathematics, sciences, and engineering. We educate students in the fundamentals of the science, analysis, and design of optical systems

The Optical Science and Engineering Major Program

Lower Division Required Courses

	UNITS
Applied Science Engineering 1	4
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C-9D	19
Chemistry 2A	5
Engineering 6 or Computer Science Engineering 30	4
Engineering 17	4
Engineering 45	4
English 1 or 3 or Comparative Literature 1, 2, 3, or 4 or Native American Studies 5	4
Communication 1 or 3	4
General Education electives	16
Total Lower Division Units	**86**

Upper Division Required Courses

Applied Science Engineering 108A, 108B,115, 161, 165, 166, and 169	28
Electrical and Computer Engineering 130A, 130B, and 135	11
Physics 104A	4
Physics 112 or Chemistry 110C	4
Chemistry 110A	4
Applied Science Engineering 137 or Engineering 190	3
Optics electives 20 units from the following: Applied Science Engineering 116, 167, 170, 172; Biological Sciences 102; Chemistry 110B; Electrical and Computer Engineering 100, 106, 133, 136, 140A, 140B, 150A, 150B	20
Technical electives	12
General Education electives	8
Minimum Upper Division Units	**94**
Minimum Units Required for Major	**180**

Optics electives and technical electives should be chosen in consultation with a staff or faculty adviser.

Courses in Engineering: Applied Science—Davis (EAD)

Lower Division Courses

1. Introduction to Optical Science and Engineering (4)
Lecture—3 hours; laboratory—3 hours. Introduction to the field of optical science and engineering. Discussion and demonstration of optical science and engineering principles and applications. Laboratory exercises emphasize basic principles. Discussion of the opportunities and professional practice in the field including ethics and responsibilities.—I. (I.)

2. Introduction to Applied Computational Science and Engineering (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 21C (may be taken concurrently), Physics 9A (may be taken concurrently), Computer Science Engineering 30. Role of mathematics in modeling physical, biological, and engineering phenomena. Pitfalls in computation. Limitations of models, numerical implementations, and quality assessment of computational data. Interactions among mathematics, algorithms, computer hardware and software, and selected scientific and engineering applications.—III. (III.)

90C. Research Group Conference for Lower Division Students (1)
Discussion—1 hour. Prerequisite: lower division standing; consent of instructor. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor and lower division standing. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

108A. Optics I (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Physics 9C and Mathematics 21D. Optical properties of matter, the nature of light, reflection, refraction, and other properties of light. Basic optical components, reflecting systems, and dispersive components. Geometrical optics, ray tracing, and optical aberrations. Optical instruments. The color of light.—I. (I.) Baldis, Kolner

108B. Optics II (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 108A. Introduction to wave theory of optics, including Maxwell's equations and boundary condition, reflection and transmission coefficients, interference, diffraction, polarization, thin film and ultra thin film optics, and radiation from extended distributions of oscillating electric dipoles. Applications of wave optics. Not open for credit to students who have completed Physics 108 and 108L.—II. (II.) Baldis, Kolner

115. Numerical Solution of Engineering and Scientific Problems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 6 or Computer Science Engineering 30, and Mathematics 22B. Computer problem solving, including error analysis, roots of equations, systems of equations, interpolation and data fitting, integration; initial value, boundary value, and eigenvalue ordinary differential equations. Emphasis on robust methods to solve realistic problems.—I. II, III. (I, II, III.)

116. Computer Solution of Physical Problems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 115. Application of computers to the solution of physical problems. Numerical solution of elliptic, parabolic, and hyperbolic partial differential equations. Eigenvalue problems. Monte Carlo methods.—III. Jensen, Cramer, Miller, Orel, Laub, McCurdy, Rodrigue

117A. Simulation and Modeling of Real Time Systems (5)
Lecture—3 hours; laboratory—3 hours; extensive problem solving. Prerequisite: course 2, 116, Physics 9D, Engineering 180 or Physics 104A or the equivalent. Application of numerical techniques for simulation and modeling of nonlinear deterministic systems. Examples taken from fluid, continuum, and molecular mechanics, and from low dimensional nonlinear systems. Emphasis given to error and stability control through adaptive methods, and evaluation of relationships between the physical system, the model equations, and the numerical implementation.—I. (I.)

117B. Simulation and Modeling of Statistical Systems (5)
Lecture—3 hours; laboratory—3 hours; extensive problem solving. Prerequisite: Statistics 131A or Civil and Environmental Engineering 114 or Mathematics 131 and course 117A. Simulation of stochastic systems, maps, and deterministic chaos. Stability and error control in stochastic modeling. Fluctuations and dissipation; dynamics of complex and disordered systems; Monte Carlo techniques, Brownian, Langevin, and molecular dynamics. Simulation of meaningful statistical sampling in stochastic and disordered systems.—II. (II.) Miller, Orel, Laub, McCurdy, Rodrique

117C. Topics in Simulation and Modeling (5)
Lecture—3 hours; laboratory—3 hours; extensive problem solving. Prerequisite: course 117B. Topics may include algorithms in electromagnetics, materials, biology, and economics. Fast multipole and re-summation techniques, algorithms for integral transforms, mesh generation, combinatorics, encryption; data mining, handling, and compression of large data sets; optimization.—III. (III.) Miller, Orel, Laub, McCurdy, Rodrigue

118. High Performance Computing (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 117B (may be taken concurrently). Algorithms for efficient scientific computing on modern high-performance computers; influence on algorithms of distributed computing, memory management, networking, and information flow; managing relationships among computer architecture, software, and algorithms.—II. (II.) Miller, Orel, Laub, McCurdy, Rodrigue

119. Applied Computational Linear Algebra (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 115 and Physics 104A. Introduction to computational linear algebra with emphasis on applications in engineered systems; matrix factorizations; mathematical software for fundamental algorithms.—I. (I.) Jensen, Laub

137. Weapons of Mass Destruction, the Cold War, and Modern Terrorism (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing, one course from Physics 1B, 7C, 9C, or 10. Science of nuclear, biological, and chemical weapons related to the Cold War and terrorism. Order of magnitude calculations and modern quandaries of mass destruction. (Same course as Physics 137.) GE credit: SciEng, Wrt.—I. Jensen, Orel, Baldis

161. Optical Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 108A. Optical materials and design of optical systems. Computer assisted design of optical systems including construction and final system characterization. Knowledge and skills acquired in earlier course work are used for designs that include engineering standards and realistic constraints.—III. (III.) Baldis

165. Statistical and Quantum Optics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 110A, Electrical and Computer Engineering 130B, Physics 112 (may be taken concurrently). Waves and photons; photon number and fluctuations; field and number fluctuations; properties of single-mode, coherent, and statistical mixture states of the radiation field; photon bunching and antibunching; photoelectric counting distributions for chaotic and coherent light; the squeezed state. Not open for credit to students who have completed course 165A.—I. (I.) Yeh, Krol, Jensen

166. Lasers and Nonlinear Optics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 165. Theory of simple optical processes, population inversion, stimulated emission, laser threshold conditions, line broadening mechanisms, saturation, coherence, laser resonator optics, Q-switching, mode locking, harmonic and sum-frequency generation, parametric conversion, stimulated scattering processes, four-wave mixing, phase conjugation, frequency chirping, ultrashort pulse generation.—II. (II.) Yeh, Krol, Orel

167. Fourier Optics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 104A and Electrical and Computer Engineering 130B. Linear systems analysis of two-dimensional optical systems, 2D Fourier transforms, scalar diffraction theory, Fresnel and Fraunhofer diffraction, coherent and incoherent optical systems, spatial frequency analysis, analog optical information processing, spatial light modulators, film, holography, character recognition, and image restoration.—II. (II.) Kolner, Orel, Jensen

169. Optical Properties of Materials (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 108B, Engineering 45, and Chemistry 110A. Relation between structure, composition, and optical properties of laser materials, nonlinear optical materials, photorefractives, fiber optics, semiconductors, liquid crystals, and thin films.—III. (III.) Krol, Parikh

170. Optical Spectroscopy: Concepts and Instrumentation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 110A and course 166. Fundamentals of absorption and emission, spectrometers, interferometers, light sources and detectors, UV, Visible, and IR spectroscopy, fluorescence spectroscopy, Raman and Brillouin scattering, high-resolution laser spectroscopy.—III. (III.) Orel, Kolner, Yeh, Parikh

171. Scanning Probe Microscopy (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Electrical and Computer Engineering 130A, Engineering 102, Chemistry 110B or the equivalent. Physics of scanning microprobe techniques, scanning tunneling microscope and atomic force microscope will be studied, as will their applications to surfaces and structural biology. Operational STM and AFM will further students' experience in nanoscale science and technology.—III. (III.) Yeh, Parikh

172. Optical Methods for Biological Research (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Course 108B, Biological Sciences 1A, and Chemistry 110A. Optical techniques for resolving significant research problems in biology. Examples include the sequence, structure, and movement of DNA; nuclear organization and DNA replication; channel transport; membrane receptor sites and cell fusion; protein-protein interactions and supramolecular organization.—III. (III.) Yeh

190C. Research Group Conference for Advanced Undergraduates (1)
Discussion—1 hour. Prerequisite: advanced standing; consent of instructor. Weekly conference on research problems, progress and techniques in applied science. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

205A. Mathematical Methods (3)
Lecture—3 hours. Prerequisite: Mathematics 22B. Complex variables, theory of convergence, evaluation of definite integrals, factorial function (gamma function), asymptotic expansions, Fourier analysis.—I. Jensen, Orel, Rodrique

205B. Mathematical Methods (3)
Lecture—3 hours. Prerequisite: course 205A. Laplace transforms, Sturm-Liouville theory, solution of 2nd order linear ODE, approximate solutions of ODE, calculus of variations, characteristics.—II. Jensen, Orel, Rodrique

205C. Mathematical Methods (3)
Lecture—3 hours. Prerequisite: course 205B. Spherical harmonics, Bessel functions, conformal mapping, hypergeometric functions, elliptic functions.—III. Jensen, Orel, Rodrique

209. Linear Modeling Techniques (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 167 or the equivalent strongly recommended. Matrix theory and linear algebra with emphasis on applications in engineered systems; geometric aspects of linear algebra; matrix factorizations; analysis and design techniques for discrete- and continuous-time lumped parameter models.—I. (I.) Laub

210A. Numerical Methods in Applied Science (3)
Lecture—3 hours. Prerequisite: calculus through differential equations and vector analysis. Numerical techniques used in a wide variety of applications of digital computers to problems in applied science. Emphasis placed on the common mathematical elements of the techniques developed.—I. (I.) Rodrigue, Miller, Jensen

210B. Numerical Methods in Applied Science (3)
Lecture—3 hours. Prerequisite: course 210A. Numerical methods applicable to the solution of partial differential equations. Emphasis on finite-difference, finite-element, and spectral methods for linear hyperbolic, parabolic, and elliptic systems and nonlinear hyperbolic systems.—II. (II.) Rodrigue, Miller, Jensen

210C. Numerical Methods in Applied Science (3)
Lecture—3 hours. Prerequisite: course 210B. Computational methods in various fields including: fluid mechanics, kinetic theory, solid mechanics, quantum mechanics.—III. (III.) Rodrigue, Vemuri

211A. Numerical Solution of Partial Differential Equations I (3)
Lecture—3 hours. Prerequisite: course 210A, 210B. Fundamentals of parallel computers, grid generation, domain decomposition, Poisson's equation, elliptic PDEs, Galerkin methods, numerical linear algebra, iterative acceleration.—I. (I.) Rodrigue, Miller, Orel, Jensen

211B. Numerical Solution of Partial Differential Equations II (3)
Lecture—3 hours. Prerequisite: course 211A. Parabolic PDEs, stability, preconditioned time differencing, hyperbolic PDEs, modified differential equation, advection-diffusion equations, wave equation, Burgers' equation, reaction-diffusion equations.—II. (II.) Rodrigue, Miller, Orel, Jensen

211C. Numerical Solution of Partial Differential Equations III (3)
Lecture—3 hours. Prerequisite: course 211B. Conservation laws, fluid equations, turbulence, elasticity equations, electromagnetic equations, transport equations.—III. (III.) Rodrigue, Miller, Orel, Jensen

213A. Computer Graphics (3)
Lecture—3 hours. Prerequisite: consent of instructor. Development of algorithms for perspective line drawings of three-dimensional objects, as defined by polygons or bicubic patches.—(II.) Max

213B. Computer Graphics (3)
Lecture—3 hours. Prerequisite: course 213A or Computer Science Engineering 175. Algorithms to produce color raster renderings of three-dimensional models.—(III.) Max

214. Scientific Visualization (3)
Lecture—3 hours. Prerequisite: Computer Science Engineering 175 or consent of instructor. Visualization of 3D data, including scalar fields, vector fields, and molecular structures. Primary emphasis on volume visualization algorithm.—(II.) Max

215. Computer Animation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Computer Science Engineering 175 or 177 or 178. Control of camera and object motion necessary to produce computer animation, modeling of articulated objects made from jointed segments, and of deformable objects. Students will complete a final animation project. (Same course as Computer Science Engineering 279). Offered in alternate years.—(III.) Max

216A-G. Special Topics in Computer Science (1-5)
Lecture, laboratory, or combination. Prerequisite: consent of instructor. Special topics in the following areas: (A) Architecture; (B) Software Systems; (C) Language Translation; (D) Language Design; (E) Operating Systems; (F) Foundations of Computing; (G) Computational Mathematics. May be repeated for credit for a total of 5 units per segment if topic differs.—(I, II, III.)

217A. Applied Computational Science (3)
Lecture—3 hours. Prerequisite: course 210A, Mathematics 229A or the equivalent (may be taken concurrently). Applied modular programming in low level language (c or fortran). Direct implementations and integrated applications of algorithms applied to computational science problems, which are exemplified through projects. Emphasis on the practical use and implementation of theory taught in course 210A.—I. Rodrique, Miller, Orel, Jensen

217B. Applied Computational Science (3)
Lecture—3 hours. Prerequisite: course 210B or the equivalent (may be taken concurrently). Applied modular programming in low level language (c or fortran). Direct implementations of the theory taught in course 210B and integrated applications of algorithms for computational science problems, exemplified through projects including partial differential equations; initial/boundary value problems.—II. Rodrique, Miller, Orel, Jensen

218. Signal Processing (3)
Lecture—3 hours. Prerequisite: Mathematics 121A, 121B or the equivalent. Discrete-time and continuous-time signal processing. Fourier transforms, Laplace transforms, sampling and reconstruction. LTI systems: convolution. Discrete-time transforms: DFT, FFT, and Discrete wavelet transforms. Filters and filter designs.—I. (I.) Dowla

219. Wavelets and Their Applications (3)
Lecture—3 hours. Prerequisite: Electrical and Computer Engineering 150A, Mathematics 167. Fourier transforms and digital filters; sampling theorem and analog-to-digital conversion, multirate signal processing; wavelet transforms and filter banks; fast algorithms: FFT, DWT, and pyramid; data compression with wavelets; spectral factorization; designing application-specific wavelets. Offered in alternate years.—(II.) Dowla

220A. Artificial Neural Nets–I (3)
Lecture—3 hours. Prerequisite: Mathematics 167; ability to use computers to solve problems using a traditional language or via tools like Matlab or Mathematica. Biological and Computational motivations. Models of neurons. Supervised and unsupervised learning. Correlation matrix memories. Discrete and continuous Hopfield nets. Self organization. Kohonen Net. Counter propagation. Perceptron. LMS methods. Back propagation. Offered in alternate years.—(I.) Vemuri

220B. Artificial Neural Nets–II (3)
Lecture—3 hours. Prerequisite: course 220A. Growing and pruning algorithms for multi-layer perceptrons, acceleration of convergence, conjugate gradient methods. RBF networks. Temporal processing. Modular networks. Reinforcement learning. Neurodynamics. Case studies. Offered in alternate years.—(II.) Vemuri

221. Genetic Algorithms and Optimization (3)
Lecture—3 hours. Prerequisite: Mathematics 145 or the equivalent; graduate standing; ability to program in one of the modern programming languages. Introduction to genetic algorithms. Fundamental theorem; schema processing; genetic operators; applications to function optimization, scheduling, VLSI circuit layout. Implementation on parallel computers; genetic programming; evolutionary algorithms.—(III.) Vemuri

225. Computational Structures for Signal and Image Processing and Graphics (3)
Lecture—3 hours. Prerequisite: Computer Science Engineering 40; course 210A. Tools for research in digital media. Relevant computer architectures, algorithms and languages for signal processing, image processing and graphics. Hardware and software issues in parallelism. Programming in SISAL. Parallel C and Parallel Fortran. Parallel algorithms using SISAL on parallel computers. Offered in alternate years.—(III.) Vemuri

226. Practical Data Communications in Digital Media (3)
Lecture—3 hours. Prerequisite: Computer Science Engineering 152. Tools for research in digital media. Communication protocols, algorithms and architectures suitable in modern networked environment. Transmission of digital data over voice-grade channels, telecommunications networks for data transport, Broadband multimedia communications, ATM, and Broadband ISDN. Offered in alternate years.—(II.) Vemuri

228A-228B-228C. Properties of Matter (3-3-3)
Lecture—3 hours. Prerequisite: Mathematics 22B and Physics 112B. Microscopic and macroscopic descriptions of matter; thermodynamics and kinetics; constitutive, electrical, mechanical and thermal properties.—I, II, III. (I, II, III.) Luhmann, Yeh, Baldis, McCurdy

229. Computational Molecular Modeling (4)
Lecture—3 hours; project. Prerequisite: course 210A and 228A or consent of instructor. Theory and hands-on implementation of algorithm in computational statistical mechanics. Temporal integrators, molecular dynamics, force fields, constrained dynamics, Monte Carlo techniques, fluctuation-dissipation theorem, and parallel vs. serial computing.—II. (II.) Jensen

230. Topics in Computational Fluid Dynamics (3)
Lecture—3 hours. Prerequisite: course 210A, 210B or consent of instructor. A hands-on approach to numerical methods for compressible fluid flow. Readings and discussions of solution strategies complemented with programming exercises and projects to give first hand experience with performance and accuracy of several computational methods; from upwind differencing to Godunov methods.—III. (III.) Miller

231A. Applied Quantum Mechanics (3)
Lecture—3 hours. Prerequisite: course 205A-205B-205C (may be taken concurrently). Classical properties of matter; introduction to quantum mechanics by the correspondence principle. Solvable bound state/continuum problems in 1-D: well, barrier, and harmonic oscillator. Solvable problems in 3-D: HO, well, and hydrogen atom. Matrix theory: Schroedinger, Heisenberg, and interaction pictures.—I. (I.) Orel, Krol, Yeh

231B. Applied Quantum Mechanics (3)
Lecture—3 hours. Prerequisite: course 231A. Perturbation theory of atoms, molecules, and solids; quantum theory of cooperative effects.—II. (II.) Orel, Krol, Yeh

233A-233B-233C. Theory and Applications of Solid-State Physics (3-3-3)
Lecture—3 hours. Prerequisite: course 230C or the equivalent. Structure and properties of crystals; theory of dielectrics, metals and alloys; magnetism, superconductivity, and semiconductors. Applications to various solid-state devices.—I-II-III. (I-II-III.) Orel

234A. Applied Electromagnetics I (3)
Lecture—3 hours. Prerequisite: Electrical and Computer Engineering 130B or the equivalent. Electrostatics; Gauss's law, potentials, fields, boundary value problems, multiple pole expansions, dielectrics, polarization, capacitance, energy, torque, forces, eigenfunction expansions. Magnostatics; Biot-Savart law, Ampere's law, vector potential, gauge transformations, magnetization, inductance, constitutive relations.—I. (I.) Kolner, Hwang

234B. Applied Electromagnetics II (3)
Lecture—3 hours. Prerequisite: course 234A. Maxwell's Equations, wave equations for fields and potentials. Poynting's Theorem and power flow. Momentum and angular momentum in the electromagnetic field. Stress tensor. Polarization. Reflection/refraction. Dispersion, causality, and susceptibility. Circuit concepts, radiation.—II. (II.) Kolner, Hwang

234C. Applied Electromagnetics III (3)
Lecture—3 hours. Prerequisite: course 234B. Dynamics of relativistic particles; collisions between charged particles, energy loss, and scattering; radiation by moving particles; bremsstrahung, method of virtual quanta, radiative beta processes; multipole fields; radiation damping, self fields of a particle, scattering and absorption of radiation.—III. (III.) Kolner, Hwang

262A. Atomic and Molecular Interactions (3)
Lecture—3 hours. Prerequisite: Physics 215A-215B-215C or the equivalent. Atomic structure and spectra. Offered in alternate years.—(I.) Orel

262B. Atomic and Molecular Interactions (3)
Lecture—3 hours. Prerequisite: Physics 215A-215B-215C. Molecular structure and spectra. Offered in alternate years.—(II.) Orel

262C. Atomic and Molecular Interactions (3)
Lecture—3 hours. Prerequisite: course 262B. Classical and quantum mechanical collision theory of electron and heavy particle scattering. Offered in alternate years.—(III.) Orel

263A. Quantum Statistics of Light (3)
Lecture—3 hours. Prerequisite: Physics 200B-200C and Physics 215A-215B-215C or the equivalent. Classical susceptibilities, single quantization of light/matter interactions, resonance phenomena, second quantization of electromagnetic fields, number representation and operators.—II. (II.) Orel, McCurdy

263B. Quantum Theory of Optics (3)
Lecture—3 hours. Prerequisite: course 263A. Statistics of photon fluctuations. Quantum theory of radiation. Theory of lasers.—III. (III.) Orel

264A. Classical Optics I (3)
Lecture—3 hours. Prerequisite: course 108B and Electrical and Computer Engineering 130B or Physics 110B. Crystal optics; anisotropic wave propagation, dispersion relations, phase and group velocity surfaces. Polarization, Stokes parameters, Poincare sphere. Optical crystallography; interference figures, optical activity, crystal symmetry and point groups. Piezoelectricity, electro-optic, magneto-optic effects. Geometrical optics; eikonal equation, Lagrange's integral invariant, Fermat's principle.—I. (I.) Kolner

264B. Classical Optics II (3)
Lecture—3 hours. Prerequisite: course 264A. Dielectric waveguide theory; slab waveguides, integrated optics waveguides, optical fibers. Guided, radiation, and leaky-wave modes. Dispersion, compensation, and communications bit rates. Coupled-mode theory, waveguide perturbations, directional couplers, fiber gratings. Dielectric microcavities. Self- and cross-phase modulation. Solitons.—II. (II.) Kolner

264C. Classical Optics III (3)
Lecture—3 hours. Prerequisite: course 264B. Huygens-Fresnel principle, Kirchoff's diffraction theory. Fresnel and Fraunhofer diffraction. Phase and amplitude gratings, aperatures, lenses, two-dimensional linear systems. Spatial filtering. Holography. Coherence theory; spatial/temporal coherence, partial coherence, mutual intensity, degree of coherence, van Cittert-Zernike theorem, coherency matrix.—III. (III.) Kolner

265A. Laser Physics I (3)
Lecture—3 hours. Prerequisite: Physics 200C and Physics 215B-215C or the equivalent. Classical theory of lasers. Classical electron oscillator, atomic susceptibility, line broadening mechanisms, rate equations, stimulated transitions, radiative/nonradiative relaxations, multilevel systems, population inversion, saturation, oscillation, Schawlow-Townes limit, paraxial wave propagation, dispersion, pulse compression, resonators, modes, stability, Q-switching, modelocking.—I. (I.) Kolner

265B. Laser Physics II (3)
Lecture—3 hours. Prerequisite: course 265A. Beam propagation, resonators and laser dynamics. Threshold dynamics and cavity modes. Ray optics and matrices, wave optics and Gaussian beams. Resonator stability. Linear pulse propagation, dispersion and pulse compression. Spiking, relaxation, Q-switching, injection locking and modelocking.—II. (II.) Kolner

267. Nonlinear Optics (3)
Lecture—3 hours. Prerequisite: course 265A-265B. Theory of the nonlinear interaction of radiation and matter. Nonlinear optical properties of materials. Crystal optics, electro-optics, and acousto-optics. Parametric oscillation and amplification. Harmonic conversion. Stimulated Raman and Brillouin scattering, self-focusing, four-wave mixing, phase conjugation and spectroscopy.—III. (III.) Krol

270A-270B. Advanced Laser Plasma Physics (3)
Lecture—3 hours. Prerequisite: course 205A, 205B, 234. Laser-produced plasmas and advanced applications of high power lasers. Plasma formation with lasers, ponderomotive force, kinetic theory, waves in unmagnetized plasmas, non-linear effects, parametric instabilities, hydrodynamic instabilities, and radiation transport. Applications include ICF, X-ray lasers.—II-III. (II-III.) Baldis

271. Optical Methods in Biophysics (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: Biological Sciences 102 or the equivalent, course 108B or the equivalent, and Chemistry 110A or the equivalent. Principal optical techniques used to study biological structures and their related functions. Specific optical techniques useful in the studies of protein-nucleic acid, protein-membrane and protein-protein interactions. Biomedical applications of optical techniques. (Same course as Biophysics 271.)—III. (III.) Yeh, Parikh, Balhorn, Matthews

273. X-Ray Spectroscopy and Synchroton Radiation (4)
Lecture—3 hours; discussion—1 hour. Fundamentals of x-ray absorption, emission, and inelastic scattering; x-ray imaging and microscopy; synchroton radiation from bend magnets, wigglers, undulators, and free electron lasers; x-ray optics and storage ring design; visits to the synchroton radiation facilities SSRL and ALS; optional experiments. Offered in alternate years.—III. Cramer

280A-280B-280C. Plasma Physics and Controlled Fusion (3-3-3)
Lecture—3 hours. Prerequisite: course 234B or consent of instructor. Equilibrium plasma properties; single particle motion; fluid equations; waves and instabilities in a fluid plasma; plasma kinetic theory and transport coefficients; linear and nonlinear Vlasov theory; fluctuations, correlations and radiation; inertial and magnetic confinement systems in controlled fusion.—I-II-III. (I-II-III.) Luhmann, Hwang

285A. Physics and Technology of Microwave Vacuum Electron Beam Devices I (4)
Lecture—4 hours. Prerequisite: B.S. degree in physics or electrical engineering or the equivalent background. Physics and technology of electron beam emissions, flow and transport, electron gun design, space charge waves and klystrons. Offered in alternate years.—(III.) Luhmann

285B. Physics and Technology of Microwave Vacuum Electron Beam Devices II (4)
Lecture—4 hours. Prerequisite: 285A. Theory and experimental design of traveling wave tubes, backward wave oscillators, and extended interaction oscillators. Offered in alternate years.—(I.) Luhmann

285C. Physics and Technology of Microwave Vacuum Electron Beam Devices III (4)
Lecture—4 hours. Prerequisite: 285B. Physics and technology of gyrotrons, gyro-amplifiers, free electron lasers, magnetrons, crossfield amplifiers and relativistic devices. Offered in alternate years.—(II.) Luhmann

285D. Physics and Technology of Microwave Vacuum Electron Beam Devices IV (4)
Lecture—4 hours. Prerequisite: 285C. Computational models of vacuum electron beam devices. Offered in alternate years.—(III.) Luhmann

289A-K. Special Topics in Applied Science (1-5)
Lecture, laboratory, or combination. Prerequisite: consent of instructor. Special topics in the following areas: **(A)** Atomic and Molecular Physics; **(B)** Chemical Physics; **(C)** Computational Physics; **(D)** Digital Media; **(E)** Materials Science; **(F)** Imaging Science and Photonics; **(G)** Nonlinear Optics; **(H)** Plasma Physics; **(I)** Quantum Electronics; **(J)** Solid State; **(K)** Microwave and Millimeter Wave Technology. May be repeated for credit up to a total of 5 units per segment when topic differs.—I, II, III. (I, II, III.)

290. Seminar (1-2)
Seminar—1-2 hours. (S/U grading only.)

290C. Graduate Research Group Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Engineering: Biological and Agricultural

(College of Engineering)

Bruce R. Hartsough, Ph.D., Chairperson of the Department

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Shrinivasa K. Upadhyaya, Ph.D., Professor
Jean S. VanderGheynst, Ph.D., Associate Professor
Wesley W. Wallender, Ph.D., Professor *(Land, Air and Water Resources)*
Ruihong Zhang, Ph.D., Associate Professor

Emeriti Faculty

Norman B. Akesson, M.S., Professor Emeritus
Robert H. Burgy, M.S., Professor Emeritus
William J. Chancellor, Ph.D., Professor Emeritus
Pictiaw (Paul) Chen, Ph.D., Professor Emeritus
Robert B. Fridley, Ph.D., Professor Emeritus
Roger E. Garrett, Ph.D., Professor Emeritus
John R. Goss, M.S., Professor Emeritus
S. Milton Henderson, M.S., Sc.D., Professor Emeritus
R. Larry Merson, Ph.D., Professor Emeritus
Stanton R. Morrison, Ph.D., Professor Emeritus
Thomas A. Rumsey, Ph.D., Professor Emeritus
Verne H. Scott, Ph.D., Professor Emeritus
Henry E. Studer, M.S., Professor Emeritus
Wesley E. Yates, M.S., Professor Emeritus

Affiliated Faculty

Daniel Downey, Ph.D., Assistant Research Engineer
James M. Meyers, Ph.D., Extension Specialist
Zhongli Pan, Ph.D., Adjunct Assistant Professor
Herbert B. Scher, Ph.D., Research Engineer
James F. Thompson, M.S., Extension Specialist

Mission. The Department of Biological and Agricultural Engineering is dedicated to the advancement of engineering for biological systems. Specifically, our goals are to advance the science, teach the principles and application, and disseminate the knowledge of engineering needed to efficiently produce, distribute, and process biological products, such as food, feed, and fiber, while conserving natural resources, preserving environmental quality, and ensuring the health and safety of people.

Objectives. We educate students in the fundamentals of mathematics, physical and biological sciences, and engineering, balanced with the application of principles to practical problems. We teach students to develop skills for solving engineering problems in biological systems through use of appropriate analysis, synthesis, and engineering design techniques. We prepare students for entry into engineering practice and graduate education, as well as engagement in life-long learning. We foster the ability of our students to collaborate and communicate effectively, and provide an awareness of the importance of economics, professional responsibility, and the environment.

The Biological Systems Engineering Major Program

Biological Systems Engineering is the branch of engineering that builds strongly on biology as a scientific base. In the coming age of biology and biotechnology, engineers will be needed to work side by side with life scientists to bring laboratory developments into commercial production. Industries in plant and animal production, tissue culture, bioprocessing, biotechnology, food processing, aquaculture, agriculture, and forest production will all need engineers with strong training in biology. Concern for our environment is opening new engineering opportunities as society strives to maintain a balance within the biosphere.

In the freshman and sophomore years, the Biological Systems Engineering major requires sequences of courses usual in all engineering programs, including mathematics, physics, chemistry, engineering science, and humanities. Unlike other majors, the Biological Systems Engineering major also requires fundamental courses in the biological sciences and the integration of engineering with biology.

Biological Systems Engineering Program

The Biological Systems Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-(22AL*)-22B	6 or 7
Physics 9A-9B-9C	15
Chemistry 2A-2B	10
Chemistry 8A or 118A	2 or 4
Biological Sciences 1A	5
Biological Systems Engineering 1	5
Engineering 6 or Computer Science Engineering 30*	4
Engineering 17	4
Engineering 35	3
Biological Systems Engineering 75	4
English 1 or 3, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5	4
Communication 1 or 3	4
General Education electives	12
Minimum Lower Division Units	**94**

* Mathematics 22AL is required concurrently with Mathematics 22A if you opt to take Computer Science Engineering 30 rather than Engineering 6.

Upper Division Program

In the junior and senior years, the Biological Systems Engineering major requires courses that focus on the integration of biology and physical sciences with engineering. Depending on your area of interest, you may select elective courses from seven specializations:

Agricultural Engineering
Aquacultural Engineering
Biomechanics/Premedicine/Preveterinary Medicine
Biotechnical Engineering
Ecological Systems Engineering
Food Engineering
Forest Engineering

You may also develop your own specialization in consultation with your adviser. The upper division requirements are listed following the areas of specialization.

Areas of Specialization

Agricultural Engineering. Students specializing in agricultural engineering integrate engineering analysis and design with applied biology to solve problems in producing, transporting and processing agricultural products. Agricultural engineers design machinery, processes, and systems for managing a productive plant and animal culture, including environment, nutrient, and waste. The recommended electives provide students with the fundamental principles of agricultural production and a broad background in engineering. Agricultural engineers are employed as practicing professionals and managers with large and small agricultural producers, equipment manufacturers, food processors, consulting engineering firms, and government agencies.

Recommended biological science electives:

Plant Emphasis
Plant Biology 111
Soil Science 100
Select one course from Agricultural Systems and Environment 110A, Entomology 100, Plant Biology 174, Environmental Horticulture 102

Animal Emphasis
Neurobiology, Physiology, and Behavior 101
Soil Science 100
Select one course from Avian Sciences 100, Animal Science 143, 144, 146

Recommended engineering electives:

Biological Systems Engineering 114, 132, 145
Civil and Environmental Engineering 141, 141L
Engineering 180

Suggested Advisers: M. Delwiche, K. Giles, M. Grismer, D. Hills, B. Jenkins, J. Rumsey, D. Slaughter, S. Upadhyaya, W. Wallender, R. Zhang.

Aquacultural Engineering. Aquacultural engineers design, build, and manage equipment and systems for the production of aquatic plants and animals. Aquacultural engineers must have a solid understanding of biology, especially processes related to water quality, to be able to work with the wide variety of systems used for aquaculture production. Systems range from sophisticated indoor plants with water treatment and recirculation to low-input earthen ponds. Employment opportunities for aquacultural engineers include engineering consulting companies and government agencies. The aquaculture industry is expanding rapidly in various areas around the world, creating international employment opportunities for aquacultural engineers.

Recommended biological science electives:

Applied Biological Systems Technology 161
Animal Science 118
Wildlife, Fish, and Conservation Biology 121

Recommended engineering electives:

Applied Biological Systems Technology 163
Civil and Environmental Engineering 140, 140L, 141, 141L, 148A, 148B

Suggested advisers: R. Piedrahita

Biomechanics/Pre-Medicine/Pre-Veterinary Medicine. This specialization is for students interested in the biomechanics of humans and animals, with emphasis on the physical, chemical, and biological factors affecting motion and function. Combined training in mechanics, material properties, and ergonomics allows graduates to work in industry on the design, evaluation, and application of medical devices as well as worker health and safety. Some students use the specialization as preparation for medical or veterinary school with the assurance of a marketable degree in engineering in case their post-graduation plans change. The Biomechanics specialization is also excellent preparation for graduate work in biomedical engineering. Students interested in medical or veterinary school should consult with admissions advisers from the appropriate school to plan for successful admission, including necessary summer experience.

Recommended Biological Science Electives:

Biological Sciences 102
Neurobiology and Physiology 101
Exercise Biology 103
Recommended Engineering Electives:
Biological Systems Engineering 128
Biological Systems Engineering 175
Biomedical Engineering 109
Biomedical Engineering 126

Additional courses for medical or veterinary school application:

Chemistry 2C, 118C (medical)
Biological Sciences 101
Molecular and Cell Biology 150, 150L

Suggested advisers: Delwiche, Fatallah, Miles, VanderGheynst

Biotechnical Engineering. This specialization is for students interested in the biotechnology industries. Core engineering courses are combined with training in genetics, biochemistry, microbiology, and molecular biology. Modern laboratory techniques in biochemistry are also included in the specialization to provide hands-on skills. Biotechnology is an area of industrial growth in the U.S. and will increasingly need engineers to transfer laboratory developments to large scale production. Present industrial activities include the production of genetically altered plants, plant materials and food products, production and packaging of biocontrol agents for plant pests and diseases; microbial production of biological products; tissue culture; and bioremediation.

Recommended biological science electives:

Biological Sciences 101, 102, 103
Microbiology 102
Molecular and Cellular Biology 120L

Recommended engineering electives:

Biological Systems Engineering 132, 160, 175
Chemical Engineering 161B, 161L
Engineering 180

Suggested advisers: M. Delwiche, K. Giles, M. Grismer, J. VanderGheynst, R. Zhang.

Ecological Systems Engineering. Specialists in ecological systems engineering are concerned with the design, development, and management of eco-systems. Typical applications include the rehabilitation of disturbed ecosystems, the design of mitigation areas, the incorporation of ecologically sustainable features into land developments, and the design and management of public and private landscapes. An understanding of ecology and the interaction of ecological communities, coupled with knowledge of engineering design and economics, are stressed in this specialization. Employment opportunities include environmental consulting firms, government regulatory agencies, and agencies involved in wildland resource management.

Recommended biological science electives:

Entomology 100
Environmental Science and Policy 100
Soil Science 100
Select one course from Atmospheric Science 133, Plant Biology 121, Environmental Toxicology 101 or 112A

Recommended engineering electives:

Applied Biological Systems Technology 180
Biological Systems Engineering 115, 135, 145
Civil and Environmental Engineering 148A or 149
Environmental and Resource Sciences 100

Recommended course:

Landscape Architecture 40 (no technical elective credit will be granted for this course in any engineering major)

Suggested advisers: K. Giles, M. Grismer, B. Jenkins, R. Piedrahita, R. Plant, J. VanderGheynst, R. Zhang.

Food Engineering. The food industry is the largest industrial sector of the U. S. economy. Food engineers conceive, design, and operate food processes, equipment, and plants for efficient food production with minimal impact on the environment. Students specializing in food engineering learn to apply engineering principles and concepts to handling, storing, processing, packaging, and distributing food and related products. In addition to engineering principles, the food engineering specialization is intended to provide an understanding of the chemical, biochemical, microbiological, and physical characteristics of foods. In the junior and senior years, students take courses that focus on the integration of biological and food science with engineering. Concepts of food refrigeration, freezing, thermal processing, drying, and other food operations are studied.

Recommended biological sciences electives:

Biological Sciences 101, 103; Environmental Science and Policy 110; Environmental Toxicology 101, 131; Food Science and Technology 104L, 119, 120, 121, 128; Plant Biology 152, 172.

Recommended engineering electives:

Biological Systems Engineering 175; Chemical Engineering 157, 159.

Suggested advisers: J. Krochta, K. McCarthy, M. McCarthy, , R. P. Singh, D. Slaughter.

Forest Engineering. Forest engineers apply engineering principles to solve problems in managing forest lands. Forestry has evolved from an emphasis on wood production toward multiple use, ecosystem management and consideration of noneconomic objectives such as retaining biodiversity. Forest engineers help to develop the equipment and techniques for reforestation, harvesting, forest residue management, and development of roads and recreation facilities.

Following the sophomore year, students are encouraged to attend an eight-week field course, followed by a semester at UC Berkeley taking forestry courses, and forest ecology, planning, and operations. Students complete their engineering programs at UC Davis, taking courses in planning methods, equipment development, and road design. Forest engineers are employed by the US Forest Service and other public agencies, the forest industry, consulting firms, and equipment manufacturers.

Recommended biological science electives:

ESPM 129* (Forest and Range Soils, 3 units) or Soil Science 100
ESPM 182* (Forest Harvest Systems, 4.5 units)
ESPM 185* (Silviculture, 6 units)

Recommended engineering electives:

Applied Biological Systems Technology 180
Biological Systems Engineering 114, 115, 116
Civil and Environmental Engineering 141, 141L, 145

Recommended Courses:

ESPM 101* (Forestry Summer Program, 15 units)
ESPM 172* (Forest Photogrammetry and Photo Interpretation, 4.5 units) or Environmental and Resource Sciences 185
ESPM 175* (Forest Influences, 4 units)
Plant Biology 120

*ESPM courses are offered at UC Berkeley campus.

Suggested advisers: B. Hartsough, J. Miles.

Upper Division Required Courses

Chemistry 8B or 118B (recommended for Aquacultural, Biotechnical, Food, and Biomechanics/Premedicine/Preveterinary Medicine Engineering specializations) or Civil and Environmental Engineering 10 (recommended for Agricultural, Ecological, and Forest Engineering specializations)..... 4

Biological Sciences 1B and 1C or Food Science and Technology 100A, 104, 131, and Biological Sciences 102 (recommended for Food Engineering specialization)..... 10 or 14

Engineering 100, 102, 103, 105, 106..... 18

Engineering 104 (recommended for Agricultural, Biomechanics/Premedicine/Preveterinary Medicine, Ecological and Forest Engineering specializations) or Chemical Engineering 161A (recommended for Aquacultural and Biotechnical Engineering specializations) ..... 4 or 3

Biological Systems Engineering 125, 130, 165, 170A, 170B, 170BL, 170C, 170CL 21

Biological Systems Engineering electives—Select one course from all upper-division Biological Systems Engineering courses not otherwise required, with the exception of Biological Systems Engineering courses 189-199 ..... 4 or 3

Statistics 100 4

Engineering electives—Select a minimum of 6 units. All upper division courses offered by the College of Engineering may be taken as engineering electives with the exception of the following: Applied Science Engineering 137, Engineering 160, all courses numbered 190-197 and 199 (except Engineering 190, which may be taken for 2 units of engineering elective credit). The following courses may also be taken as engineering electives: Applied Biological Systems Technology 163, 175, 180, 181; Environmental and Resource Sciences 100, 100L 6

Biological science electives—Select a minimum of 5 or 9 units (for a combined lower and upper division total of 24 units of biological sciences). Of the 24 units, at least nine must be upper division. All upper-division courses in the Division of Biological Sciences (with the exception of Exercise Biology 104, 105, 112, 115, 118 through 149L and all courses numbered 190-199) may be used as biological science electives. The following courses may also be taken as biological science electives: Applied Biological Systems Technology 161; Animal Science 118, 143, 144, 146; Agricultural Management and Rangeland Resources 110A; Atmospheric Science 133; Avian Sciences 100; Cell Biology and Human Anatomy 101, 101L; Entomology 100; Environmental Horticulture 102; ESPM 129, 182, 185 (offered at UC Berkeley); Environmental Science and Policy 100; Environmental Toxicology 101, 112A; Food Science and Technology 119, 120, 121, 128; Soil Science 100; Wildlife, Fish, and Conservation Biology 121. Students may choose other upper division courses with substantial biological content offered by the College of Agricultural and Environmental Sciences; consultation with a faculty adviser and approval by petition is required ..... 5 or 9

General Education electives 12

Minimum Upper Division Units 90

Minimum Units Required for Major 184

Master Undergraduate Adviser: D. Slaughter

Courses in Engineering: Biological Systems (EBS)

Lower Division Courses

1. Foundations of Biological Systems Engineering (5)
Lecture—2 hours; laboratory—6 hours; project. Open only to students in Biological Systems Engineering. Introduction to engineering and the engineering design process with examples drawn from fields of biological, agricultural and food engineering. Relationship of engineering principles to biological systems. Small group design projects and presentations, use of engineering software, and fabrication of designs.—I. (I.) Hartsough, Piedrahita

75. Properties of Materials in Biological Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A; Physics 9C (may be taken concurrently). Properties of typical biological materials; composition and structure with emphasis on the effects of physical and biochemical properties on design of engineered systems; interactions of biological materials with typical engineering materials. GE credit: SciEng.—II. (II.) Slaughter

90C. Research Group Conference in Biological Systems Engineering (1)
Discussion—1 hour. Prerequisite: lower division standing in Biological Systems Engineering or Food Engineering; consent of instructor. Research group conference. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

92. Internship in Biological Systems Engineering (1-5)
Internship. Prerequisite: lower division standing; project approval prior to period of internship. Supervised work experience in biological systems engineering. May be repeated for credit. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Group study of selected topics; restricted to lower division students. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)
(P/NP grading only.)

Upper Division Courses

114. Principles of Field Machinery Design (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Engineering 102, 104. Traction and stability of vehicles with wheels or tracks. Operating principles of field machines and basic mechanisms used in their design.—(III.)

115. Forest Engineering (3)
Lecture—3 hours. Prerequisite: Engineering 104, Biological Sciences 1C. Applications of engineering principles to problems in forestry including those in forest regeneration, harvesting, residue utilization, and transportation.—(III.) Hartsough

120. Power Systems Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 17, 102, 103, 105. Design and performance of power devices and systems including combustion engines, electric generators and motors, fluid power systems, fuels, and emerging technologies. Selection of units for power matching and optimum performance.—I. (I.) Jenkins

125. Heat and Mass Transfer in Biological Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 75 and Engineering 105. Heat and mass transfer and psychrometrics with principal applications to biological, food, and environmental processes. Steady and transient heat and mass transfer. Analysis of heat conduction, convection and radiation, and material diffusion and convection. Analysis of heat and mass transfer with non-Newtonian fluid flow.—III. (III.) Jenkins, VanderGheynst

128. Biomechanics and Ergonomics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Statistics 100, Engineering 102. Anatomical, physiological, and biomechanical bases of physical ergonomics. Human motor capabilities, body mechanics, kinematics and anthropometry. Use of bioinstrumentation, industrial surveillance techniques and the NIOSH lifting guide. Cumulative trauma disorders. Static and dynamic biomechanical modeling. Emphasis on low back, shoulder, and hand/wrist biomechanics.—III. (III.) Fathallah

130. Modeling of Dynamic Processes in Biological Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 75, Engineering 6 or Computer Science Engineering 30, Mathematics 22B. Techniques for modeling processes through mass and energy balance, rate equations, and equations of state. Computer problem solution of models. Example models include package design, evaporation, respiration heating, thermal processing of foods, and plant growth.—II. (II.) K. McCarthy, Upadhyaya

132. Unit Operations in Biological and Food Engineering (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 130, course 125 and Engineering 103 (may be taken concurrently). Mechanical unit operations which involve non-Newtonian flow, size reduction and mixing. Thermal operations related to drying, sterilization, freezing, and refrigeration. Mass transfer operations applied to membrane separations, adsorption, and absorption processes.—III. (III.) VanderGheynst, Singh

135. Bioenvironmental Engineering (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 125, 130. Biological responses to environmental conditions. Principles and engineering design of environmental control systems. Overview of environmental pollution problems and legal restrictions for biological systems, introduction of environmental quality assessment techniques, and environmental pollution control technologies.—I. (I.) Jenkins, Zhang

144. Groundwater Hydrology (4)
Lecture—4 hours. Prerequisite: Mathematics 16B or 21A; Hydrologic Science 103 or Engineering 103 recommended. Fundamentals of groundwater flow and contaminant hydrology. Occurrence, distribution, and movement of groundwater. Well-flow systems. Aquifer tests. Well construction operation and maintenance. Groundwater exploration and quality assessment. Agricultural threats to groundwater quality: fertilizers, pesticides, and salts. Same course as Hydrologic Science 144.—I. (I.) Marino

145. Irrigation and Drainage Systems (4)
Lecture—4 hours. Prerequisite: Engineering 103 or Hydrologic Science 103. Engineering and scientific principles applied to the design of surface, sprinkle and micro irrigation systems and drainage systems within economic, biological, and environmental constraints. Interaction between irrigation and drainage. (Same course as Hydrologic Science 115.)—II. Wallender, Grismer, Hills

147. Runoff, Erosion and Water Quality Management in the Tahoe Basin (3)
Lecture/laboratory—30 hours; fieldwork—15 hours; discussion—10 hours; term paper. Prerequisite: Physics 7B or 9B, Mathematics 16C or 21C, Civil and Environmental Engineering 142 or Hydrologic Science 141 or Environmental and Resource Sciences 100. Five days of instruction in Tahoe City. Practical hydrology and runoff water quality management from Tahoe Basin slopes. Development of hillslope and riparian restoration concepts, modeling and applications from physical science perspectives including precipitation-runoff relationships, sediment transport, and detention ponds. (Same course as Hydrologic Science 147.)—Grismer

160. Biotechnical Systems Engineering (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 75, Biological Sciences 101 or Microbiology 102. Microbial and enzyme kinetics. Biomass conversion. Production and recovery of biochemicals from plants and animals. Delivery and detection of microorganisms for bioremediation and biological control.—II. (II.)VanderGheynst

165. Bioinstrumentation and Control (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100. Instrumentation and control for biological production systems. Measurement system concepts, instrumentation and transducers for sensing physical and biological parameters, data acquisition and control.—I. (I.) Delwiche, Slaughter

170A. Engineering Design and Professional Responsibilities (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 1, Engineering 102, 104. Engineering design including professional responsibilities. Emphasis on project selection, data sources, specifications, human factors, biological materials, safety systems, and professionalism. Detailed design proposals will be developed for courses 170B and 170BL.—III. (III.) Giles, Miles

170B. Engineering Projects: Design (2)
Discussion—2 hours. Prerequisite: course 170A, course 170BL required concurrently. Individual or group projects involving the design of devices, structures, or systems to solve specific engineering problems in biological systems. Project for study is jointly selected by student and instructor. (Deferred grading only, pending completion of course 170C.)—I. (I.) Giles, Miles

170BL. Engineering Projects: Design Laboratory (1)
Laboratory—3 hours. Prerequisite: course 170B required concurrently. Individual or group projects involving the design of devices, structures, or systems to solve specific engineering problems in biological systems. (Deferred grading only, pending completion of course 170CL.)—I. (I.)

170C. Engineering Projects: Design Evaluation (1)
Discussion—1 hour. Prerequisite: course 170B; required to enroll in course 170CL concurrently. Individual or group projects involving the fabrication, assembly and testing of components, devices, structures, or systems designed to solve specific engineering problems in biological systems. Project for study previously selected by student and instructor in course 170B.—II. (II.) Giles, Miles

170CL. Engineering Projects: Design Evaluation (2)
Laboratory—6 hours. Prerequisite: required to enroll in course 170C concurrently. Individual or group projects involving the fabrication, assembly and testing of components, devices, structures, or systems designed to solve specific engineering problems in biological systems.—II. (II.)

175. Rheology of Biological Materials (3)
Lecture—3 hours. Prerequisite: Engineering 103 or Chemical Engineering 150A. Fluid and solid rheology, viscoelastic behavior of foods and other biological materials, and application of rheological properties to food and biological systems (i.e., pipeline design, extrusion, mixing, coating).—II. K. McCarthy

189A-G. Special Topics in Biological Systems Engineering (1-5)
Variable—3-15 hours. Prerequisite: upper division standing in engineering; consent of instructor. Special topics in: **(A)** Agricultural Engineering; **(B)** Aquacultural Engineering; **(C)** Biomedical Engineering; **(D)** Biotechnical Engineering; **(E)** Ecological Systems Engineering; **(F)** Food Engineering; and **(G)** Forest Engineering. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

190C. Research Group Conference in Biological Systems Engineering (1)
Discussion—1 hour. Prerequisite: upper division standing in Biological Systems Engineering or Food Engineering; consent of instructor. Research group conference. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship in Biological Systems Engineering (1-5)
Internship. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in biological systems engineering. May be repeated for credit. (P/NP grading only.)

197T. Tutoring in Biological Systems Engineering (1-5)
Tutorial—3-15 hours. Prerequisite: upper division standing. Tutoring individual students, leading small voluntary discussion groups, or assisting the instructor in laboratories affiliated with one of the department's regular courses. May be repeated for credit if topic differs. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

200. Research Methods in Biological Systems Engineering (2)
Lecture—2 hours. Prerequisite: graduate standing. Planning, execution and reporting of research projects. Literature review techniques and proposal preparation. Record keeping and patents. Uncertainty analysis in experiments and computations. Graphic analysis. Oral and written presentation of research results, manuscript preparation, submission and review.—I. (I.) Zhang, Giles

205. Continuum Mechanics of Natural Systems (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 21D and 22B, Physics 9B. Continuum mechanics of static and dynamic air, water, earth and biological systems using hydraulic, heat and electrical conductivity; diffusivity; dispersion; strain; stress; deformation gradient; velocity gradient; stretch and spin tensors. (Same course as Hydrologic Science 205.)—III. (III.) Wallender

215. Soil-Machine Relations in Tillage and Traction (3)
Lecture—3 hours. Prerequisite: course 114. Mechanics of interactions between agricultural soils and tillage and traction devices; determination of relevant physical properties of soil; analyses of stress and strains in soil due to machine-applied loads; experimental and analytical methods for synthesizing characteristics of overall systems. Offered in alternate years.—(I.) Upadhyaya

216. Energy Systems (3)
Lecture—3 hours. Prerequisite: Engineering 105. Theory and application of energy systems. System analysis including input-output analysis, energy balances, thermodynamic availability, economics, environmental considerations. Energy conversion systems and devices including cogeneration, heat pump, fuel cell, hydroelectric, wind, photovoltaic, and biomass conversion processes. Offered in alternate years.—II. Jenkins

218. Solar Thermal Engineering (3)
Lecture—3 hours. Prerequisite: course in heat transfer. Familiarity with FORTRAN language. Analysis and design of solar energy collection systems. Sun-earth geometry and estimation of solar radiation. Steady state and dynamic models of solar collectors. Modeling of thermal energy storage devices. Computer simulation. Offered in alternate years.—(I.)

220. Pilot Plant Operations in Aquacultural Engineering (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: Civil Engineering 243A-243B or Applied Biological Systems Technology 161, 163. Topics in water treatment as they apply to aquaculture operations. Laboratory study of unit operations in aquaculture. Offered in alternate years.—(I.) Piedrahita

228. Occupational Musculoskeletal Disorders (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: graduate standing and consent of instructor. Epidemiology and etiology of occupational musculoskeletal disorders (MSDs) with focus on low back and upper extremities disorders; anatomical and biomechanical functions of lower back and upper extremities; MSDs risk factors assessment and control; research opportunities related to MSDs.—III. (III.) Fathallah

231. Mass Transfer in Food and Biological Systems (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing. Application of mass transfer principles to food and biological systems. Study of mass transfer affecting food quality and shelf life. Analysis of mass transfer in polymer films used for coating and packaging foods and controlling release of biologically active compounds. Offered in alternate years.—(II.) Krochta

233. Analysis of Processing Operations: Drying and Evaporation (3)
Lecture—3 hours. Prerequisite: course in food or process engineering, familiarity with FORTRAN. Diffusion theory in drying of solids. Analysis of fixed-bed and continuous-flow dryers. Steady-state and dynamic models to predict performance evaporators: multiple effects, mechanical and thermal recompression, control systems. Offered in alternate years.—(II.)

235. Advanced Analysis of Unit Operations in Food and Biological Engineering (3)
Lecture—3 hours. Prerequisite: course 132. Analysis and design of food processing operations. Steady state and dynamic heat and mass transfer models for operations involving phase change such as freezing and frying. Separation processes including membrane applications in food and fermentation systems.—III. Singh

237. Thermal Process Design (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course in heat transfer. Heat transfer and biological basis for design of heat sterilization of foods and other biological materials in containers or in bulk. Offered in alternate years.—III. Singh

239. Magnetic Resonance Imaging in Biological Systems (3)
Lecture—3 hours. Prerequisite: graduate standing. Theory and applications of magnetic resonance imaging to biological systems. Classical Bloch model of magnetic resonance. Applications to be studied are drying of fruits, flow of food suspensions, diffusion of moisture, and structure of foods. Offered in alternate years.—I. M. McCarthy

240. Infiltration and Drainage (3)
Lecture—3 hours. Prerequisite: Soil Science 107, Engineering 103. Aspects of multi-phase flow in soils and their application to infiltration and immiscible displacement problems. Gas phase transport and entrapment during infiltration, and oil-water-gas displacement will be considered. Offered in alternate years.—(II.) Grismer

241. Sprinkle and Trickle Irrigation Systems (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 145/Hydrologic Science 115. Computerized design of sprinkle and trickle irrigation systems. Consideration of emitter mechanics, distribution functions and water yield functions. Offered in alternate years.—(III.) Hills

242. Hydraulics of Surface Irrigation (3)
Lecture—3 hours. Prerequisite: course 145, Hydrologic Science 115. Mathematical models of surface-irrigation systems for prediction of the ultimate disposition of water flowing onto a field. Quantity of runoff and distribution of infiltrated water over field length as a function of slope, roughness, infiltration and inflow rates. Offered in alternate years.—III. Wallender

243. Water Resource Planning and Management (3)
Lecture—3 hours. Prerequisite: Hydrologic Science 141 or the equivalent. Applications of deterministic and stochastic mathematical programming techniques to water resource planning, analysis, design, and management. Water allocation, capacity expansion, and reservoir operation. Conjunctive use of surface water and groundwater. Water quality management. Irrigation planning and operation models.

(Same course as Hydrologic Science 243.) Offered in alternate years—(I.) Marino

245. Waste Management for Biological Production Systems (3)
Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Characterization of solid and liquid wastes from animal, crop, and food production systems. Study of methods and system design for handling, treatment, and disposal/utilization of these materials.—II. (II.) Zhang

260. Analog Instrumentation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100. Instrument characteristics: generalized instrument models, calibration, and frequency response. Signal conditioning: operational amplifier circuits, filtering, and noise. Transducers: motion, force, pressure, flow, temperature, and photoelectric. Offered in alternate years.—II. Delwiche

262. Computer Interfacing and Control (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100, course 165. Procedural and object-oriented programming in C++, analog and digital signal conversion, data acquisition and computer control. Offered in alternate years.—II. Delwiche

265. Design and Analysis of Engineering Experiments (5)
Lecture—3 hours; lecture/discussion—2 hours. Prerequisite: Statistics 100, Agricultural Systems and Environment 120, or an introductory course in statistics. Simple linear, multiple, and polynomial regression, correlation, residuals, model selection, one-way ANOVA, fixed and random effect models, sample size, multiple comparisons, randomized block, repeated measures, and Latin square designs, factorial experiments, nested design and subsampling, split-plot design, statistical software packages.—III. (III.) Upadhyaya, Plant

267. Renewable Bioprocessing (3)
Lecture—3 hours. Prerequisite: course 160, Biological Sciences 101 or Microbiology 102. Applications of biotechnology and bioprocess engineering toward the use of agricultural and renewable feedstocks for the production of biochemicals. Design and modeling of microbial- and plant-based production systems including associated fermentation, extraction, and purification processes. Offered in alternate years.—I. VanderGheynst

270. Modeling and Analysis of Biological and Physical Systems (3)
Lecture—3 hours. Prerequisite: familiarity with a programming language. Mathematical modeling of biological systems: model development; analytical and numerical solutions. Case studies from various specializations within biological and agricultural engineering. Offered in alternate years.—(III.) Upadhyaya

275. Physical Properties of Biological Materials (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: consent of instructor. Selected topics on physical properties, such as mechanical, optical, rheological, and aerodynamic properties, as related to the design of harvesting, handling, sorting, and processing equipment. Techniques for measuring and recording physical properties of biological materials. Offered in alternate years.—(I.) Slaughter, Rosa

289A-K. Selected Topics in Biological Systems Engineering (1-5)
Variable—1-5 hours. Prerequisite: consent of instructor. Special topics in: **(A)** Animal Systems Engineering; **(B)** Aquacultural Engineering; **(C)** Biological Engineering; **(D)** Energy Systems; **(E)** Environmental Quality; **(F)** Food Engineering; **(G)** Forest Engineering; **(H)** Irrigation and Drainage; **(I)** Plant Production and Harvest; **(J)** Postharvest Engineering; **(K)** Sensors and Actuators. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Weekly seminars on recent advances and selected topics in biological systems engineering. Course theme will change from quarter to quarter. May be repeated for credit. (S/U grading only.)

290C. Graduate Research Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress and techniques in biological systems engineering. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Professional Course

390. Supervised Teaching in Biological and Agricultural Engineering (1-3)
Laboratory—3 hours; tutorial—3-9 hours. Prerequisite: graduate standing; consent of instructor. Tutoring and teaching students in undergraduate courses offered in the Department of Biological and Agricultural Engineering. Weekly conferences with instructor; evaluation of teaching. Preparing for and conducting demonstrations, laboratories and discussions. Preparing and grading exams. May be repeated for a total of 6 units. (S/U grading only.)—I, II, III. (I, II, III.)

Engineering: Biomedical

(College of Engineering)

Katherine W. Ferrara, Chairperson of the Department

Department Office, 1013 Academic Surge
(530-752-2611)

http://www.bme.ucdavis.edu

The Biomedical Engineering Major

Biomedical Engineering advances fundamental medical concepts; creates knowledge from the molecular to the organ systems levels; and develops innovative biologics, materials, processes, implants, devices, and informatics approaches. These approaches are applied to the prevention, diagnosis, and treatment of disease. The objective is to prepare students for employment in companies that manufacture medical assist devices, human tissue products, and therapeutics. This program also prepares students to enter a graduate program in Biomedical Engineering or pursue professional degrees in medicine and related health fields.

Biomedical Engineering Program

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C-9D	19
Chemistry 2A-2B-2C, 8A-8B or 118A-118B-118C*	21
Engineering 6, 17, 35	11
English 1 or 3, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5	4
Communication 1 or 3	4
Biological Sciences 1A	5
Biomedical Engineering 1	1
General Education electives	8
Minimum Lower Division Units	**95**

* May not count in lower-division program and towards Engineering and Physical Science electives

Upper Division Program

Areas of Specialization
All coursework for the biomedical engineering programs or the areas of specialization, with the exception of the Premedical Specialization, consist of the coursework outlined above.

Biomolecular Specialization
The recent sequencing of 3.1 billion base pairs of the human genome is revolutionizing our understanding of living systems and the nature of various disease processes. However, elucidation of the genetic code introduces a new set of challenges. These include developing an understanding of the process of gene expression, approaches to characterize physiological and pathological changes that involve large numbers of genes and environmental factors, and apply this new information in effective therapeutic strategies. Students who wish to work at this exciting interface between engineering and genomics must gain a background in the biological sciences, mathematics, physics, chemistry, engineering, and bioinstrumentation.

Suggested advisors: M. Savageau, S. Simon

Imaging Specialization
Specialists in imaging apply engineering principles to visualize systems in the biological sciences and medicine. the study of imaging may have an electrical, mechanical, or chemical emphasis and can take place on scales ranging from subcellular to whole body. Students specializing in imaging have the flexibility to select electives (in consultation with their faculty advisors) in their junior and senior years to tailor to their particular interests. Employment opportunities include the design of imagining instruments for research or clinical applications; development of diagnostic agents; and image processing and analysis.

Suggested advisors: K. Ferrara, A. Louie

Pre-Medical Specialization
the premedical specialization is designed for students planning to attend medical school after graduation, or for students interested in working in the biomedical industries. Course work in biology, chemistry, and organic chemistry satify the typical entrance requirements for medical school. There is flexibility in the selection of technical electives to gear towards particular interests (for example, in neurobiology versus systems physiology; or in electrical versus mechanical engineering) or towards particular medical school entrance requirements. the elective requirements differ slightly for the Pre-Medical Specialization to allow room to satisfy all of the medical school entrance requirements.

Suggested advisors: A. Louie, S. Simon

Upper Division Required Courses

Engineering 100 or Electrical and Computer Engineering 100 3
Engineering 105, 190 7
Neurobiology, Physiology, and Behavior 101 5
Statistics 120 or 130A or 131A 4
Biomedical Engineering 106, 107, 108, 109, 110, 111 24
Life Sciences electives** 9
To be chosen according to specialization. Any graded upper-division course in Biological Sciences **including** Biological Sciences 1B, 1C, Molecular and Cellular Biology, Neurobiology, Physiology and Behavior, **excluding** Biological Sciences 120, 120P, 122, 122P, 123, 195A,195B, Molecular and Cellular Biology 126, Neurobiology, Physiology and Behavior 102, 115, 141, 141P, 150, 152, 159

Engineering and Physical Science electives** 18
Any upper-division Biomedical Engineering course, Engineering 45, 102, 103, 104, 106; Electrical and Computer Engineering 110A, 110B, 106, 114, 118, 130A, 130B, 140A, 140B, 150A, 150B, 151, 157A, 157B; Applied Science Engineering 108A, 108B, 161, 165, 166, 167, 169, 170, 171, 172; Biological Systems Engineering 128; Chemical Engineering 161A, 161B, 161L, 170; Chemistry 105, 107A, 107B, 108, 110A, 110B, 110C, 115, 118A, 118B, 118C*, 120, 121, 124A, 124B, 124C, 125, 128A, 128B, 128C,

129A, 129B, 129C, 131, 135, 140; Physics 104A, 104B, 104C, 105A, 105B, 108, 108L, 110A, 110B, 110C, 112, 115A, 115B, 116A, 116B, 121, 129A, 129B, 130A, 130B, 140A, 140B.

General Education electives 16

Minimum Upper Division Units 86

Minimum Units Required for Major 181

* May not count in lower-division program and towards Engineering and Physical Science electives.

**Life Science electives and Engineering and Physical Science Electives are to be selected in consultation with a staff or faculty adviser.

Courses in Biomedical Engineering (BIM)

Lower Division Courses

1. Introduction to Biomedical Engineering (1)
Lecture—1 hour. Introduction to the field of biomedical engineering with examples taken from the various areas of specialization within the discipline. Areas include cellular and molecular engineering; biomedical imaging; biofluids and transport; musculoskeletal biomechanics; and bioinstrumentation. (P/NP grading only.)—I. Hull

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

106. Biotransport Phenomena (4)
Lecture—4 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101, Physics 9B, course 107 (may be taken concurrently). Principles of heat and mass transfer with applications to biomedical systems; emphasis on heat exchange between the biomedical system and its environment, mass transfer across cell membranes and the design and analysis of artificial human organs.—III.

107. Mathematical Methods for Biological Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 22A-22B. Restricted to upper division Engineering majors. Essential mathematical and numerical techniques for engineering problems in medicine and biology. Contents include boundary value problems, the calculus of linear transforms, ordinary and partial differential equations, and an introduction to probability and stochastic processes.—II.

108. Biomedical Signals and Control (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: Mathematics 22A-22B, Engineering 100 (may be taken concurrently). Restricted to upper division Engineering students. Systems and control theory applied to bioengineering problems. Topics include modeling, linearization, transfer functions, Laplace and Fourier transforms, closed-loop systems, design and dynamic behavior and control of first and second order processes, stability, Bode design, and features of biological control systems.—III. Insana

109. Biomaterials (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45, course 106, Biological Sciences 1A, Neurobiology, Physiology, and Behavior 101. Mechanical and chemical properties of metallic, ceramic, and polymeric implant materials. The properties of bones, joints, and blood vessels. The cellular response to implants, including inflammation, blood coagulation, and wound and fracture healing. Biocompatibility of orthopaedic and cardiovascular materials.—I.

110. Capstone Biomedical Engineering Design (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 107, 108, 109. Restricted to senior Biomedical Engineering majors. Application of bioengineering theory and experimental analysis culminating in the design of a unique solution to a problem. The design may be geared towards current applications in applied biomechanics, bio- or medical technology.—III.

111. Biomedical Instrumentation Laboratory (4)
Lecture—1 hour; laboratory—9 hours. Prerequisite: Biological Sciences 1A, course 107, Statistics 120, 131A, or 130A, Engineering 100. Basic biomedical signals and sensors. Topics include analog and digital records using electronic, hydrodynamic, and optical sensors, and measurements made at cellular, tissue and whole organism level.—II.Willig-Onwaachi

126. Tissue Mechanics (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Exercise Science 103 and/or Engineering 45 and/or consent of instructor. Structural and mechanical properties of biological tissues, including bone, cartilage, ligaments, tendons, nerves, and skeletal muscle. (Same course as Exercise Science 126.)—II. (II.) Hawkins

140. Protein Engineering (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A and Chemistry 8B. Restricted to upper division majors in sciences or engineering. Introduction to protein structure and function. Modern methods for designing, producing, and characterizing novel proteins and peptides. Design strategies, computer modeling, heterologous expression, in vitro mutagenesis. Protein crystallography, spectroscopic and calorimetric methods for characterization, and other techniques.—I. Sutcliffe-Goulden

141. Cell and Tissue Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 9C, Engineering 35, Neurobiology, Physiology, and Behavior 101. Mechanical properties that govern blood flow in the microcirculation. Concepts in blood rheology and cell and tissue viscoelasticity, biophysical aspects of cell migration, adhesion, and motility.—III. Simon

167. Biomedical Fluid Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106 (may be taken concurrently) or Engineering 103. Basic biofluid mechanics, Navier Stokes equations of motion, circulation, respiration and specialized applications including miscellaneous topics such as boundary layer flow. Not open for credit to students who have completed Mechanical Engineering 167C.—I.

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

202. Cell and Molecular Biology for Engineers (4)
Lecture/discussion—4 hours. Prerequisite: Biological Sciences 104 or Molecular and Cellular Biology 121, course in eukaryotic cell biology. Preparation for research and critical review in the field of cell and molecular biology for biomedical or applied science engineers. Emphasis on biophysical and engineering concepts intrinsic to specific topics including receptor-ligand dynamics in cell signaling and function, cell motility, DNA replication and RNA processing, cellular energetics and protein sorting. Modern topics in bioinformatics and proteomics.—II.

204. Physiology for Bioengineers (5)
Lecture—5 hours. Prerequisite: Biological Sciences 1A or the equivalent. Basic human physiology of the nervous, muscular, cardiovascular, respiratory, and renal systems and their interactions; emphasis on the physical and engineering principles governing these systems, including control and transport processes, fluid dynamics, and electrochemistry.—I. Benham

210. Introduction to Biomaterials (4)
Lecture—4 hours. Prerequisite: Engineering 45 or consent of instructor. Mechanical and atomic properties of metallic, ceramic, and polymeric implant materials of metallic, ceramic, and polymeric implant materials; corrosion, degradation, and failure of implants; inflammation, wound and fracture healing, blood coagulation; properties of bones, joints, and blood vessels; biocompatibility of orthopaedic and cardiovascular materials. Offered in alternate years.—(II.) Hazelwood

212. Biomedical Heat and Mass Transport Processes (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 165, Biological Systems Engineering 125, Chemical Engineering 153 or the equivalent. Application of principles of heat and mass transfer to biomedical systems related to heat exchange between the biomedical system and its environment, mass transfer across cell membranes and the design and analysis of artificial human organs. (Same course as Mechanical and Aeronautical Engineering 212.) Offered in alternate years.—(II.) Alderidge

214. Blood Cell Biomechanics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Mechanical properties that govern blood flow in the microcirculation and cell adhesion and motility. Constitutive equations of vasculature tissue and blood. Blood rheology and viscoelasticity. Red and white blood cell mechanics. Remodeling of blood vessels in disease and engineering of blood vessels and cells.—I. Simon

215. Biomedical Fluid Mechanics and Transport Phenomena (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or Chemical Engineering 150B or Civil and Environmental Engineering 141. Application of fluid mechanics and transport to biomedical systems. Flow in normal physiological function and pathological conditions. Topics include circulatory and respiratory flows, effect of flow on cellular processes, transport in the arterial wall and in tumors, and tissue engineering. (Same course as Mechanical and Aeronautical Engineering 215.)—III. (III.) Barakat

216. Advanced Topics in Cellular Engineering (4)
Lecture—4 hours. Prerequisite: course 214 or consent of instructor. Advanced research strategies and technologies used in the study of immune function and inflammation. Static and dynamic measurements of stress, strain, and molecular scale forces in blood and vascular cells, as well as genetic approaches to the study of disease.—III. (III.) Simon

223. Multibody Dynamics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Coupled rigid-body kinematics/dynamics; reference frames; vector differentiation; configuration and motion constraints; holonomicity; generalized speeds; partial velocities; mass; inertia tensor/theorems; angular momentum; generalized forces; comparing Newton/Euler, Lagrange's, Kane's methods; computer-aided equation derivation; orientation; Euler; Rodrigues parameters. (Same course as Mechanical and Aeronautical Engineering 223.)—II. (II.) Eke, Hubbard

225. Spatial Kinematics and Robotics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C Language and course 222. Spatial kinematics, screw theory, spatial mechanisms analysis and synthesis, robot kinematics and dynamics, robot workspace, path planning, robot programming, real-time architecture and software implementation. (Same course as Mechanical and Aeronautical Engineering 225.) Offered in alternate years.—II. Cheng

227. Research Techniques in Biomechanics (4)
Lecture—2 hours; laboratory—4 hours; term paper/discussion—1 hour. Prerequisite: consent of instructor, Mathematics 22B; Exercise Science 115 recommended. Experimental techniques for biomechanical analysis of human movement are examined. Techniques evaluated include data acquisition and analysis by computer, force platform analysis, strength assessment, planar and three-dimensional videography, data reduction and smoothing, body segment parameter determination, electromyography, and

biomechanical modeling. (Same course as Mechanical and Aeronautical Engineering 227/Exercise Science 227.)—II. (II.) Williams, Hawkins

228. Skeletal Muscle Mechanics: Form, Function, Adaptability (4)
Lecture—4 hours. Prerequisite: basic background in biology, physiology, and engineering; Engineering 35 and 45, Mathematics 21D; Neurobiology, Physiology and Behavior 101 recommended. Basic structure and function of skeletal muscle examined at the microscopic and macroscopic level. Muscle adaptation in response to aging, disease, injury, exercise, and disuse. Analytic models of muscle function are discussed. (Same course as Exercise Science 228.)—I. (I.) Hawkins

231. Musculo-Skeletal System Biomechanics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Mechanics of skeletal muscle and mechanical models of muscle, solution of the inverse dynamics problem, theoretical and experimental methods of kinematic and kinetic analysis, computation of intersegmental load and muscle forces, applications to gait analysis and sports biomechanics. (Same course as Mechanical and Aeronautical Engineering 231.)—III. (III.) Hull

232. Skeletal Tissue Mechanics (3)
Lecture—3 hours; laboratory—1 hour. Prerequisite: Engineering 104. Overview of the mechanical properties of the various tissues in the musculoskeletal system, the relationship of these properties to anatomic and histologic structure, and the changes in these properties caused by aging and disuse. The tissues covered include bone, cartilage and synovial fluid, ligament and tendon. (Same course as Mechanical and Aeronautical Engineering 232.)—III. (III.) Martin

240. Computational Methods in Nonlinear Mechanics (4)
Lecture—4 hours. Prerequisite: Applied Science Engineering 115 or Mathematics 128B or Engineering 180. Deformation of solids and the motion of fluids treated with state-of-the-art computational methods. Numerical treatment of nonlinear dynamics; classification of coupled problems; applications of finite element methods to mechanical, aeronautical, and biological systems. Offered in alternate years. (Same course as Mechanical and Aeronautical Engineering 240.)—II. Sarigul-Klign

241. Introduction to Magnetic Resonance Imaging (3)
Lecture—3 hours. Prerequisite: Physics 9D, Mathematics 22B. Equipment, methods, medical applications of MRI. Lectures review basic, advanced pulse sequences, image reconstruction, display and technology and how these are applied clinically. Lecture complements a more technical course. (course 246 can be taken concurrently.)—I. (I.) Buonocore

242. Introduction to Biomedical Imaging (4)
Lecture—4 hours. Prerequisite: Physics 9D and Electrical and Computer Engineering 106 or consent of instructor. Introduction to the basic physics and engineering principles of image science with emphasis on ionizing and nonionizing radiation production and interactions with the body and detectors. Description of major imaging systems: radiography, computed tomography, magnetic resonance, ultrasound and optical microscopy.—I. (I.) Insana, Boone, Seibert

243. Radiation Detectors for Biomedical Applications (4)
Lecture/discussion—4 hours. Prerequisite: Physics 9D, Mathematics 21D, 22B. Radiation detectors and sensors used for biomedical applications. Emphasis on radiation interactions, detection, measurement and use of radiation sensors for imaging. Operating principles of gas, semiconductor, and scintillation detectors.—II. (II.) Cherry

246. Magnetic Resonance Technology (3)
Lecture—3 hours. Prerequisite: Physics 9D, Mathematics 22B. Course covers MRI technology at an advanced level with emphasis on mathematical des-criptions and problem solving. Topics include spin dynamics, signal generation, image reconstruction, pulse sequences, biophysical basis of T1, T2, RF, gradient coil design, signal to noise, image artifacts.—I. (I.) Buonocore

247. Current Concepts in Magnetic Resonance Imaging I (3)
Lecture—3 hours. Prerequisite: course 241 or 246 or consent of instructor. Modern pulse sequences, pulse sequence options, and biomedical/industrial applications; velocity encoded phase imaging and angiography, echo planar imaging, spiral imaging, computer simulation of MRI, fast spin echo, other topics.—II. (II.) Buonocore

248. Current Concepts in Magnetic Resonance Imaging II (3)
Lecture—3 hours. Prerequisite: course 247 or consent of instructor. Continuation of lecture coverage of modern pulse sequences, pulse sequence options, and biomedical/industrial applications: Control of tissue contrast by magnetization refocusing and spoiling, RF pulse design, diffusion and perfusion imaging, image artifact reduction methods, others.—III. (III.) Buonocore

249. Microsensor Design and Fabrication (3)
Lecture—3 hours. Prerequisite: graduate standing. Design and fabrication of sensors. Topics include transduction principles, fabrication technologies specific to microsensors, and design of microsensor systems, including packaging. (Same course as Electrical and Computer Engineering 248.) Not open for credit to students who have completed Electrical and Computer Engineering 248. Offered in alternate years.—(I.)

250. Mathematical Methods of Biomedical Imaging (4)
Lecture—4 hours. Prerequisite: graduate standing or consent of instructor. Advanced mathematical techniques with emphasis on imaging systems. Matrices and vector spaces, Fourier analysis, integral transforms, signal representations, probability and random processes.—I. (I.) Insana

251. Medical Image Analysis (4)
Lecture—4 hours. Prerequisite: Electrical and Computer Engineering 106. Techniques for assessing the performance of medical imaging systems. Principles of digital image formation and processing. Measurements that summarize diagnostic image quality and the performance of human observers viewing those images. Definition of ideal observer and other mathematical observers that may be used to predict performance from system design features.—II. Insana

270. Biochemical Systems Theory (4)
Lecture—4 hours. Prerequisite: course 202 concurrently or consent of instructor. Systems biology at the biochemical level. Mathematical and computational methods emphasizing nonlinear representation, dynamics, robustness, and optimization. Case studies of signal-transduction cascades, metabolic networks and regulatory mechanisms. Focus on formulating and answering fundamental questions concerning network function, design, and evolution.—I. (I.) Savageau

271. Gene Circuit Theory (4)
Lecture—4 hours. Prerequisite: course 270 or 202 and consent of instructor. Analysis, design, and construction of gene circuits. Modeling strategies, elements of design, and methods for studying variations in design. Case studies involving prokaryotic gene circuits to illustrate natural selection, discovery of design principles, and construction of circuits for engineering objectives.—II. (II.) Savageau

281. Acquisition and Analysis of Biomedical Signals (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100, Statistics 130A. Basic concepts of digital signal recording and analysis; sampling; empirical modeling; Fourier analysis, random processes, spectral analysis, and correlation applied to biomedical signals.—III.

282. Biomedical Signal Processing (4)
Lecture—4 hours. Prerequisite: Electrical and Computer Engineering 150A, 150B. Characterization and analysis of continuous- and discrete-time signals from linear systems. Examples drawn from physiology illustrate the use of Laplace, Z, and Fourier transforms to model biological and bioengineered systems and instruments. Filter design and stochastic signal modeling. Genomic signal processing.—II. Insana

284. Mathematical Methods for Biomedical Engineers (4)
Lecture—4 hours. Prerequisite: Mathematics 22B, Statistics 130A. Theoretical and computational applications of linear systems, random processes, and differential equations that describe biological systems and instruments that measure them.—(I.) I.

286. Nuclear Imaging in Medicine and Biology (4)
Lecture/discussion—3 hours; extensive problem solving. Prerequisite: Mathematics 21D, 22B, Physics 9D. Radioactive decay, interaction of radiation with matter, radionuclide production, radiation detection, digital autoradiography, gamma camera imaging, single photon emission computed tomography, positron emission tomography and applications of these techniques in biology and medicine.—III. Cherry

287. Concepts in Molecular Imaging (4)
Lecture—2 hours; lecture/discussion—2 hours; term paper. Prerequisite: Chemistry 2C, Mathematics 21C, Physics 9D, consent of instructor. Current techniques and tools for molecular imaging. Emphasis on learning to apply principles from the physical sciences to imaging problems in medicine and biology.—III. (III.) Louie, Sutcliffe-Goulden

289A-E. Selected Topics in Biomedical Engineering (1-5)
Variable. Prerequisite: consent of instructor. Selected topics in **(A)** Bioinstrumentation and Signal Processing; **(B)** Biomedical Imaging; **(C)** Biofluids and Transport; **(D)** Orthopedic Biomechanics; **(E)** Analysis of Human Movement. May be repeated for credit.—I, II, III. (I, II, III.)

290. Seminar (1)
Seminar—1 hour. Seminar in biomedical engineering. (S/U grading only.)

290C. Graduate Research Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Individual and/or group conference on problems, progress, and techniques in biomedical engineering research. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

299. Research (1-12)
(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Engineering: Chemical Engineering and Materials Science

(College of Engineering)

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Faculty

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Nigel Browning, Ph.D., Professor
Roger B. Boulton, Ph.D., Professor *(Chemical Engineering, Viticulture and Enology)*
Stephanie R. Dungan, Ph.D., Associate Professor *(Chemical Engineering, Food Science and Technology)*

Roland Faller, Ph.D., Assistant Professor
Bruce C. Gates, Ph.D., Professor
Jeffery C. Gibeling, Ph.D., Professor
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Enrique J. Lavernia, Ph.D., Professor
Marjorie L. Longo, Ph.D., Associate Professor
Karen A. McDonald, Ph.D., Professor
Amiya K. Mukherjee, D.Phil., Professor, *Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement*
Zuhair A. Munir, Ph.D., Professor
Alexandra Navrotsky, Ph.D., Professor *(Materials Science and Engineering; Chemistry; Land, Air and Water Resources)*
Ahmet N. Palazoglu, Ph.D., Professor
Ronald J. Phillips, Ph.D., Professor
Robert L. Powell, Ph.D., Professor
Subhash H. Risbud, Ph.D., Professor
Dewey D.Y. Ryu, Ph.D., Professor
Julie M. Schoenung, Ph.D., Associate Professor
James F. Shackelford, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Pieter Stroeve, Sc.D., Professor, *Academic Senate Distinguished Teaching Award*

Emeriti Faculty

Richard L. Bell, Ph.D., Professor Emeritus
Benjamin J. McCoy, Ph.D., Professor Emeritus
Howard L. Needles, Ph.D., Professor Emeritus
J. M. Smith, Sc.D., Professor Emeritus
Stephen Whitaker, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
S. Haig Zeronian, Ph.D., D.Sc., Professor Emeritus

The Department of Chemical Engineering and Materials Science offers four undergraduate programs: Chemical Engineering, Chemical/Biochemical Engineering, Chemical Engineering/Materials Science and Engineering, and Materials Science and Engineering.

Mission Statement. To advance, through teaching and research programs, the frontiers of chemical engineering, biochemical engineering, and materials science and engineering; to educate students with a sense of professionalism and community; and to serve the public of California through outreach efforts.

Chemical Engineering Program

Chemical engineers apply the principles of chemistry and engineering to produce useful commodities, ranging from fuels to polymers. Chemical engineers are increasingly concerned with chemical and engineering processes related to the environment and food production. They work in areas as diverse as integrated circuits and integrated waste management. Preparation for a career in chemical engineering requires an understanding of both engineering and chemical principles to develop proficiency in conceiving, designing, and operating new processes.

The chemical engineering curriculum has been planned to provide a sound knowledge of engineering and chemical sciences so that you may achieve competence in treating current and future technical problems.

Objectives. The objectives of the program in Chemical Engineering are to educate students in the fundamentals of chemical engineering, balanced with the application of these principles to practical problems; to educate students as independent, critical thinkers who can also function effectively as a team; to educate students with a sense of community, ethical responsibility, and professionalism; to educate students for careers in industry, government, and academia; to teach students the necessity for continuing education and self-learning; and to help students to learn to communicate proficiently in written and oral form.

The Chemical Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C	15
Chemistry 2A, 2B, 2C or Chemistry 2AH, 2BH, 2CH	15
Chemistry 128A, 128B, 129A	8
Chemical Engineering and Materials Science 5, 6	6
Chemical Engineering 51	4
Chemical Engineering 80	1
Engineering 45	4
English 1 or 3, or Comparative Literature 1, 2, 3 or 4, or Native American Studies 5	4
General Education electives	12
Minimum Lower Division Units	**91**

Options for Junior and Senior Years

The focus in your junior year is on fundamentals, such as thermo-dynamics, fluid mechanics, and energy transfer. In the senior year, you draw together these fundamentals and apply them in a study of mass transfer phenomena, process design, and process dynamics and control. The program includes twelve units of technical electives, and six units of advanced chemistry electives that allow you to strengthen specific areas in chemical engineering, explore new areas, or pursue new areas of specialization.

Areas of Specialization

The most popular areas of specialization, together with lists of suggested technical electives, are identified and discussed in the following listing. Talk to the instructors of the courses listed about possible prerequisites before enrolling.

Suggested Technical Electives

Advanced Materials Processing: Electrical and Computer Engineering 140A, 140B, 145A, 145B, 146A, 146B; Physics 140A, 140B; Materials Science and Engineering 172, 180, 181

Applied Chemistry: Chemistry 110C, 115, 128C, 129B, 129C, 130, 131, 150; Fiber and Polymer Science 100, 110, 150

Applied Mathematics: Applied Science Engineering 115, 116; Mathematics 118A, 118B, 118C, 119A, 119B, 121A, 121B, 128A, 128B, 128C, 131, 132A, 132B, 185A, 185B

Computers and Automation:

Artificial Intelligence and Computer Graphics: Computer Science and Engineering 170, 175

Numerical Analysis and Optimization: Applied Science 115, 116; Mathematics 128B, 128C, 168; Civil and Environmental Engineering 153

Automatic Control: Biological and Agricultural Engineering 165; Electrical and Computer Engineering 150B, 157B; Biological and Agricultural Engineering 165; Mechanical Engineering 172

Environmental Engineering–Air Environment: Civil and Environmental Engineering 149; Atmospheric Science 121A, 121B, 158; Civil and Environmental Engineering 150; Environmental Studies 110; Environmental Toxicology 101, 112A, 112B, 131

Environmental Engineering–Water Environment: Chemical Engineering 161A, 161B, 161L; Civil and Environmental Engineering 140, 140L, 148A, 148B; Microbiology 102; Biological Sciences 102, 103; Civil and Environmental Engineering 147; Environmental Studies 110, 150A, 151; Environmental Toxicology 101, 112A, 112B; Soil Science 100, 102, 107; Hydrologic Science 124

Food Process Engineering: Biological Systems Engineering 132; Food Science and Technology 100A, 104, 104L; Food Science and Technology 100B

Management and Marketing: Engineering 190; Management 250, 251; Agricultural Economics 113, 130, 136; Statistics 103

Polymer Science: Chemistry 108, 128C, 129B, 129C; Fiber and Polymer Science 150; Chemical Engineering 150C; Materials Science and Engineering 147

Pre-Biomedical Engineering: Four to six courses from: Anatomy, Physiology, and Cell Biology 100; Biological Sciences 1A, 1B, 1C, 101, 102, 103, 104; Molecular and Cellular Biology 140L, 141, 142; Neurobiology, Physiology, and Behavior 101, 112, 113, 114

Pre-Medical: Anatomy, Physiology, and Cell Biology 100, Chemistry 128C, 129B, 129C; and six biology or biochemistry courses, such as Biological Sciences 1B, 1C, 101, 103, 104; Microbiology 102; Molecular and Cellular Biology 140L, 141, 142, 150; Neurobiology, Physiology, and Behavior 101, 112, 113, 114

Chemical Engineering Upper Division Required Courses

Chemical Engineering, 140, 141, 142, 143, 146, 152A, 152B, 155A, 155B, 158A, 158B, 158C	52
Biological Sciences 102	3
Chemistry 110A, 110B	8
Statistics 100	4
Chemical Engineering and Materials Science Electives	6
Choose from the following: Chemistry 110C, 128C, 129B, Chemical Engineering 144, 161A, 161B, 161L, 166, 170; Materials Science and Engineering 147, 160, 164; Fiber and Polymer Science 150.	
Technical electives	10
General Education electives	12
Minimum Upper Division Units	**95**
Minimum Units Required for Major	**186**

Chemical Engineering/Materials Science and Engineering Program

Chemical Engineering/Materials Science is a combined major that offers unique interdisciplinary courses requiring chemical engineering and materials science students to work together. Chemical engineers apply the principles of chemistry and engineering to produce useful commodities, ranging from antibiotics to zirconium. Materials science and engineering is directed toward an understanding of the structure, properties, and behavior of materials. The development of new materials and the understanding of chemical processes demand a thorough knowledge of basic engineering and scientific principles, including crystal structure, elastic and plastic behavior, thermodynamics, phase equilibria and reaction rates, and physical and chemical behavior of engineering materials. The Chemical Engineering/Materials Science program provides the background for activities in research, processing, and the design of materials. The curriculum is based on a common core of courses basic to engineering; courses taken during your first two years provide a strong foundation in fundamental engineering concepts.

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C	15
Chemistry 2A, 2B, 2C or Chemistry 2AH, 2BH, 2CH	15
Chemistry 128A, 128B, 129A	8

Chemical Engineering and Materials Science 5, 6 6
Chemical Engineering 51 4
Chemical Engineering 80 1
Engineering 45 4
English 1 or 3, or Comparative Literature 1, 2, 3 or 4, or Native American Studies 5 4
General Education electives 12
Total Lower Division Units 91

Upper Division Required Courses
Chemical Engineering 140, 141, 142, 143, 146, 152A, 152B, 155A, 155B, 157, 158A, 158B, 158C 52
Chemistry 110A, 110B 8
Biological Sciences 102 3
Statistics 100 4
Materials Science and Engineering 160, 162, 162L, 164, and two courses chosen from Materials Science and Engineering 147, 172, 174, 180, 181, 182, 188A-188B (if Material Science and Engineering 147 is taken, then either Material Science and Engineering 172L or 174L must also be taken in order to obtain the minimum unit requirement) 22
General Education electives 12
Minimum Upper Division Units 101
Minimum Units Required for Major 192

Biochemical Engineering Program

As the biotechnology industry expands and matures, there is increasing need for engineers who can move products from the research stage to large scale manufacturing. As they fill this need, engineers must also understand the production, purification, and regulatory issues surrounding biopharmaceutical manufacturing.

Biochemical engineers—with their strong foundations in chemistry, biological sciences, and chemical process engineering—are in a unique position to tackle these problems. Biochemical engineers apply the principles of cell and molecular biology, biochemistry, and engineering to develop, design, scale-up, optimize, and operate processes that use living cells, organisms, or biological molecules for the production and purification of products (such as monoclonal antibodies, vaccines, therapeutic proteins, antibiotics, and industrial enzymes); for health and/or environmental monitoring (such as diagnostic kits, microarrays, biosensors); or for environmental improvement (such as bioremediation). An understanding of biological processes is also becoming increasingly important in the industries that traditionally employ chemical engineers, such as the materials, chemicals, food, energy, fuels, and semiconductor processing industries.

Objectives. We educate students in the fundamentals of chemical and biochemical engineering, balanced with the application of these principles to practical problems; educate students as independent, critical thinkers who can also function effectively in a team; educate students with a sense of community, ethical responsibility, and professionalism; educate students for careers in industry, government, and academic; teach students the necessity for continuing education and self learning; and help students learn to communicate proficiently in written and oral form.

The Biochemical Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C	15
Chemistry 2A, 2B, 2C or Chemistry 2AH, 2BH, 2CH	15
Chemistry 128A, 128B, 129A	8
Biological Sciences 1A	5
Chemical Engineering and Materials Science 5, 6	6
Chemical Engineering 51	4
Chemical Engineering 80	1
English 1 or 3, or Comparative Literature 1, 2, 3 or 4, or Native American Studies 5	4
General Education electives	12
Minimum Lower Division Units	**92**

Upper Division Required Courses
Chemical Engineering 140, 141, 142, 143, 146, 152A, 152B, 155A, 157, 158A, 158C, 161A, 161B, 161C, 161L 58
Biological Sciences 102 3
Microbiology 102 4
Chemistry 110A, 110B 8
Biochemical Engineering electives 10
Choose two laboratory courses from the laboratory electives list, and choose additional courses from the lecture elective list to provide a total of at least 10 units:
Laboratory elective list: Food Science and Technology 123L; Microbiology 102L, 155L; Molecular and Cellular Biology 120L (this course counts as two laboratory electives and completely satisfies the laboratory requirement), 160L; Neurobiology, Physiology, and Behavior 104L; Plant Biology 111L, 153, 161A, 161B; two units of an internship (192), independent study (199), or Biotechnology 189L taken for 2 or more units can be used to satisfy one biochemical engineering laboratory elective requirement..
Lecture elective list: Biological Sciences 1B, 1C, 101, 103, 104; Biological Systems Engineering 175; Biotechnology 188; Chemical Engineering 170; Food Science and Technology 123; Microbiology 140, 150; Molecular and Cellular Biology 122, 123; Neurobiology, Physiology, and Behavior 103; Plant Biology 111, 112, 152, 160; Statistics 120, 130A, 131A.
General Education electives 12
Minimum Upper Division Units 95
Minimum Units Required for Major 187

Materials Science and Engineering Curriculum

Materials science and engineering is directed toward an understanding of the structure, properties, and behavior of materials. Society demands new and improved materials with capabilities far superior to common metals, polymers, and ceramics. New materials are needed for high-speed transportation systems, surgical and dental implants, new generations of power plants, and solid-state electronic devices in computer and communication technology. Both the development of new materials and the understanding of present-day materials demand a thorough knowledge of basic engineering and scientific principles, including crystal structure, elastic and plastic behavior, thermodynamics, phase equilibria and reaction rates, and physical and chemical behavior of engineering materials.

Materials engineers study phenomena found in many different engineering operations, from fracture behavior in automobiles to fatigue behavior in aircraft frames; from corrosion behavior in petro-chemical refineries to radiation-induced damage in nuclear power plants; and from the fabrication of steel to the design of semiconductors. Materials engineers are also increasingly involved in developing the new materials needed to attain higher efficiencies in existing and proposed energy conversion schemes and will play a central role in the development of new technologies based on composites and high-temperature superconductivity.

The undergraduate materials science and engineering program provides the background for activities in research, processing, and the design of materials. The curriculum is based on a common core of courses basic to engineering; courses taken during your first two years provide a strong foundation in fundamental engineering concepts.

There are several combined majors with Materials Science and Engineering: Civil Engineering/Materials Science and Engineering; Chemical Engineering/Materials Science and Engineering; Electrical Engineering/Materials Science and Engineering; and Mechanical Engineering/Materials Science and Engineering.

Objectives. We educate students in the fundamentals of materials science and engineering, balanced with the application of these principles to practical problems; educate students as independent, critical thinkers who can also function effectively in a team; educate students with a sense of community, ethical responsibility, and professionalism; educate students for careers in industry, government, and academia; teach students the necessity for continuing education and self-learning; and help students learn to communicate proficiently in written and oral form.

The Materials Science and Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Materials Science and Engineering Program

The Materials Science and Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C-9D	19
Chemistry 2A, 2B or 2AH, 2BH	10
Engineering 6, 17, 35, 45	15
English 1 or 3 or Comparative Literature 1, 2, 3 or 4, or Native American Studies 5	4
Communication 1 or 3	4
General Education electives	16
Minimum Lower Division Units	**90**

Upper Division Program

In your third and fourth years, you will take "fundamentals" courses (Materials Science and Engineering 160, 162, 164, 174). With this background, you are then ready for the "applications" courses (Materials Science and Engineering 147, 180, 181, 182, 188) during the fourth year.

If you need a technical elective course in your program, you may select it from the College list of Technical Electives.

Suggested advisers: N. Browning, J.C. Gibeling, J.R. Groza, D.G. Howitt, A.K. Mukherjee, Z.A. Munir, A. Navrotsky, S.H. Risbud, J. F. Shackelford.

Upper Division Required Courses
Engineering 100, 102, 103, 104, 105, 190 22
Select from Aeronautical Science and Engineering 137, 138, Civil and Environmental Engineering 132, 135, Mechanical Engineering 150A, 150B 8
Materials Science and Engineering 147, 160, 162, 162L, 164, 172, 172L, 174, 174L, 180, 181, 182, 188A-188B 45
Select one course from Engineering 180; Mathematics 131; Statistics 120, 131A; Civil and Environmental Engineering 114; Chemical Engineering 140; or Applied Science Engineering 115 ..... 4 or 3
Select one course from Chemistry 110A, 128A, Physics 121 or Geology 161 ..... 3 or 4
Technical electives ..... 0 or 1
General Education electives 8
Minimum Upper Division Units 90
Minimum Units Required for Major 180

Courses in Engineering: Chemical and Materials Science (ECM)

(Courses in Chemical and Materials Science Engineering (ECM) are listed below; courses in Chemical Engineering (ECH) are listed immediately following; courses in Materials Science and Engineering (EMS) follow.)

Lower Division Courses

5. Analysis in Biochemical, Chemical and Materials Engineering (2)
Lecture/discussion—2 hours. Prerequisite: Chemistry 2B (may be taken concurrently), Mathematics 21B (may be taken concurrently). Analysis of systems of interest to chemical engineers and materials scientists. Applications of differential and integral calculus. Dimensional analysis.—II. (II.)

6. Computational Methods for Bio/Chemical/ Materials Engineers (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 21C and course 5. Programming methods for solving problems in chemical, biochemical and materials engineering using Mathematica. Programming styles, data structures, working with lists, functions and rules. Applications drawn from material balances, statistics, numerical methods, and bioinformatics. Introduction to object oriented programming using Java.—III. (III.)

Courses in Engineering: Chemical (ECH)

Lower Division Courses

51. Material Balances (4)
Lecture—4 hours. Prerequisite: Mathematics 21D. Application of the principle of conservation of mass to single and multicomponent systems in chemical process calculations. Studies of batch, semi-batch, and continuous processes involving mass transfer, change of phase, stoichiometry and chemical reaction. Not open for credit to students who have completed course 151.—II. (II.)

80. Chemical Engineering Profession (1)
Lecture/discussion—1 hour. Professional opportunities and professional responsibilities of chemical engineers. Opportunities and needs for post-baccalaureate education. Relationship of chemical engineering to contemporary issues.—III. (III.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor and lower division standing. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

140. Mathematical Methods in Biochemical and Chemical Engineering (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 22B. Mathematical methods for solving problems in chemical and biochemical engineering, with emphasis on transport phenomena. Fourier series and separation of variables. Sturm-Liouville eigenvalue problems. Similarity transformations. Tensor analysis. Finite difference methods for solving time-dependent diffusion problems. Not open for credit to students who have completed course 159.—I. (I.)

141. Fluid Mechanics for Biochemical and Chemical Engineers (4)
Lecture/discussion—4 hours. Prerequisite: Course 140. Principles and applications of fluid mechanics in chemical and biochemical engineering. Hydrostatics. The stress tensor and Newton's law of viscosity. Derivation of the Navier-Stokes equations from Euler's laws of mechanics. One-dimensional laminar and turbulent flows. Macroscopic momentum and mechanical energy balances. Boundary layer theory. Low Reynolds number flow. Not open for credit to students who have completed course 150B.—II. (II.)

142. Heat Transfer for Biochemical and Chemical Engineers (4)
Lecture/discussion—4 hours. Prerequisite: course 51 with a C- or better, course 141. Conduction, convection, and radiation of thermal energy in applications to chemical and biochemical engineering. Derivation of thermal and mechanical energy equations. Thermal boundary layers. Macroscopic balances. Applications: heat transfer in tubes, channels, and integrated circuits, and analysis of heat exchangers. Not open for credit to students who have completed course 153.—III. (III.)

143. Mass Transfer for Biochemical and Chemical Engineers (4)
Lecture/discussion—4 hours. Prerequisite: course 51 with a C- or better, course 141. Derivation of species conservation equations describing convective and diffusive mass transfer. Fick's law and the Stefan-Maxwell constitutive equations. Mass transfer coefficients. Multicomponent mass transfer across gas/liquid interfaces. Applications include drying, heterogeneous chemical reactions, and membrane separations.—III. (III.)

144. Rheology and Polymer Processing (3)
Lecture/Discussion—3 hours. Prerequisite: Course 141. Deformation in steady shear, unsteady shear, and elongational flows. Linear and non-linear viscoelastic constitutive models. The principle of material indifference and admissibility of constitutive equations. Introduction to the unit operations of polymer processing. Not open for credit to students who have completed course 150C.—III. (III.)

146. Chemical Kinetics and Reaction Engineering (5)
Lecture/discussion—5 hours. Prerequisite: Course 143 and 152B. Application of principles of kinetics, heat, and mass transfer to the analysis and design of chemical reaction systems. Not open for credit to students who have completed course 156B.—II. (II.)

152A. Chemical Engineering Thermodynamics (3)
Lecture—3 hours. Prerequisite: course 151. Application of principles of thermodynamics to chemical processes. Not open for credit to students who have completed Engineering 105 or Engineering 105A.—II. (II.)

152B. Chemical Engineering Thermodynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 152A. Continuation of course 152A. Not open for credit to students who have completed Engineering 105B.—III. (III.)

155A. Chemical Engineering Laboratory (4)
Laboratory—6 hours; discussion—1 hour; term paper. Prerequisite: course 150B, 153, and 154A (may be taken concurrently), satisfaction of the upper division English composition requirement. Open only to majors in Chemical Engineering, Chemical Engineering/Materials Science, Chemical Engineering/Biochemical Engineering, Biomedical Engineering, and Biological Systems Engineering. Laboratory experiments in transport phenomena, chemical kinetics, and thermodynamics. GE credit: Wrt.—I, II.

155B. Chemical Engineering Laboratory (4)
Laboratory—6 hours; discussion—1 hour; extensive writing. Prerequisite: courses 154B (may be taken concurrently), 155A, and satisfaction of the Engineering upper division English composition requirement. Open only to majors in Chemical Engineering, Chemical Engineering and Materials Science, Materials Science, Chemical/Biochemical Engineering, Biomedical Engineering, Food Engineering or Biosystems Engineering. Continuation of 155A. Laboratory experiments in transport phenomena, chemical kinetics, and thermodynamics. GE credit: Wrt.—II, III. (II, III.)

157. Process Dynamics and Control (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: course 140. Fundamentals of dynamics and modeling of chemical processes. Design and analysis of feedback control of chemical processes.—I. (I.)

158A. Process Design and Analysis I (4)
Lecture—4 hours. Prerequisite: courses 142 and 143. Process and product creation and design. Cost accounting and estimation. Profitability analysis techniques. Optimization of process flowsheets.—I. (I.)

158B. Process Design and Analysis II (4)
Lecture—4 hours. Prerequisite: course 158A. Heuristic and rigorous design of chemical process equipment. Synthesis of reactor and separation networks, heat and power integration.—II. (II.)

158C. Plant Design Project (4)
Laboratory/discussion—2 hours; project. Prerequisite: course 158B or 161C. Conceptual design of chemical and biochemical processes. Design, costing and profitability analysis of complete plants. Use of computer-aided design techniques.—III. (III.)

161A. Biochemical Engineering Fundamentals (3)
Lecture—3 hours. Prerequisite: Chemistry 128A, Mathematics 22B, Microbiology 102 (or consent of instructor). Biokinetics; bioreactor design and operation; transport phenomena in bioreactors; microbial, plant, and animal cell cultures. Not open for credit to students who have completed course 161.—II. (II.)

161B. Bioseparations (3)
Lecture—3 hours. Prerequisite: course 154A. Product recovery and purification of biochemicals. Cell disruption, centrifugation, filtration, membrane separations, extraction, and chromatographic separation processes.—II. (II.)

161C. Biotechnology Facility Design and Regulatory Compliance (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 161A, 161B (may be taken concurrently). Design of biotechnology manufacturing facilities. Fermentation and purification equipment, and utility systems. Introduction to current good manufacturing practices, regulatory compliance, and documentation.—II. (II.) Block

161L. Bioprocess Engineering Laboratory (4)
Laboratory—9 hours; discussion—1 hour; term paper. Prerequisite: course 161A and 161B, or Viticulture and Enology 186, or Biological Sciences 103 and Molecular and Cellular Biology 120L. Restricted to chemical/biochemical engineering majors during pass 1. Laboratory experiments in the operation and analysis of bioreactors; determination of oxygen mass transfer coefficients in bioreactors and ion exchange chromatography. GE credit: Wrt.—III.

166. Catalysis (3)
Lecture—3 hours. Prerequisite: course 156A (may be taken concurrently) or consent of instructor. Principles of catalysis based on an integration of principles of physical, organic, and inorganic chemistry and chemical kinetics and chemical reaction engineering. Catalysis in solution; catalysis by enzymes; catalysis in swellable polymers; catalysis in microscopic cages (zeolites); catalysis on surfaces.—II. (II.) Gates

170. Introduction to Colloid and Surface Phenomena (3)
Lecture—3 hours. Prerequisite: Chemistry 110A. Introduction to the behavior of surfaces and disperse systems. The fundamentals will be applied to the solution of practical problems in colloid science. The course should be of value to engineers, chemists, biologists, soil scientists, and related disciplines.—III. (III.) Stroeve

190C. Research Group Conferences (1)
Discussion—1 hour. Prerequisite: upper division standing in Chemical Engineering; consent of instructor. Research group conferences. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

190X. Upper Division Seminar (1)
Seminar—1 hour. Prerequisite: upper division standing. In-depth examination of a special topic in a small group setting.

198. Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

206. Biochemical Engineering (3)
Lecture—3 hours. Prerequisite: Microbiology 102 and 102L, Biological Sciences 101, 102, 103, Molecular and Cellular Biology 120L, 200A; Food Science and Technology 205 recommended; or consent of instructor. Interaction of chemical engineering, biochemistry, and microbiology. Mathematical representations of microbial systems. Kinetics of growth, death, and metabolism. Continuous fermentation, agitation, mass transfer and scale-up in fermentation systems, product recovery, enzyme technology. Offered in alternate years.—(II.) Ryu

226. Enzyme Engineering (3)
Lecture—3 hours. Prerequisite: Microbiology 102 and 102L, Biological Sciences 102, 103, Molecular and Cellular Biology 122, 120L, 200A; or consent of instructor. Application of basic biochemical and engineering principles of practical enzymatic processes. Lectures cover large scale production and separation of enzymes, immobilized enzyme systems, enzyme reactor design and optimization, and new application of enzymes in genetic engineering related biotechnology. Offered in alternate years.—II. Ryu

246. Advanced Biochemical Engineering (2)
Lecture—2 hours. Prerequisite: course 206 or consent of instructor. Advances in the field of biotechnology including genetic engineering, enzyme engineering, fermentation science, and renewable resources development. The important results of original research will be evaluated for understanding of the fundamental principles and for potential practical application.—II. (II.) Ryu

252. Statistical Thermodynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 152B, Engineering 105B, or the equivalent. A treatment of the statistical basis of thermodynamics; introduction to statistical mechanics; discussion of the laws of thermodynamics; application of thermodynamic relationships to phase and chemical reaction equilibrium; introduction to molecular simulations and the evaluation of thermodynamic properties from molecular simulations.—I. (I.)

253A. Advanced Fluid Mechanics (4)
Lecture—4 hours. Prerequisite: courses 150A, 150B and 259. Kinematics and basic principles of fluid flow. Principles of constitutive equations. Navier-Stokes equations for Newtonian fluids. Survey or rectilinear creeping flow, lubrication flow, and boundary layer theory.—I. (I.)

253B. Advanced Heat Transport (4)
Lecture—4 hours. Prerequisite: courses 153 and 259 or the equivalent. Fundamental energy postulates and derivation of microscopic and macroscopic energy equations. Mechanisms of conduction. Isotropic, thermoelastic and anisotropic materials solution problems using Green's functions and perturbation theory. Photon transport, black and gray body radiation, radiant exchange. Free and forced convection.—II. (II.)

253C. Advanced Mass Transfer (4)
Lecture—4 hours. Prerequisite: courses 154A, 154B, and 259 (may be taken concurrently) or the equivalents. Kinematics and basic conservation principles for multicomponent systems. Constitutive equations for momentum, heat and mass transfer. Applications to binary and ternary systems. Details of diffusion with reaction, and the effects of concentration.—I. (I.)

254. Colloid and Surface Phenomena (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing in science or engineering or consent of instructor. Thermodynamics and rate processes at interfaces. These fundamental processes will be applied to determine the collective properties of thin films and membranes, self-assembled systems, liquid crystals and colloidal systems. Experimental techniques in surface analysis.—III. (III.) Stroeve, Longo

256. Chemical Kinetics and Reaction Engineering (4)
Lecture—4 hours. Prerequisite: courses 156A and 156B or the equivalent. Analysis of the performance of chemical reactors and design of chemical reactors based on the principles of chemical kinetics and transport phenomena. Consideration of noncatalytic and catalytic reactions in single fluid phases and emphasis on reactions in multiphase mixtures, especially gas-solid reactors.—II. (II.)

259. Advanced Engineering Mathematics (4)
Lecture—4 hours. Prerequisite: Mathematics 22A, 22B, 21D. Applications of methods of applied mathematics to the analytical and numerical solution of linear and nonlinear ordinary and partial differential equations arising in the study of transport phenomena.—I. (I.)

262. Transport Phenomena in Multiphase Systems (3)
Lecture—3 hours. Prerequisite: course 253C. Heat, mass, and momentum transfer in multiphase, multicomponent systems with special emphasis on transport processes in porous media. Derivation of the averaging theorem and application of the method of volume averaging to multicomponent, reacting systems.—III. (III.) Whitaker

263. Rheology and Mechanics of Non-Newtonian Fluids (3)
Lecture—3 hours. Prerequisite: courses 253A and 259 or consent of instructor. Mechanics of polymer solutions and suspension, especially the development of properly invariant constitutive equations. Topics include: viscometry, linear and nonlinear viscoelasticity, continuum mechanics, kinetic theory. Offered in alternate years.—II. Powell

265. Emulsions, Microemulsions and Bilayers (3)
Lecture—3 hours. Prerequisite: an undergraduate course in physical chemistry. Thermodynamic and mechanical descriptions of surfactant-laden interfaces. Forces between and within interfaces. Physics of micelle and microemulsion formation. Structure and stability of emulsions. Properties of phospholipid bilayers, with emphasis on vesicles.—II. (II.) Dungan

267. Advanced Process Control (3)
Lecture—3 hours. Prerequisite: course 157 or the equivalent. Advanced course in analysis and synthesis of linear multivariable systems. Emphasis on frequency domain techniques and applications to chemical processes. Topics include singular value analysis, internal model control, robust controller design methods as well as self-tuning control techniques. Offered in alternate years.—III.

289A-L. Special Topics in Chemical Engineering (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics in **(A)** Fluid Mechanics; **(B)** Nonlinear Analysis and Numerical Methods; **(C)** Process Control; **(D)** Chemistry of Catalytic Processes; **(E)** Biotechnology; **(F)** Interfacial Engineering; **(G)** Molecular Thermodynamics; **(H)** Membrane Separations; **(I)** Advanced Materials Processing; **(J)** Novel Experimental Methods; **(K)** Advanced Transport Phenomena; **(L)** Biomolecular Engineering. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290. Seminar (1)
Seminar—1 hour. (S/U grading only.)

290C. Graduate Research Group Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress and techniques in chemical engineering. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

293. Graduate Student Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Presentation by graduate students of research in progress. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

294. Current Progress in Biotechnology (1)
Seminar—1 hour. Prerequisite: graduate standing. Seminars presented by guest lecturers on subjects of their own research activities. May be repeated for credit. (Same course as Molecular and Cellular Biology 294.) (S/U grading only.)—I, II, III. (I, II. III.) Ryu, Doi

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Course

390. Teaching of Chemical Engineering (1)
Discussion—1 hour. Prerequisite: qualifications and acceptance as teaching assistant and/or associate-in in chemical engineering. Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated twice for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Courses in Materials Science and Engineering (EMS)

Upper Division Courses

147. Principles of Polymer Materials Science (3)
Lecture—3 hours. Prerequisite: chemistry through organic or Engineering 45; introductory physics sequence. Basic principles of polymer science presented including polymer structure and synthesis; polymerization mechanisms, polymer classes, properties, and reactions; polymer morphology, rheology, and characterization; polymer processing. (Same course as Fiber and Polymer Science 100.)—II. (II.)

160. Thermodynamics of Materials Processes and Phase Stability (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45. Review of thermodynamic principles of interest to materials scientists and engineers. Application of thermodynamics to material processing, phase stability, corrosion and oxidation reactions, and environmental issues. Specific examples from molten metallurgy, glass melting, and solid state materials will be used. Only 1 unit of credit allowed to students who have completed course 130. Only 3 units of credit allowed to students who have completed course 144. Not open for credit to students who have completed both courses 130 and 144.—I.

162. Structure and Characterization of Engineering Materials (4)
Lecture—4 hours. Prerequisite: Engineering 45. Description of the structure of engineering materials on the atomic scale by exploring the fundamentals of crystallography. The importance of this structure to materials' properties. Description of experimental determination using x-ray diffraction techniques. Only 2 units of credit allowed to students who have completed course 132. Only 3 units of credit allowed to students who have completed course 142. Only 1 unit of credit allowed to students who have completed both courses 132 and 142.—II.

162L. Structure and Characterization of Materials Laboratory (2)
Laboratory—3 hours; discussion—1 hour. Prerequisite: course 162 (concurrent enrollment recommended). Experimental investigations of structure of solid materials are combined with techniques for characterization of materials. Laboratory exercises emphasize methods used to study structure of solids at the atomic and microstructural levels. Methods focus on optical, x-ray and electron techniques. Only 2 units of credit allowed to students who have completed course 134L. Not open for credit to students who have completed course 132L. GE credit: Wrt.—II.

164. Rate Processes in Materials Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 and course 160. Basic kinetic laws and the principles governing phase transformations. Applications in diffusion, oxidation, nucleation, growth, and spinodal transformations. Only 1 unit of credit allowed to students who have completed course 134. Only 3 units of credit allowed to students who have completed course 144. Not open for credit to students who have completed both courses 134 and 144.—III.

172. Electronic, Optical and Magnetic Properties of Materials (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45, upper division standing in engineering, physics, chemistry, or geology. Electronic, optical, and magnetic properties of materials as related to structure and processing of solid state materials. Physical principles for understanding the properties of metals, semiconductors, ceramics, and amorphous solids and the applications of these materials in engineering.—I.

172L. Electronic, Optical and Magnetic Properties Laboratory (2)
Laboratory—3 hours; lecture/laboratory—1 hour. Prerequisite: course 172 (concurrent enrollment recommended). Experimental investigation of electronic, optical and magnetic properties of engineering materials, emphasizing the fundamental relationship between microstructure and properties as well as the influence of rate processes on the evolution of the microstructure and properties. GE credit: Wrt.—I.

174. Mechanical Behavior of Materials (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 and course 162. The microscopic and macroscopic aspects of the mechanical behavior of engineering materials, with emphasis on recent development in materials characterization by nondestructive testing. The fundamental aspects of plasticity in engineering materials, strengthening mechanisms and mechanical failure modes of materials systems. Only 1 unit of credit allowed to students who have completed course 138. Only 3 units of credit allowed to students who have completed course 142. Not open for credit to students who have completed both courses 138 and 142. GE credit: Wrt.—I.

174L. Mechanical Behavior Laboratory (2)
Laboratory—3 hours; lecture/laboratory—1 hour. Prerequisite: course 174 (concurrent enrollment recommended). Experimental investigation of mechanical behavior of engineering materials. Laboratory exercises emphasize the fundamental relationship between microstructure and mechanical properties, and the evolution of the microstructure as a consequence of rate process. Not open for credit to students who have completed course 138L. GE credit: Wrt.—I.

180. Materials in Engineering Design (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Engineering 45 and upper division standing in Engineering. Quantitative treatment of materials selection for engineering applications. Discussion of the relationship between design parameters and materials properties. Emphasis on the influence of processing and fabrication on the properties of metals, ceramics, polymers and composites as related to the overall design process. Not open for credit to students who have completed course 140. (Former course 140.) GE credit: Wrt.—III.

181. Materials Processing (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Engineering 45 and upper division standing in engineering, physics, chemistry, or geology. Principles of phase equilibria, thermodynamics and reaction kinetics applied to materials processing. Effects of processing variables on the structure-property relationship. Fundamentals of the manufacturing processes for electronic, optical, functional and structural materials. Only 2 units of credit allowed to students who have completed course 146 or 155. Not open for credit to students who have completed both courses 146 and 155. GE credit: Wrt.—II.

182. Failure Analysis (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 45, upper division standing in science or engineering. Analysis of the way materials fail. Effects of temperature, mechanical deformation and corrosion on the properties of materials. Forensics and methodologies for investigating failures of materials including optical microscopy, x-ray analysis and scanning electron microscopy. Investigation of practical problems. Only 1 unit of credit to students who have completed course 148. Only 3 units of credit to students who have completed course 142 or course 144. Not open for credit to students who have completed both courses 142 and 148 or both courses 144 and 148. GE credit: Wrt.—II.

188A-188B. Materials Design Project (2-2)
Laboratory—3 hours; discussion—1 hour. Prerequisite: course 160, 162, 164, 172, 174. A capstone materials design experience involving analysis of real materials processing and applications including economic, manufacturing, and ethical constraints. Various principles of materials science introduced in other courses in the curriculum are integrated into a team design project. Only 1 unit of credit to students who have completed course 149. (Deferred grading only, pending completion of sequence.)—II-III.

190C. Research Group Conferences (1)
Discussion—1 hour. Prerequisite: consent of instructor; upper division standing. Individual and/or group conference on problems, progress and techniques in materials research. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)
Lecture—1-5 hours. Prerequisite: consent of instructor. Group study of selected topics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

230. Fundamentals of Electron Microscopy (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Engineering 132. Principles and techniques of scanning and transmission of electron microscopy used in the study of materials. Emphasis upon practical applications. Offered in alternate years.—(II.) Howitt

230L. Laboratory for Electron Microscopy (2)
Laboratory—6 hours. Prerequisite: course 230 concurrently. Practical application of techniques of electron scanning and transmission microscopy including x-ray microanalysis. Offered in alternate years.—(II.) Jones

232. Advanced Topics in Transmission Electron Microscopy (3)
Lecture—1 hour; discussion—2 hours. Prerequisite: course 230. Advanced course in the techniques of electron microscopy including analytical techniques, probe diffraction methods, and high resolution imaging. Offered in alternate years.—II. Howitt

232L. Laboratory for Advanced Transmission Electron Microscopy (2)
Discussion—1 hour; laboratory—3 hours. Prerequisite: course 230L. Laboratory in advanced transmission electron microscopy techniques relevant to specific graduate research projects in materials science. Offered in alternate years.—II.

240. Transport Phenomena in Materials Processes (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing in Engineering. Phenomenological and atomistic mechanisms in transport processes in condensed and noncondensed phases. Application to heat treatment, chemical and physical vapor deposition, crystal growth, bonding, sintering and joining of metals. Offered in alternate years.—III.

241. Principles and Applications of Dislocation Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing in Engineering; consent of instructor. Concepts in dislocation theory are applied to explain plasticity of crystalline solids. Glide and climb of dislocations, strain hardening, recrystallization, theories of creep processes and interaction of dislocation with solute atoms, precipitates and impurity clouds are discussed. Offered in alternate years.—(II.) Mukherjee

242. Advanced Mechanical Properties of Materials (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 138. Strength and structure of engineering materials. The dependence of their mechanical properties on time, stress, and temperature, Generalized concepts of dislocation theory in plastic deformation, including creep, superplasticity, and cavitation. Influence of microstructure in optimizing the mechanical strength properties. Offered in alternate years.—II. Mukherjee

243. Kinetics of Phase Transformation in Engineering Materials (3)
Lecture—3 hours. Prerequisite: graduate standing in Engineering and consent of instructor; course 130 recommended. Theory of alloying, kinetics of phase changes, homogeneous and heterogeneous transformation, transformation by shear, order-disorder reactions. Offered in alternate years.—III. Groza

244. Interaction of Materials and their Environment (3)
Lecture—3 hours. Prerequisite: Engineering 45 and 105A, or consent of instructor. Thermodynamic and kinetic foundations of the corrosion and oxidation processes. Practical aspects of corrosion control and prevention. Stress-corrosion and gas-embrittlement phenomena. Special topics in corrosion; microbiological and atmospheric corrosion. Offered in alternate years.—I. Munir

245. Advanced Topics in Structure of Materials (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 132 and graduate standing in Engineering or consent of instructor; courses 138 and 142 recommended. Nature of microstructure in engineering materials will be explored. Crystalline and non-crystalline structures will be studied with special emphasis on grain boundary segregation in development of polycrystalline microstructure and the radial distribution function of amorphous materials. Offered in alternate years.—III. Shackelford

247. Advanced Thermodynamics of Solids (3)
Lecture—3 hours. Prerequisite: course 130 or the equivalent. Thermodynamics of gas-solid reactions and solutions; criteria for phase stability, thermodynamics of surfaces and interfaces; thermodynamics of defects in compounds, their influence on transport processes; thermodynamics of EMF cells and application to solid-state electrolytes. Offered in alternate years.—(I.) Munir

248. Fracture of Engineering Materials (3)
Lecture—3 hours. Prerequisite: course 138. Description of failure of materials by crack propagation. Topics include the stress fields about elastic cracks, the Griffith-Irwin analysis, descriptions of plastic zones, fracture toughness testing, microstructural aspects of fracture and failure at elevated temperatures. Offered in alternate years.—(I.) Gibeling

249. Mechanisms of Fatigue (3)
Lecture—3 hours. Prerequisite: course 138 or consent of instructor; course 248 recommended. Microstructural description of mechanisms of fatigue in metals. Topics include a phenomenological treatment of cyclic deformation, dislocation processes in cyclic deformation, fatigue crack nucleation, stage I crack growth, threshold effects and high temperature cyclic deformation. Offered in alternate years.—I.

250A-F. Special Topics in Polymer and Fiber Science (3)
Lecture—3 hours. Prerequisite: course 147 or consent of instructor. Selected topics of current interest in polymer and fiber sciences. Topics will vary each time the course is offered. (Same course as Textiles and Clothing 250A-F.)—II. (II.)

251. Applications of Solid State Nuclear Magnetic Resonance Spectroscopy (3)
Lecture—3 hours. Prerequisite: graduate standing in chemistry, physics or engineering, or consent of

instructor. Fundamentals of solid state NMR spectroscopy and principles of advanced NMR techniques for analyzing structure of solid materials.—III. (III.) Risbud

289A-G. Special Topics in Materials Science (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics in: **(A)** Electronic Materials; **(B)** Ceramics and Minerals; **(C)** Physics and Chemistry of Materials; **(D)** Materials Processing; **(E)** Materials Science and Forensics; **(F)** Biomaterials; **(G)** Surface Chemistry of Metal Oxides. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290C. Graduate Research Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Individual and/or group conference on problems, progress, and techniques in materials science and engineering research. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

294. Materials Science Seminar (1)
Seminar—1 hour. Current literature and developments in materials science with presentations by individual students. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Shackelford, Mukherjee, Munir, Howitt, Gibeling, Groza, Risbud

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Course

390. The Teaching of Materials Science (1)
Discussion—1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in materials science and engineering. Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated twice for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Engineering: Civil and Environmental

(College of Engineering)

Jeannie L. Darby, Ph.D., Chairperson of the Department (530-752-0586)

Department Office, 2001 Engineering III (530-752-0586)

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Faculty

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Fabian A. Bombardelli, Ph.D., Assistant Professor
Ross W. Boulanger, Ph.D., Professor
Y. H. (Rob) Chai, Ph.D., Associate Professor
Daniel P. Y. Chang, Ph.D., Professor
Yannis F. Dafalias, Ph.D., Professor
Jeannie L. Darby, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Yueyue Fan., Ph.D., Assistant Professor
Timothy R. Ginn, Ph.D., Professor
John T. Harvey, Ph.D., Associate Professor
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Boris Jeremic, Ph.D., Associate Professor
Amit Kanvinde, Ph.D., Assistant Professor
M. Levent Kavvas, Ph.D., Professor
Ryuichi Kitamura, Ph.D., Adjunct Professor
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Jay R. Lund, Ph.D., Professor
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Patricia L. Mokhtarian, Ph.D., Professor
Debbie Niemeier, Ph.D., Professor
Mark M. Rashid, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
John B. Rundle, Ph.D., Professor *(Civil and Environmental Engineering; Physics; Geology)*
S. Geoffrey Schladow, Ph.D., Professor
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Daniel Sperling, Ph.D., Professor *(Civil and Environmental Engineering; Environmental Science and Policy)*
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Anthony S. Wexler, Ph.D., Professor *(Civil and Environmental Engineering; Mechanical and Aeronautical Engineering; Land, Air and Water Resources)*
Stefan Wuertz, Ph.D., Professor
Thomas M. Young, Ph.D., Associate Professor
Bassam A. Younis, Ph.D., Professor
H. Michael Zhang, Ph.D., Associate Professor

Emeriti Faculty

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Takashi Asano, Ph.D., Professor Emeritus
Don O. Brush, Ph.D., Professor Emeritus
Robert H. Burgy, M.S., Professor Emeritus
James A. Cheney, Ph.D., Professor Emeritus
Leonard R. Herrmann, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement*
James R. Hutchinson, Ph.D., Professor Emeritus
I.M. Idriss, Ph.D., Professor Emeritus
Ian P. King, Ph.D., Professor Emeritus
Bruce E. Larock, Ph.D., Professor Emeritus
Gerald T. Orlob, Ph.D., Professor Emeritus
Otto G. Raabe, Ph.D., Professor Emeritus
Melvin R. Ramey, Ph.D., Professor Emeritus
Karl M. Romstad, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
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Verne H. Scott, Ph.D., Professor Emeritus
Chih-Kang Shen, Ph.D., Professor Emeritus
Michael A. Taylor, Ph.D., Professor Emeritus
George Tchobanoglous, Ph.D., Professor Emeritus

The Civil and Environmental Engineering Programs

Mission. The Department of Civil and Environmental Engineering integrates research, education, and professional service in areas related to civil infrastructure and the environment. We provide the profession and academia with outstanding graduates who advance both engineering practice and fundamental knowledge.

Program Educational Objectives. *Fundamentals:* To educate students in the fundamental principles needed for civil and environmental engineering: mathematics, basic sciences, and engineering sciences. *Application:* To educate students in the application of fundamental principles for solving civil and environmental engineering problems; provide proficiency in at least four of the environmental, geotechnical, structural, transportation, and water resource areas; and expose students to current research. *Professionalism:* To imbue students with attributes that lead to professional growth throughout their careers: a sense of community and ethical responsibility; an awareness of business practices; a recognition of the need for life-long learning, continuing education, and participation in professional societies; a preparedness for graduate education; an appreciation for diversity in the engineering profession; the ability to think independently and perform effectively in multidisciplinary teams; and the ability to communicate effectively. *Service to State and Profession:* To provide an educational program that serves the needs of the state and profession; recruit and retain a diverse student population that is representative of the state; engage in outreach activities; provide an efficient program that minimizes the time-to-degree and maximizes enrollment opportunities; and prepare students for entry into post-graduate education or practice.

Study Abroad and Civil Engineering. It is possible for students to complete a portion of the civil engineering program at an international institution, such as the University of Edinburgh, by participating in an Education Abroad Program. The department encourages interested students to select a campus through the Education Abroad Program, then consult with the undergraduate staff adviser in Civil Engineering about their individual course plan. Often students are in their junior or senior year of study when they participate in this option.

Civil Engineering Program

The Civil Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Lower Division Required Courses
Requirements for the Civil Engineering and the Civil Engineering/Materials Science and Engineering programs.

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C and choice of Physics 9D, Chemistry 2C, Biological Science 1A or Geology 50-50L*	19
Chemistry 2A-2B or 2AH-2BH	10
Civil and Environmental Engineering 3 (Civil and Environmental Engineering 3 is designed for freshman students and is not open to upper division students. Students who do not take this course will substitute 3 units of additional upper division civil engineering coursework as technical elective units.)	3
Engineering 6, 17, 35, 45	15
Civil and Environmental Engineering 10	4
English 1 or 3, or Comparative Literature 1, 2, 3 or 4, or Native American Studies 5	4
Communication 1 or 3	4
General Education electives	12
Minimum Lower Division Units	**93**

*Units in excess of the requirement from Chemistry, Biological Sciences, or Geology courses may count toward the technical elective requirement. Please consult with the departmental staff adviser.

Upper Division Program

Areas of Specialization
Undergraduates may emphasize one or more of the following areas of specialization, or generalize across all areas. You are urged to consult a faculty adviser when developing your individual program. Additional information on areas of specialization and potential faculty advisers can be obtained from the College of Engineering Bulletin and the departmental Web page.

Environmental Engineering. The focus of this area is on the management and improvement of air, land, and water quality in the face of increasing population and expanding industrialization. Examples of environmental engineering problems include innovative analysis and design of air, water, wastewater, and solid waste treatment systems; mathematical modeling of natural and engineered systems; sampling, analysis, and transport and transformation of natural and anthropogenic pollutants; and modeling of air pollutant emissions.

Suggested technical electives:

Applied Science Engineering 116; Atmospheric Science 121A, , 158, 160; Chemical Engineering 154A, 154B, 156A, 156B, 161A, 161B, 170; Chemistry

107A, 107B, 128A, 128B; Civil and Environmental Engineering 140, 142, 144, 145, 146, 148A, 148B, 149, 150, 153, 163; Engineering 180; Environmental Science and Policy 150A, 151; Mathematics 128A, 128B, 128C; Mechanical Engineering 161, 163, Microbiology 102, 105, 120, 140, 150; Soil Science 111, 112; Statistics 130A, 130B

Suggested advisers: D. Chang, J. L. Darby, T. R. Ginn, B. A. Holmén, M. J. Kleeman, D. Niemeier, S. G. Schladow, S. Wuertz, T. M. Young.

Geotechnical Engineering. This area deals with civil infrastructure and environmental problems that require quantifying the behavior of geologic materials (e.g., soils and rocks). Examples of geotechnical engineering problems include foundations for buildings and bridges, earthwork (e.g., dams, tunnels, highways), earthquake hazards (e.g., ground motions, liquefaction, soil-structure interaction), and geo-environmental problems (ground water flow, subsurface contaminant transport and remediation).

Suggested technical electives:

Civil and Environmental Engineering 131, 132, 134, 135, 137, 138, 139, 140, 144, 171, 171L, 173, 175, 179; Engineering 180; Geology 17, 50, 50L, 134, 161; Hydrologic Science 146; Mathematics 128A, 128B, 128C

Suggested advisers: R. W. Boulanger, Y. F. Dafalias, J. T. Harvey, B. Jeremic, B. L. Kutter.

Structural Engineering and Structural Mechanics. The focus of this area is the conception, design, analysis, construction, and life-cycle modeling of all types of civil infrastructure, including buildings, bridges, dams, ports, highways, and industrial facilities. Structural materials include metals, reinforced concrete, timber, and advanced composites. Loads range from earthquakes to adverse environmental conditions. Structural mechanics emphasizes theoretical and computational tools that may be used in structural engineering.

Suggested technical electives:

Civil and Environmental Engineering 131, 132, 134, 135, 136, 137, 138, 139, 171, 171L, 173, 179; Engineering 122, 180; Materials Science and Engineering 174; Mathematics 128A, 128B, 128C

Suggested advisers: J. E. Bolander, Y. K. Chai, Y. F. Dafalias, J.T. Harvey, A. Kanvinde, S. Kunnath, B. Maroney, M. M. Rashid, N. Sukumar.

Transportation Planning and Engineering. This area deals with the movement of people and goods in a manner consistent with society's environmental (e.g. air and water quality) and socio-economic goals (e.g. equity and mobility). Transportation engineering applies engineering, economic, and behavioral science principles to the planning, analysis, design, and operation of transportation systems such as highways and public transit. Transportation planning involves the formulation and analysis of transportation policy, program, and project alternatives in consideration of societal goals, budgetary constraints, economic objectives, and technological feasibilities.

Suggested technical electives: Civil and Environmental Engineering 137, 149, 153, 161, 162, 163, 165; Engineering 160; Environmental Science and Policy 167, 168A, 168B, 171, 173, 178, 179

Suggested advisers: Y. Fan, P. L. Mokhtarian, D. Niemeier, D. Sperling, H. M. Zhang.

Water Resources Engineering. This area includes hydrology, hydraulics, fluid mechanics, and water resources systems planning and design. Hydrology deals with quantifying and understanding all aspects of the hydrologic cycle, including the relationships between precipitation, runoff, groundwater, and surface water. Water quality and contaminant transport issues are linked to hydrologic conditions. Hydraulics and fluid mechanics deal with flows in pipes, open-channel water-distribution systems, and natural systems, such as lakes and estuaries. Water resources systems planning and design deals with the comprehensive development of water resources to meet the multiple needs of industry, agriculture, municipalities, recreation, and other activities.

Suggested technical electives:

Agricultural and Resource Economics 176; Atmospheric Science, 121A; Biological and Agricultural Engineering 145; Civil and Environmental Engineering 141, 141L, 142, 144, 145, 148B, 153, 155; Environmental Science and Policy 128, 150A, 151; Hydrologic Science 110.

Suggested advisers: F. Bombardelli, T. R. Ginn, B. L. Kavvas, J. R. Lund, M. A. Mariño, S. G. Schladow, B. A. Younis.

Civil Engineering Upper Division Required Courses

Engineering 102, 103, 104, 104L, 105, 106 20
Applied Science Engineering 115..... 4
Civil and Environmental Engineering 114 .. 4
One course from Applied Science Engineering 116, Civil and Environmental Engineering 153, Mathematics 118A, 121, or Statistics 108 4
A minimum of four of the following group options (a minimum of two courses in each of the four areas and a minimum of 19 design units from group option selections and technical electives. Courses listed in more than one group may be counted only once. The design unit content of each course is noted on the Civil Engineering degree requirement advising sheet, available from the department, also shown in its entirety on the department's undergraduate Web site.)..... 28*
Environment: Civil and Environmental Engineering148A or 149 and at least one from courses 140, 147, 148B, 150;
Geotechnical: Civil and Environmental Engineering 171 and 171 Lab and at least one from courses 173, , 175, 179;
Structures: Civil and Environmental Engineering 135 and at least one from courses 130, 131, 132, 134, 136, 137, 138, 139, 179;
Transportation: Civil and Environmental Engineering 161 or 163 and at least one from courses 162, 165, 179;
Water Resources: Civil and Environmental Engineering 141 and 141 Lab and at least one from courses 142, 144, 145, 146, 155
Technical electives 18
Fourteen units must be selected from upper division engineering courses; of these units, seven units must be selected from Civil and Environmental Engineering courses other than Civil and Environmental Engineering 192 or 199.
General Education electives 12
Minimum Upper Division Units 90
Minimum Units Required for Major 183

*Units in excess of the 28 unit requirement may count toward the technical elective requirement. Please consult with the departmental staff adviser.

Civil Engineering/Materials Science and Engineering
Upper Division Required Courses

Engineering 100, 102, 103, 104, 104L, 105, 106 23
Applied Science Engineering 115..... 4
Civil and Environmental Engineering 114 .. 4
One course from Applied Science Engineering 116, Civil and Environmental Engineering 153, Mathematics 118A, 121, or Statistics 108 4
Civil and Environmental Engineering 130, 135, 141, 141L, 148A, 171, 171L..... 21
Three courses from Civil and Environmental Engineering 132, 134, 136, 145, 147, 148B, 150, 155, 162, 173 (and must include one of Civil and Environmental Engineering 134, 136, 145, 148B, 150, 162, or 173)..... 11
Materials Science and Engineering 160, 162, 162L, 164, 174, and one course from Materials Science and Engineering 172, 180, 181, 182, 188A and 188B (these courses must be taken in consecutive quarters to fulfill one course requirement) 22
General Education electives 12
Minimum Upper Division Units 101
Minimum Units Required for Major 194

Courses in Engineering: Civil and Environmental (ECI)

Lower Division Courses

3. Introduction to Civil and Environmental Engineering Systems (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: trigonometry. An introduction to civil engineering systems. A general view of the engineering process as obtained by participation in laboratory experiments illustrative of the solution of representative, but greatly simplified, engineering problems. Not open for credit to upper division engineering students.—I. (I.)

10. Introduction to Surveying (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Physics 9A (may be taken concurrently). Theory and practice of Civil Engineering surveying. Modern methods of land surveying and computer-aided design in civil engineering practice. Only 3 units of credit for students who have completed Biological Systems Engineering 1.—II. (III.) Chang

90X. Lower Division Seminar (1-4)
Seminar—1-4 hours. Prerequisite: consent of instructor. Examination of a special topic in a small group setting. May be repeated for credit.

92. Internship in Engineering (1-5)
Internship. Prerequisite: lower division standing; approval of project prior to period of internship. Supervised work experience in civil engineering. May be repeated for credit. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor and lower division standing. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor; lower division standing. (P/NP grading only.)

Upper Division Courses

114. Probabilistic Systems Analysis for Civil Engineers (4)
Lecture—4 hours. Prerequisite: Mathematics 21C. Probabilistic concepts and models in engineering. Statistical analysis of engineering experimental and field data. Introduction to stochastic processes and models of engineering systems. Not open for credit to students who have completed Statistics 120.—I, II. (I, II.) Mokhtarian

119A. C/FORTRAN Programming for Engineers (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 6, any two of Engineering 102, 103, 104, 105, or the equivalent, upper division standing. Computational problem solving techniques for engineering applications using C/FORTRAN structured programming; algorithm design applied to realistic problems.—II. (II.) Jeremic, Kleeman

119B. Parallel Processing for Engineering Applications (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 119A or consent of instructor, upper division standing. Fundamental skills in parallel computing for engineering applications; emphasis on structured parallel programming for distributed memory parallel clusters.—III. (III.) Kleeman, Jeremic

130. Structural Analysis (4)
Lecture—4 hours. Prerequisite: Mathematics 22A, Engineering 104. Elastic structural analysis of determinate and indeterminate trusses, beams and

frames. Plastic bending and limit analysis.—III. (III.) Dafalias

131. Matrix Structural Analysis (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 6 and 104. Matrix formulation and computer analysis of statically indeterminate structures. Stiffness and flexibility formulations for elastic structures. Finite element methods for elasticity and bending problems.—I. (I.) Kunnath

132. Structural Design: Metallic Elements (4)
Lecture—4 hours. Prerequisite: Engineering 104. Design of metallic beams, columns, and other members for various types of loading and boundary conditions; design of connections between members; member performance within structural systems.—II. (II.) Bolander

134. Analysis and Design of Bridges (4)
Lecture—3 hours; laboratory—3 hours; field trip. Prerequisite: courses 130 or 131; 135. Bridge design using state-of-the-art programs. Overview of Caltrans and American Association of State Highway and Transportation Officials (AASHTO) codes and principles. Seismic analysis/retrofitting of bridges. Bridge design details, final plans, specifications and estimate. Field Trip.—II. (II.) Chai

135. Structural Design: Concrete Elements (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 104. Restricted to majors in Civil Engineering, Civil Engineering/Materials Science and Engineering, or Materials Science and Engineering only. Strength design procedures for columns, rectangular beams, T-beams and beams of general cross-section. Building code requirements for bending, shear, axial load, combined stresses and bond. Introduction to prestressed concrete.—I, III. (I, III.) Chai

136. Building Design: Wood, Steel, and Concrete Applications (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 130 or 131, course 135; course 132 recommended. Horizontal and lateral load paths; dead and live loading; earthquake and wind forces. Approximate analyses of building frames; wood engineering for buildings. Steel, concrete and wood building design.—III. (III.)

137. Construction Principles (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: senior standing in Engineering. A study of the construction industry; its form, evolution, and methods of operation; fundamental principles underlying construction practices; economic factors in planning, organizing, and operating a construction force. Field trips and analysis of local construction projects.—(III.) Harvey

138. Earthquake Loads on Structures (4)
Lecture—4 hours. Prerequisite: Engineering 102, course 130 or 131. Determination of loads on structures due to earthquakes. Methods of estimating equivalent static lateral forces; response spectrum and time history analysis. Concepts of mass, damping and stiffness for typical structures. Design for inelastic behavior. Numerical solutions and Code requirements.—II. (II.) Kunnath

139. Advanced Structural Mechanics (3)
Lecture—3 hours. Prerequisite: Engineering 104 or the equivalent. Review of stress, strain, equilibrium, compatibility, and elastic material behavior. Plane stress and plane strain problems in elasticity theory; stress function. Theories for straight, tapered, composite, and curved beams. Beams on elastic foundations. Introduction to plates, curved membranes, and cables.—I. (I.) Rashid

140. Environmental Analysis of Aqueous Systems (3)
Lecture—3 hours. Prerequisite: Chemistry 2B; course 148A recommended. Introduction to chemical principles underlying current practices in sampling and analysis of water and wastewater.—I. (I.) Darby

140L. Environmental Analysis of Aqueous Systems Laboratory (1)
Laboratory—3 hours. Prerequisite: Chemistry 2B or the equivalent; course 140 (may be taken concurrently). Restricted to Civil Engineering undergraduate and graduate students. Introduction to "wet chemical" and instrumental techniques commonly used in the examination of water and wastewater and associated data analysis.—(I.) Darby

141. Engineering Hydraulics (3)
Lecture—3 hours. Prerequisite: Engineering 103. Nature of flow of a real fluid; flow in pipes; open channel flow; turbomachinery; fluid forces on objects: boundary layers, lift and drag.—I, III. (I, III.) Schladow

141L. Engineering Hydraulics Laboratory (1)
Laboratory—3 hours. Prerequisite: course 141 (may be taken concurrently). Open to Engineering students only. Laboratory experiments and demonstrations on flow measurement, sluice gates, hydraulic jump, flow characteristics, and centrifugal pumps.—I, III. (I, III.) Schladow

142. Engineering Hydrology (4)
Lecture—4 hours. Prerequisite: courses 141 (may be taken concurrently); course 114 recommended. The hydrologic cycle. Evapotranspiration, interception, depression storage and infiltration. Streamflow analysis and modeling. Flood routing through channels and reservoirs. Frequency analysis of hydrologic variables. Precipitation analysis for hydrologic design. Hydrologic design.—(I.) Kavvas

144. Groundwater Systems Design (4)
Lecture—4 hours. Prerequisite: courses 141 and 148A. Groundwater occurrence, distribution, and movement; groundwater flow systems; aquifer management; groundwater quality and contamination; solute transport by groundwater; fate and transport of subsurface contaminants. Introduction to groundwater supply and transport modeling.—I. (I.) Ginn

145. Hydraulic Structure Design (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 141 and 141L; course 142 recommended. Fundamental principles and practical aspects of the design of hydraulic structures including water storage, conveyance, and pumping systems. Emphasis on use of industry-standard computer software for hydraulic design.—III. (III.) Younis

146. Water Resources Simulation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103; Applied Science Engineering 115, course 141, 142 recommended. Computer simulation techniques in the analysis, design and operation of surface water systems; modeling concepts and practices with application to surface runoff; water quality in rivers and streams and dispersion of contaminants in water bodies. GE credit: Wrt.—II. (II.) Younis

147. Solid Waste Management (3)
Lecture—2 hours; laboratory—3 hours. Characteristics and amounts of solid wastes; collection systems; introduction to waste treatment processes and return of treated wastes to the environment.—(I.)

148A. Water Quality Management (4)
Lecture—4 hours. Prerequisite: Engineering 103. Basic concepts of water quality. Fundamentals of water and wastewater treatment processes. Analysis of treatment process flowsheets. Analysis of water quality management alternatives.—II. (II.) Young

148B. Water Quality Management Systems Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 148A. Application of the principles of fluid mechanics to the analysis and design of flow measuring devices, pumps and pump station design, water distribution systems, wastewater collection systems, water and wastewater treatment plant headloss analysis, and bioremediation systems.—III. (III.) Wuertz

149. Air Pollution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D, 22B, Chemistry 2B, Atmospheric Science 121A or Engineering 103. Physical and technical aspects of air pollution. Emphasis on geophysical processes and air pollution meteorology as well as physical and chemical properties of pollutants. (Same course as Atmospheric Science 149.)—I. (I.) Chang

150. Air Pollution Control System Design (4)
Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: Engineering 103, 105, 106, course 149. Design and evaluation of air pollution control devices and systems.—II. (II.) Chang

153. Deterministic Optimization and Design (4)
Lecture—4 hours. Prerequisite: Mathematics 21C, 22A, Engineering 5 or 6, upper division standing; Applied Science Engineering 115 recommended. Operations research. Optimization techniques such as linear programming, dynamic programming, and non-linear programming. Applications in water, transportation, environmental, infrastructure systems, and other civil engineering disciplines through computer-based design projects.—I. (II.) Lund

155. Water Resources Engineering Planning (4)
Lecture—4 hours. Prerequisite: Engineering 106 or Economics 1A, course 114, 142; course 153 recommended. Basic engineering planning concepts; role of engineering, economic, environmental and social information and analysis; institutional, political and legal aspects. Case studies and computer models illustrate the planning of water resource systems. GE credit: Wrt.—(III.) Lund

161. Transportation System Operations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 6 (or the equivalent) and 102. Principles of transportation system operations; traffic characteristics and methods of measurement; models of transportation operations and congestion applied to urban streets and freeways.—I. (I.) Zhang

162. Transportation System Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 161 or 163. Driver, vehicle and roadway factors and their relationship to transportation planning and system design. Generalized design paradigm; group problem solving.—III. (III.) Niemeier

163. Energy and Environmental Aspects of Transportation (4)
Lecture—3 hours; extensive writing. Prerequisite: Economics 1A and course 162. Engineering, economic, and systems planning concepts. Analysis and evaluation of energy, air quality and selected environmental attributes of transportation technologies. Strategies for reducing pollution and petroleum consumption in light of institutional and political constraints. Evaluation of vehicle emission models. (Same course as Environmental Science and Policy 163.) Offered in alternate years. GE credit: Wrt.—I. Sperling

165. Transportation Policy (3)
Lecture—3 hours. Prerequisite: Economics 1A and Engineering 106 recommended. Transportation and associated environmental problems confronting urban areas, and prospective technological and institutional solutions. Draws upon concepts and methods from economics, engineering, political science and environmental studies. Offered in alternate years. GE credit: SocSci, Wrt.—(I.) Sperling

171. Soil Mechanics (4)
Lecture—4 hours. Prerequisite: Engineering 103 and 104 (may be taken concurrently), course 171L must be taken concurrently. Soil formations, mass-volume relationships, soil classification, effective stress, soil-water-void relationships, compaction, seepage, capillarity, compressibility, consolidation, strength, states of stress and failure, lateral earth pressures, and slope stability.—I, III. (I, III.) Kutter

171L. Soil Mechanics Laboratory (1)
Laboratory—3 hours. Prerequisite: course 171 must be taken concurrently. Laboratory studies utilizing standard testing methods to determine physical, mechanical and hydraulic properties of soil and demonstration of basic principles of soil behavior.—I, III. (I, III.) Kutter

173. Foundation Design (4)
Lecture—4 hours. Prerequisite: courses 135 (may be taken concurrently) and 171. Soil exploration and determination of soil properties for design; consolidation and elastic settlements of foundations; bearing capacity of soils and footing design; lateral earth pressures and retaining wall design; pile foundations; excavations and de-watering.—II. (II.) Boulanger

175. Geotechnical Earthquake Engineering (4)
Lecture—4 hours. Prerequisite: course 171 and 171L. Earthquake sources and ground motions. Cyclic behavior of soils; triggering, consequences, and mitigation of effects of liquefaction. NEES (Network for Earthquake Engineering Simulation) equipment and techniques for studying earthquake engineering with focus on liquefaction problems.—I. (I.) Kutter, Idriss

179. Pavement Engineering (4)
Lecture—3 hours; discussion/lecture—3 hours. Prerequisite: Engineering 104. Pavement types (rigid, flexible, unsurfaced, rail), their applications (roads, airfields, ports, rail) and distress mechanisms. Materials, traffic and environment characterization. Empirical and mechanistic-empirical design procedures. Maintenance, rehabilitation and reconstruction; construction quality; asphalt concrete mix design.—I. (I.) Harvey

189A-J. Selected Topics in Civil Engineering (1-5)
Prerequisite: consent of instructor. Directed group study of selected topics with separate sections in **(A)** Environmental Engineering; **(B)** Hydraulics and Hydrologic Engineering; **(C)** Engineering Planning; **(D)** Geotechnical Engineering; **(E)** Structural Engineering; **(F)** Structural Mechanics; **(G)** Transportation Engineering; **(H)** Transportation Planning; **(I)** Water Resources Engineering; **(J)** Water Resources Planning. May be repeated for credit when the topic is different.—I, II, III. (I, II, III.)

190C. Research Group Conferences in Civil and Environmental Engineering (1)
Discussion—1 hour. Prerequisite: upper division standing in Civil and Environmental Engineering; consent of instructor. Research group conferences. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship in Engineering (1-5)
Internship. Prerequisite: upper division standing; approval of project prior to the period of the internship. Supervised work experience in civil engineering. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: senior standing in engineering and at least a B average. (P/NP grading only.)

Graduate Courses

201. Introduction to Theory of Elasticity (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 104. Fundamental equations of elasticity in three dimensions; plane stress and plane strain; flexture and torsion of bars of various shapes. Introduction to variational and approximate methods.—I. (I.) Rashid

203. Inelastic Behavior of Solids (3)
Lecture—3 hours. Prerequisite: course 201. Fundamentals of theories of plasticity, viscoelasticity and viscoplasticity for solids. Macroscopic constitutive modelling for engineering materials, e.g., metals, polymers, soils, etc., and microscopic motivation. Offered in alternate years.—(II.) Dafalias

205. Continuum Mechanics (3)
Lecture—3 hours. Prerequisite: course 201. Tensor formulation of the field equations for continuum mechanics, including large deformation effects. Invariance and symmetry requirements. Introduction to nonlinear thermoelasticity and thermodynamics. Solution of three-dimensional problems. Selected topics. Offered in alternate years.—II. Dafalias

206. Fracture Mechanics (3)
Lecture—3 hours. Prerequisite: Engineering 104; course 201. Linear and nonlinear fracture mechanics, stress analysis, energy concepts, brittle fracture criteria, path independent integrals, Dugdale-Barenblatt model, general cohesive zone models, ductile fracture criteria, crack tip fields for stationary and propagating cracks, fatigue. Application of numerical methods for fracture mechanics.—II. (II.) Rashid

211. Advanced Matrix Structural Analysis (4)
Lecture—4 hours. Prerequisite: course 131. Analysis of complex frameworks by the displacement method; treatment of tapered beams, curved beams, and beams on elastic foundations; partially rigid connections; geometric and material nonlinearities; buckling; flexibility-based formulations; FEM-software for nonlinear analysis of structures.—II. (II.) Kunnath

212A. Finite Element Procedures in Applied Mechanics (4)
Lecture—4 hours. Prerequisite: Applied Science Engineering 115, or Mathematics 128A and Mathematics 128B (may be taken concurrently). Weighted-residual and Rayleigh-Ritz methods. Weak/variational formulation and development of discrete equations using finite element approximations. Application to one- and two-dimensional problems (heat conduction).—II. (II.) Sukumar

212B. Finite Elements: Application to Linear and Non-Linear Structural Mechanics Problems (4)
Lecture—4 hours. Prerequisite: course 212A. Application to linear and nonlinear structural mechanics problems. Linear elasticity, weak form, and finite element approximation. Incompressible media problems. Non-linear problems with material nonlinearity.—III. (III.) Sukumar

213. Analysis of Structures Subjected to Dynamic Loads (4)
Lecture—4 hours. Prerequisite: courses 138 and 211. Analysis of structures subjected to earthquake, wind and blast loading; distributed, consistent and lumped mass techniques; computer implementation; nonlinear response spectrum; frequency and time domain analysis; seismic protection of structures; numerical methods in linear and nonlinear structural dynamics.—II. (II.) Kunnath

221. Theory of Plates and Introduction to Shells (3)
Lecture—3 hours. Prerequisite: course 201 (may be taken concurrently). Development of classical and refined plate theories. Application to isotropic, orthotropic and composite plates. Solutions for rectangular and circular plates. Membrane theory for axisymmetric shells and bending of circular shells.—(I.)

232. Advanced Topics in Concrete Structures (4)
Lecture—4 hours. Prerequisite: course 130, 135, 138 and graduate standing. Ductility of reinforced concrete; strength of two-way slabs; modified compression field theory.—I. (I.) Chai

233. Advanced Design of Steel Structures (4)
Lecture—4 hours. Prerequisite: courses 130 or 131, 132. Review of Load and Resistance Factor Design (LRFD); steel-plate girder design; plastic design of indeterminate systems; moment frames and bracing systems; connection design; seismic design of steel structures; vibration of flooring systems; steel-concrete composite design.—III. (III.) Bolander

234. Prestressed Concrete (4)
Lecture—4 hours. Prerequisite: courses 130 or 131, 132. Survey of methods and applications; prestressing materials and systems; prestress losses; flexural design; design for shear and torsion; deflection computation and control; continuous beams and indeterminate structures; floor systems; partial prestressing; design of compression members; strut-and-tie models. Offered in alternate years—(I.) Bolander

235. Cement Composites (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 104. Applications of cement composites; materials selection and proportioning; component and composite properties; hydration reactions and microstructure development; mechanisms of failure; nondestructive test methods; fiber reinforcement; concrete durability; novel reinforcing materials; ferrocement; repair and retrofit technologies; applications to structural design. Offered in alternate years.—I. Bolander

238. Performance-Based Seismic Engineering (4)
Lecture—4 hours. Prerequisite: Courses 138 and 213. Modern seismic design; performance-based seismic design; seismic hazard; seismic demands: linear and nonlinear procedures; performance assessment: deterministic and probabilistic procedure; review of FEMA-350, FEMA-356, ATC-40 and other performance-based guidelines.—III. (III.) Kunnath

240. Water Quality (4)
Lecture—4 hours. Prerequisite: courses 141 and 142. Quality requirements for beneficial uses of water. Hydrologic cycle of quality. Hydromechanics in relation to quality of surface and groundwaters; transport and fate of waterborne pollutants. Heat budget for surface waters; predictive methods; introduction to water quality modeling.—II. (II.) Schladow

241. Air Quality Modeling (4)
Lecture—4 hours. Prerequisite: Applied Science Engineering 115, course 119A, 149, 150, one from course 242 or 247, or the equivalent, graduate standing. Modeling of urban and regional air quality problems including gas-phase chemical reactions, aqueous-phase chemical reactions, phase partitioning, and numerical solution schemes. Offered in alternate years.—I. Kleeman

242. Air Quality (4)
Lecture—4 hours. Prerequisite: Engineering 105, course 141, 149 or the equivalent. Factors determining air quality. Effects of air pollutants. Physical and chemical fundamentals of atmospheric transport and reaction. Introduction to dispersion modeling. Offered in alternate years.—III. Kleeman

243A. Water and Waste Treatment (4)
Lecture—4 hours. Prerequisite: course 148A or the equivalent. Characteristics of water and airborne wastes; treatment processes and process kinetics; treatment system design.—I. (I.) Darby

243B. Water and Waste Treatment (4)
Lecture—4 hours. Prerequisite: course 243A. Continuation of course 243A. Aeration, thickening, biological processes, design of biological treatment systems.—II. (II.) Wuertz

245A. Applied Environmental Chemistry: Inorganic (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 105, Chemistry 2B or the equivalent, course 140; Chemistry 2C or 107A recommended. Chemistry of natural and polluted waters. Topics include chemical, kinetic and equilibrium principles, redox reactions, gas solution and solid-solution equilibria, thermodynamics, carbonate systems, coordination chemistry, interfacial phenomena. Offered in alternate years.—(III.) Young

245B. Applied Environmental Chemistry: Organic (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 128A, 128B, 128C, or the equivalent; Chemistry 2C or 107A recommended. Transport and transformation of organic chemicals in the environment. Topics include application of thermodynamics to predict solubility and activity coefficients; distribution of organic chemicals between the aqueous phase and air, solvent, or solid phases; chemical, photochemical and biological transformation reactions. Offered in alternate years.—III. Young

246. Pilot Plant Laboratory (4)
Lecture—1 hour; discussion—1 hour; laboratory—6 hours. Prerequisite: course 243A, 243B (may be taken concurrently) or consent of instructor, graduate standing. Laboratory investigation of physical, chemical, and biological processes for water and wastewater treatment.—II. (II.) Darby

247. Aerosols (4)
Lecture—4 hours. Prerequisite: Engineering 103, 105, course 141, 149. Behavior of airborne particles including particle formation, modification, and removal processes. Offered in alternate years.—I. Kleeman

247L. Aerosols Laboratory (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 247. Methods of generation and charac-

terization of aerosols. Detailed topics may include flow rate measurement, aerosol generation, aerosol collection, ions measurement, metals measurement, and carbon measurement. May be repeated once for credit.—III. (III.) Kleeman

248. Biofilm Processes (4)
Lecture—4 hours. Prerequisite: Soil Science 111 or 211 or course 243B or consent of instructor; calculus and basic cell molecular biology recommended. Natural and engineered biofilms, including biofilm occurrence and development, spatial structure, microbial processes, fundamental and applied research tools, biofilm reactors, beneficial uses, and detrimental effects.—III. (III.) Wuertz

249. Probabilistic Design and Optimization (3)
Lecture—3 hours. Prerequisite: Engineering 106; courses 114 and 153 or the equivalent. Design by optimization for probabilistic systems, decision theory, the value of information, probabilistic linear programming, probabilistic dynamic programming, nonlinear probabilistic optimization. Applications in civil engineering design, project evaluation, and risk management. Offered in alternate years.—III. Lund

251. Transportation Demand Analysis (4)
Lecture—4 hours. Prerequisite: course 114 or the equivalent. Procedures used in urban travel demand forecasting. Principles and assumptions of model components (trip generation, trip distribution, model split). New methods of estimating travel demand. Computer exercises using empirical data to calibrate models and forecast travel demand.—I. (I.) Niemeier

252. Sustainable Transportation Technology and Policy (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 160 or the equivalent. Role of technical fixes and demand management in creating a sustainable transportation system. Emphasis on technology options, including alternative fuels, electric propulsion, and IVHS. Analysis of market demand and travel behavior, environmental impacts, economics and politics. (Same course as Environmental Science and Policy 252.) Offered in alternate years—III. Sperling

254. Discrete Choice Analysis of Travel Demand (4)
Lecture—4 hours. Prerequisite: course 114. Behavioral and statistical principles underlying the formulation and estimation of discrete choice models. Practical application of discrete choice models to characterization of choice behavior, hypothesis testing, and forecasting. Emphasis on computer exercises using real-world data sets.—III. (III.) Mokhtarian

256. Urban Traffic Management and Control (4)
Lecture—4 hours. Prerequisite: course 114. Basic concepts, models, and methods related to the branch of traffic science that deals with the movement of vehicles on a road network, including travel speed, travel time, congestion concepts, car-following and hydrodynamic traffic models.—I. (I.) Zhang

257. Flow in Transportation Networks (4)
Lecture—4 hours. Prerequisite: course 153; 161 or 256 recommended. Elements of graph theory, a survey of pertinent optimization techniques, extremal principles in network flow problems, deterministic equilibrium assignment, stochastic equilibrium assignment, extensions of equilibrium assignments and dynamic transportation network assignment.—II. (II.) Zhang

258. Transportation Planning in Developing Countries (3)
Lecture—3 hours. Prerequisite: course 160 or consent of instructor. Investigation of the role that transportation investments and policies play in the development of regions and countries. Emphasis is on identifying appropriate technologies, policies, and planning methods for designing transportation systems in regions of differing socioeconomic, geographic, and institutional settings. Offered in alternate years.—III. Sperling

260. Noncohesive Sediment Transportation (3)
Lecture—3 hours. Prerequisite: course 141. Sediment materials. Particle suspension by currents, waves, and winds. Modes of transport. Bed load relations and suspended load relations. Calculation of total loads in streams. Similarity criteria for movable bed models. Stable channel design. Offered in alternate years.—(II.)

261. Cohesive Particle Transportation (3)
Lecture—3 hours. Prerequisite: course 141. Cohesion; cohesive particulate materials; processes of aggregation and dispersion; aggregate properties; deposition and scour, channel and harbor design and maintenance. Offered in alternate years.—(III.)

262. Transit Systems Analysis (3)
Lecture—3 hours. Prerequisite: course 251. Theoretical presentation of transit planning and analysis techniques. Five modules: policy and funding; management and operations; design standard and issues; planning and forecasting methods for performance evaluation. Review of transit studies from other regions. Offered in alternate years.—I. Niemeier

264A. Transport, Mixing and Water Quality in Rivers and Lakes (4)
Lecture—4 hours. Prerequisite: course 141 and 240. Principal causes of mixing and transport in rivers, lakes and reservoirs, and their impacts on water quality. Case studies of specific lakes and rivers. Offered in alternate years.—III. Schladow

264B. Transport, Mixing and Water Quality in Estuaries and Wetlands (4)
Lecture—4 hours. Prerequisite: courses 141 and 240. Principal causes of mixing and transport in estuaries and wetlands, and their impacts on water quality. Topics include advection/diffusion; tides; transverse mixing; longitudinal dispersion; sediment transport; nutrient cycling; computer modeling of estuaries. Case studies of specific systems. Offered in alternate years.—(III.) Schladow

265. Stochastic Contaminant Transport (4)
Lecture—4 hours. Prerequisite: course 266. Stochastic theory of molecular diffusion covered by means of Taylor-Chandrasekhar theory. Turbulence diffusion covered in the Lagrangian-Eulerian frameworks. Application of theory to contaminant transport in groundwater aquifers, atmosphere, river and oceanic environments. Offered in alternate years.—I. Kavvas

266. Applied Stochastic Methods in Engineering (4)
Lecture—4 hours. Prerequisite: course 114 or Mathematics 131 or Statistics 130A or 131A; Mathematics 118A (may be taken concurrently). Stochastic processes classification; Gaussian random fields; stochastic calculus in mean square; Ito and Stratonovich stochastic differential equations; Fokker-Planck equation; stochastic differential equations with random coefficients. Offered in alternate years.—(I.) Kavvas

267. Water Resources Management (3)
Lecture—3 hours. Prerequisite: courses 114, 141 and 142; course 153 recommended. Engineering, institutional, economic, and social basis for managing local and regional water resources. Examples in the context of California's water development and management. Uses of computer modeling to improve water management.—I. (I.) Lund

268. Infrastructure Economics (3)
Lecture—3 hours. Prerequisite: Economics 1A, Engineering 106 or the equivalent. Economics applied to infrastructure engineering planning, operations, maintenance, and management problems; microeconomic and macroeconomic theories; benefit-cost analysis; effect of uncertainty; optimization economics; non-classical economics; public finance. Offered in alternate years.—(II.) Lund

269. Transportation-Air Quality: Theory and Practice (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 149 or the equivalent. Health and regulatory aspects of airborne pollutants. Principles of modeling vehicle emissions. Conformity issues and the regulatory framework. Regional and micro-scale modeling.—III. (III.) Niemeier

270. Advanced Water Resources Management (3)
Lecture—3 hours. Prerequisite: courses 153 and 267 or the equivalent. Discussion of technical papers related to planning theory, system maintenance, regionalization, multi-objective methods, risk analysis, institutional issues, pricing model application, economic development, forecasting, operations, and other topics. Offered in alternate years.—(III.) Lund

272A. Advanced Hydrogeology (4)
Lecture—4 hours. Prerequisite: course 144; Mathematics 118A recommended. Flow in confined, unconfined, and leaky aquifers. Geological aspects of aquifers. Regional groundwater flow and hydraulics of pumping and recharging wells. Identification of aquifer parameters. Isotope hydrogeology and recharge estimation.—II. (II.) Ginn

272B. Advanced Hydrogeology (4)
Lecture—4 hours. Prerequisite: courses 212A and 272A. Processes of subsurface flows and transport. Numerical methods of subsurface fluid flow and transport systems. Flow in the unsaturated zone. Fresh water/salt water interface in coastal aquifers. Macrodispersion. Identification of regional aquifer parameters. Modeling of aquifer systems. Offered in alternate years.—III. Ginn

272C. Multiphase Reactive Transport (4)
Lecture—4 hours. Prerequisite: courses 142, 144, 148A. Multicomponent reactive transport including multiple phases. Advective/dispersive transport, chemical equilibria, and mass transformation kinetics. Natural chemical/microbiological processes including sorption, complexation, biodegradation, and diffusive mass transfer. Eulerian and Lagrangean averaging methods. Applications to contaminant remediation problems in river and subsurface hydrology. Offered in alternate years.—III. Ginn

273. Water Resource Systems Engineering (3)
Lecture—3 hours. Prerequisite: courses 114 and 153 or the equivalent. Planning, design, and management of water resource systems. Application of deterministic and stochastic optimization techniques. Water allocation, capacity expansion, and design and operation of reservoir systems. Surface water and groundwater management. Offered in alternate years.—(I.) Marino

275. Hydrologic Time-Series Analysis (4)
Lecture—4 hours. Prerequisite: course 114 and 142. Application of statistical methods for analysis and modeling of hydrologic series. Statistical simulation and prediction of hydrologic sequences using time series methodology. Offered in alternate years.—III. Kavvas

276. Watershed Hydrology (4)
Lecture—4 hours. Prerequisite: course 142 or the equivalent. Analysis and mathematical modeling of hydrologic processes taking place in a watershed. Precipitation analysis and modeling. Theory of overland flow and its kinematic wave approximation. Analysis and modeling of saturated and unsaturated subsurface flow processes taking place on a hill slope.—II. (II.) Kavvas

277A. Computational River Mechanics I (4)
Lecture—4 hours. Prerequisite: Applied Science Engineering 115, course 141 (both may be taken concurrently). Unsteady open channel flows, computation of water surface profiles, shallow water equations, St. Venant equations, method of characteristics, finite difference methods, stability and accuracy of explicit and implicit schemes, flood routing in simple and compound channels, advection of plumes. Not open for credit to students who have completed course 277.—I. (I.) Younis

277B. Computational River Mechanics II (4)
Lecture—4 hours. Prerequisite: course 277A. Open channel flows, physical aspects of river mechanics, formulation of depth-averaged equations, boundary conditions, coordinates transformation and grid generation, finite-difference solution techniques, applications to two-dimensional momentum and pollutant transport in rivers. Offered in alternate years.—III. Younis

277C. Turbulence and Mixing Processes (4)
Lecture—4 hours. Prerequisite: graduate standing. Nature of turbulent flows, conservation equations, momentum, heat and mass transport in free and wall-bounded flows, body forces and mixing, roughness effects, turbulence modeling and simulation. Offered in alternate years.—III. Younis

278. Hydrodynamics (3)
Lecture—3 hours. Prerequisite: course 141. Perturbation methods. Basic water waves. Governing equations for fluid motion on a rotating earth. Rotation effects, vorticity dynamics, Ekman layer. Stratification effects, internal waves and turbulent mixing. Combined effects. Offered in alternate years.—II.

279. Advanced Mechanics of Fluids (4)
Lecture—4 hours. Prerequisite: course 141. Rotational flows. Navier-Stokes equations and solutions for laminar flow; boundary layer equations and solution techniques. Nature of turbulence. Reynolds equations. Introduction to turbulence modeling. Offered in alternate years.—I.

281A. Advanced Soil Mechanics (4)
Lecture—4 hours. Prerequisite: course 171. Consolidation and secondary compression. Preloading and wick drains. Seepage and seepage pressures. Filtration, drainage, and dewatering. Shear strength: friction, cohesion, dilatancy and critical states.—I. (I.) Kutter

281B. Advanced Soil Mechanics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 281A. Site investigation methods: CPT, SPT, pressuremeter, vane, seismic investigation, electrical properties. Slope stability, including seepage pressures and earthquake effects. Slope stabilization and reinforcement methods. Centrifuge modeling.—II. (II.) Boulanger

282. Pavement Design and Rehabilitation (4)
Lecture—4 hours. Prerequisite: course 179 or consent of instructor. Advanced pavement design and structural/functional condition evaluation for concrete and asphalt pavements. Highways, airfields, port facilities; new facilities, rehabilitation, reconstruction. Mechanistic-empirical procedures, materials, climate and traffic characterization. Use of current design methods; recent developments and research. Offered in alternate years.—II. Harvey

283. Physico-Chemical Influences and In Situ Evaluation of Soil Behavior (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 171. Analysis of the mechanical behavior of soils from consideration of clay mineralogy, colloidal phenomena, ion-exchange. Soil-water-electrolyte characteristics and soil structure. Laboratory includes methods of characterization of soils, quantification of soil structure, and rotating cylinder tests to evaluate soil erosion.—I. (I.)

284. Theoretical Geomechanics (4)
Lecture—4 hours. Prerequisite: course 171. Elasticity, plasticity, micromechanics, coupled behavior and large deformations for geomaterials. Prediction of stress-strain-volume change behavior of geomaterials. Monotonic and cyclic loading, anisotropy, bifurcation of deformation.—II. (II.) Jeremic

285N. Computational Geomechanics (4)
Lecture—4 hours. Prerequisite: courses 212A and 213. Development of computational methods for simulating solids and structures made of geomaterials (soils, rocks, concrete, foams, powders). Static and dynamic inelastic simulations for single and two phase material (solid and pore fluid).—III. (III.) Jeremic

286. Advanced Foundation Design (4)
Lecture—4 hours. Prerequisite: course 173. Design and analysis of pile and pier foundations, including seismic effects; deep excavation systems; tie-back, nailing, and anchor systems; coffer dams; loads on buried conduits; ground modification techniques; and other related topics.—III. (III.) Boulanger

287. Geotechnical Earthquake Engineering (4)
Lecture—4 hours. Prerequisite: courses 138 and 281A. Characteristics and estimation of earthquake ground motions; wave propagation and local site response; liquefaction potential and remediation; residual strength and stability considerations; ground deformations; dynamic soil-structure interaction.—III. (III.)

288. Earth and Rockfill Dams (4)
Lecture—4 hours. Prerequisite: courses 281A and 281B (may be taken concurrently). Site selection; design considerations; layout; seismic effects including considerations of fault movements; construction; environmental considerations, instrumentation; maintenance remediation and retrofit of existing dams. Offered in alternate years.—(II.)

289A-I. Selected Topics in Civil Engineering (1-5)
Lecture, laboratory, or combination. Prerequisite: consent of instructor. Directed group study of special topics with separate sections in **(A)** Environmental Engineering; **(B)** Hydraulics and Hydrologic Engineering; **(C)** Engineering Planning; **(D)** Geotechnical Engineering; **(E)** Structural Engineering; **(F)** Structural Mechanics; **(G)** Transportation Engineering; **(H)** Transportation Planning; **(I)** Water Resources Engineering. May be repeated for credit.—I, II, III. (I, II, III.)

290. Seminar (1)
Seminar—1 hour. Discussion of current graduate research, and guest lectures on recent advances. Oral presentation of individual study. Course required of graduate degree candidates. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Graduate Research Group Conference (1)
Discussion—1 hour. Research problems, progress, and techniques in civil engineering. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

296. Topics in Water and Environmental Engineering (1)
Seminar—2 hours. Seminars presented by visiting lecturers, UC Davis faculty and, graduate students. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Course

390. The Teaching of Civil Engineering (1)
Discussion—1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in Civil Engineering. Participation as teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated for total of 9 units. (S/U grading only.)—I, II, III. (I, II, III.)

Engineering: Computer Science

(College of Engineering)

Daniel Gusfield, Ph.D., Chairperson of the Department

Department Office, 2063 Engineering II (530-752-7004)

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Faculty

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John Bruno, Ph.D., Professor
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Vladimir Filkov, Ph.D, Assistant Professor
Matthew Franklin, Ph.D., Associate Professor
Michael Gertz, Ph.D., Associate Professor
Dipak Ghosal, Ph.D., Associate Professor
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Bernd Hamann, Ph.D., Professor
Kenneth I. Joy, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Alan J. Laub, Ph.D., Professor
Karl Levitt, Ph.D., Professor
Kwan Liu Ma, Ph.D., Professor
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Richard F. Walters, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*

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Nancy E. Reed, Ph.D., Adjunct Assistant Professor

The Computer Science and Engineering Major Program

The Department of Computer Science administers two curricula: Computer Science and Engineering in the College of Engineering, and Computer Science in the College of Letters and Science. It also administers a minor in the College of Letters and Science. For information on the Computer Science curriculum and minor, see "Computer Science" in this catalog.

The field of Computer Science and Engineering encompasses the organization, design, analysis, theory, programming, and application of digital computers and computing systems. It develops versatile engineers with backgrounds spanning a broad computer hardware/software spectrum.

The Computer Science and Engineering major provides students with a solid background in mathematics, physics, chemistry, and electronic circuits and systems, all supporting the computer hardware and computer software courses which form the focus of the curriculum.

A key theme of this curriculum is the hardware/software interaction in today's computer systems design, a theme reflected in the balance between computer hardware and computer software aspects in the course requirements. The key theme of hardware/software interaction is also reflected in the orientation of the courses themselves. The Computer Science and Engineering major also requires additional general education electives, helping to develop the verbal skills and intellectual breadth demanded by today's employers.

The Computer Science and Engineering program prepares students to do further work in hardware, software, or electronics, either in industry or postgraduate study.

Mission. The University of California, Davis, is first and foremost, an institution of learning and teaching, committed to serving the needs of society. The Department of Computer Science contributes to the mission of the University in three ways. First, its undergraduate and graduate education programs seek to educate students in the fundamental principles of computer science and the skills needed to solve the complex technological problems of modern society; the breadth of course work provides a framework for life-long learning and an appreciation for multidisciplinary activities. Second, through its

research programs, the department contributes to the development and progress of computer science, and software and information technology, to provide innovative, creative solutions for societal needs. Finally, the department disseminates its research—to enhance collaborations with the public sector, further interdisciplinary interests that benefit society, and educate the public—through publications, public service, and professional activities.

Department Objectives. *Teaching*—To provide undergraduate students with a thorough understanding of the key principles and practices of computing, which include a strong theoretical background in mathematics, basic sciences, and engineering fundamentals and an ability to apply this knowledge to practical problems. To provide students with sufficient breadth to work creatively and productively in multidisciplinary work teams; this breadth, in its broadest context, will form the basis for an appreciation and interest in life-long learning. To provide students with the ability to design and conduct experiments, and to collect and analyze data in core, as well as more specialized, areas of computer science. To provide students with breadth in the humanities and social sciences so they learn to communicate effectively, understand professional and ethical issues in society, and appreciate the interrelatedness between computing and society. To educate graduate students to be our next generation of teachers or leaders in industry, or to pursue meaningful, creative research in industry, government, or academia. *Research*—To develop and maintain research programs that produce fundamental scientific advances, as well as useful technological innovations, while simultaneously training the next generation of researchers and leaders in the field of computer science.

Objectives. Students will work well on a team; work independently; communicate well in writing; communicate well in speaking; write correct, easily maintainable programs; solve complex problems in their discipline; understand computer hardware; understand the relationship between hardware and software; effectively gather and use experimental data (e.g., profiling data); act with professional ethics and responsibility; use their knowledge and skills to contribute to the betterment of the society; achieve distinction in their careers; think creatively about new problems; do well in graduate school (for students who plan to go to graduate school); learn new things.

Integrated Degree Program. An integrated B.S./M.S. plan in Computer Science allows Davis students in Computer Science, Computer Science Engineering, or Computer Engineering to complete a master's degree in Computer Science in one year. Formal course work for the master's degree is reduced by 6 units for students. Students can begin graduate studies immediately after completing their B.S. degree. More information is available in the graduate section of the College of Engineering Bulletin, or on the Internet at http://www.cs.ucdavis.edu/graduate/bs-ms.html.

Computer Science and Engineering Program

The Computer Science and Engineering program is accredited by the Engineering Accreditation Commission and the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology.

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C-9D	19
Chemistry 2A	5
Computer Science Engineering 20, 30, 40	12
Computer Science Engineering 50 or Electrical and Computer Engineering 70	4
Engineering 17	4
English 1 or 3, or Comparative Literature 1, 2, 3 or 4, or Native American Studies 5	4
Communication 1	4
General Education electives	12
Unrestricted electives	4
Minimum Lower Division Units	**90**

Upper Division Program

Upper Division Required Courses

Computer Science Engineering 188 or Engineering 190	3
Electrical and Computer Engineering 100 and 180A	10
Mathematics 131 or Statistics 131A	4
Computer Science Engineering 110	4
Computer Science Engineering 120† or 122A†	4
Computer Science Engineering 152A, 154A, 154B, and Electrical and Computer Engineering 172	16
Computer Science Engineering 140A, 150, and 160	12
Computer electives—a minimum of 4 courses and a minimum of 13 units chosen from Computer Science Engineering 120†, 122A†, 122B, 130, 140B, 142, 152B, 153, 158, 163, 165A, 165B, 170, 175, 177, 178; one course (minimum 3 units from one single course) from approved 192 or 199, or Electrical and Computer Engineering 194; Electrical and Computer Engineering 180B	13
General Education electives	21
Unrestricted elective	3
Minimum Upper Division Units	**90**
Minimum Units Required for Major	**180**

† Completion of both Computer Science Engineering 120 and 122A will satisfy the computer science theory requirement and a computer elective requirement.

Courses in Engineering: Computer Science (ECS)

Lower Division Courses

10. Basic Concepts of Computing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: two years of high school algebra. Introduction to principles of computing. Methods and algorithms for solving problems by use of a digital computer. Not intended for students in physical sciences, engineering, or mathematics. Not open for credit to students who have completed course 30, Engineering 5, or former course 30H.—I, II, III. (I, II, III.)

15. Introduction to Computers (4)
Lecture—3 hours; laboratory—3 hours. Computer uses in modern society. Emphasis on uses in non-scientific disciplines. Includes word processing, other applications, elementary programming concepts, overview of current/projected computer uses. Intended for Letters and Science and other non-computer majors. Not open for credit to students who have completed course 15AT, 30, Engineering 5 or former course 30H. Only 2 units of credit allowed to students who have completed Agricultural Systems and Environment 21. GE credit: SciEng, Wrt.—I, II, III. (I, II, III.)

15AT. Introduction to Computers (4)
Independent study—4 hours. Prerequisite: consent of instructor. Computer uses in modern society. Includes word processing, spreadsheet, DOS, networks and programming concepts. Independent study course paralleling course 15 lectures. Not open to students who have completed course 15, 30, or Engineering 5. Only 2 units of credit allowed to students who have completed Agricultural Systems and Environment 21. GE credit: SciEng, Wrt.—I, II, III. (I, II, III.)

20. Discrete Mathematics for Computer Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21A. Discrete structures and applications in computer science. Proofs, particularly induction. Introduction to propositional logic, logic circuit design, combinatorics, recursion and solution of recurrence relations, analysis of algorithms, graph theory and trees, finite state machines. Not open for credit to students who have completed course 100.—I, II, III. (I, II, III.) Gusfield, Rogaway, Bai, Laub

30. Introduction to Programming and Problem Solving (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A or 21A (may be taken concurrently); prior experience with basic programming concepts (variable, loops, conditional statements) recommended. Introduction to computers and computer programming, algorithm design, and debugging. Elements of good programming style. Programming in the C language. Use of basic UNIX tools.—I, II, III. (I, II, III.)

40. Introduction to Software Development and Object-Oriented Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 30 or the equivalent with a grade of C- or better. Elements of program design, style, documentation, efficiency. Methods for debugging and verification. Operating system tools. Principles and use of object-oriented programming in C++. Basic data structures and their use.—I, II, III. (I, II, III.)

50. Computer Organization and Machine-Dependent Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40. Comparative study of different hardware architectures via programming in the assembly languages of various machines. Role of system software in producing an abstract machine. Only one unit of credit allowed for students who have taken Electrical and Computer Engineering 70.—I, II, III. (I, II, III.) Farrens, Matloff

89A-L. Special Topics in Computer Science (1-5)
Lecture, laboratory or combination. Prerequisite: consent of instructor. Special topics in **(A)** Computer Science Theory; **(B)** Architecture; **(C)** Programming Languages and Compilers; **(D)** Operating Systems; **(E)** Software Engineering; **(F)** Databases; **(G)** Artificial Intelligence; **(H)** Computer Graphics; **(I)** Networks; **(J)** Computer-Aided Design; **(K)** Scientific Computing; **(L)** Computer Science. May be repeated for credit when the topic is different.—I, II, III. (I, II, III.)

92. Internship in Computer Science (1-5)
Internship. Prerequisite: lower division standing; project approval prior to period of internship. Supervised work experience in computer science. May be repeated for credit. (P/NP grading only.)

98. Directed Group Study (1-5)
(P/NP grading only.)

99. Special Study for Lower Division Students (1-5)
(P/NP grading only.)

Upper Division Courses

110. Data Structures and Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 20 and 40 with a grade of C- or better. Design and analysis of data structures for a variety of applications. Trees, heaps, searching, sorting, hashing, graphs. Extensive programming.—I, II, III. (I, II, III.) Joy

120. Introduction to the Theory of Computation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 20; Mathematics 108 recommended. Fundamental ideas in the theory of computation, including formal languages, computability and complexity. Reducibility among computational problems.—I, II, III. (I, II,III.) Rogaway, Gusfield, Martel, Bai, Franklin

122A. Algorithm Design and Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 20, 110. Complexity of algorithms, bounds

on complexity, algorithms for searching, sorting, pattern matching, graph manipulation, combinatorial problems, introduction to NP-complete problems. Not open for credit to students who have taken course 122.—I, II, III. (I, II, III.) Rogaway, Gusfield, Martel, Bai, Franklin

122B. Algorithm Design and Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 122A. Theory and practice of hard problems, and problems with complex algorithm solutions. NP-completeness, approximation algorithms, randomized algorithms, dynamic programming and branch and bound. Students do theoretical analysis, implementation and practical evaluations. Examples from parallel, string, graph, and geometric algorithms.—I. (I.) Rogaway, Gusfield, Martel

124. Theory and Practice of Bioinformatics (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 10 or 30 or Engineering 5 or 6, Statistics 12 or 13 or 32 or 100 or Mathematics 131/Statistics 131A, Biological Sciences 1A or Molecular and Cellular Biology 10. Fundamental biological, mathematical and algorithmic models underlying bioinformatics, sequence analysis, database search, gene prediction, molecular structure comparison and prediction, phylogenetic trees, high throughput biology, massive datasets; applications in molecular biology and genetics; use and extension of common bioinformatics tools.—III. (III.) Gusfield, Filkov

130. Scientific Computation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110, Mathematics 22A. Matrix-vector approach using MATLAB for floating point arithmetics, error analysis, interpolations, numerical integration, matrix computations, nonlinear equations and optimization. Parallel computing for matrix multiplication and the Cholesky factorization.—III. (III.) Bai, Hamann, Joy, Laub

140A. Programming Languages (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 or Electrical and Computer Engineering 70; course 110. Syntactic definition of programming languages. Introduction to programming language features including variables, data types, data abstraction, scoping, parameter disciplines, exception handling. Comparative study of several high-level programming languages. Not open for credit to students who have taken course 140.—I, II, III. (I, II, III.) Olsson, Pandey

140B. Programming Languages (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 140A. Continuation of programming language principles. Further study of programming language paradigms such as functional and logic; additional programming language paradigms such as concurrent (parallel), dataflow, and constraint; key implementation issues for those paradigms; and programming language semantics.—I. (I.) Olsson, Levitt, Pandey

142. Compilers (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 20, 140A; course 120 recommended. Principles and techniques of lexical analysis, parsing, semantic analysis, and code generation. Implementation of compilers.—II. (II.) Pandey, Su

150. Operating Systems and System Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40; course 154A or Electrical and Computer Engineering 70; course 154B or Electrical and Computer Engineering 170 strongly recommended. Basic concepts of operating systems and system programming. Processes and interprocess communication/synchronization; virtual memory, program loading and linking; file and I/O subsystems; utility programs. Study of a real operating system.—I, II, III. (I, II, III.) Levitt, Matloff, Olsson, Wu

152A. Computer Networks (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 154A or Electrical and Computer Engineering 170, course 110 or Electrical and Computer Engineering 73, Mathematics 131 or Statistics 131A or 120 or 32. Overview of local and wide-area computer networks, ISO seven-layer model, physical aspects of data transmission, data-link protocols multiplexing, switched networks, local and wide area networks, internetworking.—I, II, III. (I, II, III.) Mukherjee, Matloff, Ghosal, Mohapatra, Liu

152B. Computer Networks (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 152A, 150. TCP/IP protocol suite, network layer protocols, transport layer protocols, transport layer interfaces, sockets, UNIX network programming, computer networking applications, remote procedure calls and network management.—I, II, III. (I, II, III.) Mukherjee, Ghosal, Matloff, Mohapatra

153. Introduction to Computer Security (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150, 152A. Principles, mechanisms, and implementation of computer security and data protection. Policy, encryption and authentication, access control, and integrity models and mechanisms; network security; secure systems; programming and vulnerabilities analysis. Study of an existing operating system.—I, II, III. (I, II, III.) Bishop

154A. Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 or Electrical and Computer Engineering 70, and course 110. Introduction to digital design. Interfacing of devices for I/O, memory and memory management. Input/output programming, via wait loops, hardware interrupts and calls to operating system services. Hardware support for operating systems software. Only one unit of credit allowed for students who have taken Electrical and Computer Engineering 170.—I, II, III. (I, II, III.) Farrens, Mukherjee, Chong

154B. Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 154A or Electrical and Computer Engineering 170, and course 110. Hardwired and microprogrammed CPU design. Memory hierarchies. Uniprocessor performance analysis under varying program mixes. Introduction to pipelining and multiprocessors. I, II, III. (I, II, III.) Farrens, Chong

158. Programming on Parallel Architectures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150; course 154B recommended. Techniques for software development using the shared-memory and message-passing paradigms, on parallel architectures and networks of workstations. Locks, barriers, and other techniques for synchronization. Introduction to parallel algorithms.—III. (III.) Chong, Farrens, Matloff, Pandey, Ma

160. Introduction to Software Engineering (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 140A. Requirements, specification, design, implementation, testing, and verification of large software systems. Study and use of software engineering methodologies. Team programming.—I, II, III. (I, II, III.) Levitt, Devanbu

163. User/Computer Interfaces (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 20, 110. Study of the principles of user/computer interaction. User interface management system architectures; semantics of input devices; transition network and event-based systems, models of interaction, graphical interfaces; implementations; and performance issues and tradeoffs.—III. (III.) Ma

165A. Database Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110. Database design, entity-relationship and relational models, relational algebra, query language SQL, storage and file structures, query processing, system architectures.—II. (II.) Gertz

165B. Database Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 165A. Advanced database systems: object-oriented and object-relational database systems; distributed and multidatabase systems; advanced database applications: web-based database access, data warehouses.—III. (III.) Gertz

170. Introduction to Artificial Intelligence (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 140A. Design and implementation of intelligent computer systems. Knowledge representation and organization. Memory and inference. Problem solving. Natural language processing.—II. (II.) Levitt

175. Introduction to Computer Graphics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110 or Electrical and Computer Engineering 73; Mathematics 22A. Principles of computer graphics. Current graphics hardware, elementary operations in two- and three-dimensional space, transformational geometry, clipping, graphics system design, standard graphics systems. Individual projects.—I, II, III. (I, II, III.) Amenta, Joy, Hamann, Ma, Staadt

177. Introduction to Visualization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 175. Graphics techniques for generating images of various types of measured or computer-simulated data. Typical applications for these graphics techniques include study of air flows around car bodies, medical data, and molecular structures.—II. (II.) Joy, Hamann, Ma, Staadt

178. Introduction to Geometric Modeling (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 175. Interactive graphics techniques for defining and manipulating geometrical shapes used in computer animation, car body design, aircraft design, and architectural design.—I. (I.) Joy, Hamann, Max, Staadt

188. Ethics and the Information Age (3)
Seminar—2 hours; term paper. Prerequisite: upper division standing. Responsibilities of computer scientists as influenced by growth in computer use and networks.—I, II, III. (I, II, III.)

189A-L. Special Topics in Computer Science (1-5)
Lecture, laboratory or combination. Prerequisite: consent of instructor. Special topics in **(A)** Computer Science Theory; **(B)** Architecture; **(C)** Programming Languages and Compilers; **(D)** Operating Systems; **(E)** Software Engineering; **(F)** Data Bases; **(G)** Artificial Intelligence; **(H)** Computer Graphics; **(I)** Networks; **(J)** Computer-Aided Design; **(K)** Scientific Computing; **(L)** Computer Science. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

190C. Research Group Conferences in Computer Science (1)
Discussion—1 hour. Prerequisite: upper division standing in Computer Science and Engineering; consent of instructor. Research group conferences. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

190X. Senior Seminar (2)
Seminar—2 hours. Prerequisite: senior standing. Examination of a special topic in a small group setting.

192. Internship in Computer Science (1-5)
Internship. Prerequisite: completion of a minimum of 84 units; project approval prior to period of internship. Supervised work experience in computer science. May be repeated for credit. (P/NP grading only.)

197T. Tutoring in Computer Science (2-3)
Discussion—1 hour; laboratory/discussion—3-6 hours. Prerequisite: upper division standing, consent of instructor. Tutoring in computer science courses, especially introductory courses. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

201A. Advanced Computer Architecture (4)
Lecture—3 hours; term paper. Prerequisite: course 154B or Electrical and Computer Engineering 170, course 150. Modern research topics and methods in computer architecture. Design implications of memory latency and bandwidth limitations. Performance enhancement via within-processor and between-processor parallelism. Term project involving student-proposed extensions/modifications of work in the

research literature. Not open for credit to students who have completed course 250A.—I. Farrens

201B. High-Performance Uniprocessing (4)
Lecture—3 hours; term paper. Prerequisite: course 201A. Maximizing uniprocessor performance. Barriers to high performance; solutions to the problems; historical and current processor designs. Not open for credit to students who have completed course 250B.—II. Farrens

201C. Parallel Architectures (4)
Lecture—3 hours; project—1 hour. Prerequisite: course 201A. Evolution of parallel architectures from special-purpose machines to commodity servers. Emphasis on recent machines and applications that drive them. Not open for credit to students who have completed course 250C.—III. Chong

203. Novel Computing Technologies (4)
Lecture—3 hours; project—1 hour. Prerequisite: course 201A. Novel computing technologies that could revolutionize computer architecture. Quantum computing technologies, including algorithms, devices, and fault tolerance. A survey of other unconventional technologies including nanoscale electronics, MEMS devices, biological devices, and nanotechnology. Offered in alternate years.—II. Chong

220. Theory of Computation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 120, 122A. Time and space complexity classes. Reductions, completeness, and the role of randomness. Logic and undecidability.—III. Rogaway

222A. Design and Analysis of Algorithms (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 122A; Statistics 131A recommended. Techniques for designing efficient algorithms, analyzing their complexity and applying these algorithms to a broad range of applications. Methods for recognizing and dealing with difficult problems.—I, II. (I, II.) Amenta, Franklin, Gusfield, Martel, Rogaway

222B. Advanced Design and Analysis of Algorithms (4)
Lecture—3 hours; project—1 hour. Prerequisite: course 222A. Advanced topics in complexity theory. Problem classification. The classes P, NP, P-space, co-NP. Matching and network flow algorithms. Matrix multiplication. Approximation algorithms.—III. (III.) Gusfield, Franklin, Martel, Rogaway

223. Parallel Algorithms (4)
Laboratory/discussion—3 hours; project—1 hour. Prerequisite: course 222A. Models of parallel computer systems including PRAMs, loosely coupled systems and interconnection networks. Parallel algorithms for classical problems and general techniques for their design and analysis. Proving lower bounds on parallel computation in several settings.—II. (II.) Martel

224. String Algorithms and Applications in Computational Biology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 122A. Algorithms that operate on strings. Pattern matching, sets of patterns, regular expression pattern matching, suffix trees and applications, inexact similarity, parametric sequence alignment, applications to DNA sequencing and protein database searching. Offered in alternate years—I, III. Gusfield

225. Graph Theory (3)
Lecture—3 hours. Prerequisite: graduate standing in electrical engineering or computer science or consent of instructor. Fundamental concepts. Vector spaces and graphs. Planar graphs: Whitney's and Kuratowski's theorems. Topological parameters: packings and coverings. Connectivity: Menger's theorem. Hamilton graphs: Posa's and Chvatal's theorems. Graph factorization: Tutte's theorem. Graph coloring: Brooks; and Vizing's theorem.—II. (II.) Franklin

227. Modern Cryptography (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 220 or 222A. Modern cryptography as a discipline emphasizing formal definitions and proofs of security. One-way functions, pseudo-randomness, encryption, digital signatures, zero-knowledge, secure protocols.—II. (II.) Rogaway

228. Cryptography for E-Commerce (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 222A. Cryptographic primitives and protocols of importance to e-commerce, present and future, including content distribution mechanisms, payment mechanisms, pricing mechanisms, anonymity and privacy mechanisms, fair exchange mechanisms. Offered in alternate years.—II. Franklin

230. Applied Numerical Linear Algebra (4)
Laboratory/discussion—3 hours; discussion—1 hour. Prerequisite: course 130. Numerical linear algebra (NLA) with emphasis on applications in engineered systems; matrix factorizations; perturbation and rounding error analyses of fundamental NLA algorithms. Offered in alternate years.—I, II. Laub, Bai

231. Large-Scale Scientific Computation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 130. Algorithms and techniques for large-scale scientific computation, including basics for high performance computing, iterative methods, discrete approximation, fast Fourier transform, Poisson solvers, particle methods, spectral graph partition and its applications. Offered in alternate years.—II. Bai, Laub

235. Computer and Information Security (4)
Laboratory/discussion—3 hours; project—1 hour. Prerequisite: course 150. Methods of protecting data in computer and communication systems from unauthorized disclosure and modification. Introduction to mathematical principles of security with applications to operating systems, database systems and computer networks. Not open for credit to students who have completed course 253.—I. (I.) Bishop

236. Computer Security: Intrusion Detection Based Approach (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150; course 153 recommended. Concepts of intrusion detection, anomaly detection based on machine learning, signature-based detection using pattern matching, automated response to attacks using artificial intelligence planning, tracing intruders based on principal component analysis, security policy languages. Offered in alternate years.—I. Levitt

240. Programming Languages (4)
Lecture—3 hours; discussion—1 hour. Prerequisites: courses 140A, 142. Advanced topics in programming languages, including formal syntax and semantics, the relation between formal semantics and verification, an introduction to the lambda calculus. Additional topics will include language design principles, alternative programming languages, in-depth semantic theory and models of language implementation.—II. (II.) Pandey

242. Translation of Programming Languages (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 240. Lexical analysis, parsing, storage management, symbol table design, semantic analysis and code generation. LR, LALR grammars. Compiler-compilers.—III. (III.) Pandey

243. Code Generation and Optimization (3)
Lecture—3 hours. Prerequisite: course 242. Advanced code generation techniques. Representation of intermediate code. Data flow analysis, code movement, loop optimization, common subexpression elimination, and peephole optimization. Optimization by program transformation.—III. (III.) Pandey, Wilken

244. Principles of Concurrent Programming (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 20, 150. Fundamental concepts and applications of concurrent programs; concurrent program verification and derivation; synchronization mechanisms in programming languages; distributed programming techniques; case studies of languages.—I. (I.) Olsson, Pandey

247. Concurrent Programming Languages (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 140A, 150. Language design parameters. Models of parallel machines. Load balancing. Scalability. Portability. Efficiency measures. Design and implementation techniques for several classes of concurrent programming languages (such as object-oriented, functional, logic, and constraint programming languages).—I. (I.) Pandey, Olsson

251. Operating System Models (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 151B; introductory probability theory course. A survey of formal models for the study of operating systems. Modeling of parallel processes and their synchronization in terms of partial orderings and procedure relations. Deterministic and probabilistic models for the evaluation of system performance. Pertinent programming project.—III. (III.) Pandey

252. Computer Networks (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 152B. Internet protocol based computer networks applications, transport, network layer protocols. High speed LAN technologies: Ethernet, Asynchronous Transfer Mode (ATM). Delay models in data networks: analysis of multiaccess techniques in polling, ring, random access networks. Multimedia applications requirements and design.—II. Mukherjee, Mohapatra, Ghosal

256. Performance Evaluation (4)
Lecture—3 hours; project—1 hour. Prerequisite: courses 20, 152A, 154A-154B or Electrical and Computer Engineering 170, Statistics 131A; course 150 recommended. Use of simulation and queueing theory in computer and communication system design. Applications to processor scheduling, memory hierarchies; I/O systems; packet and circuit switched networks; fault-tolerance; computer networks applications. Not open for credit to students who have completed course 256A.—I, II. (I, II.) Matloff, Ghosal, Mohapatra, Mukherjee

257. Mobile and Wireless Networks (4)
Lecture—3 hours; independent study. Prerequisite: course 252. Fundamental techniques in design of second generation wireless networks: cellular network and protocols, medium access techniques, handoff control, signaling and mobility management, wireless data works, Internet mobility and Personal Communication Services (PCS). Third generation wideband systems, novel technologies, adhoc networks. Offered in alternate years.—I. Ghosal, Mohapatra, Mukherjee

258. Internet Quality of Service (4)
Lecture—3 hours; independent study. Prerequisite: course 252. Fundamentals of Internet technology, resource management issues in the Internet, techniques for supporting quality of service in the Internet and Internet servers, traffic engineering, future research issues. Offered in alternate years.—(III.) hapatra, Ghosal

259. Optical Networks (4)
Lecture—3 hours; independent study. Prerequisite: course 252. Optical networks. Enabling technologies. Multiplexing techniques. WDM. Broadcast networks. Wavelength-routed networks. Network architectures. Protocols. Network algorithms. Device-network interface. Optimization problems.—I. (I,) Mukherjee, Ghosal

260. Software Engineering (4)
Lecture—3 hours; project. Prerequisite: course 142; course 160 recommended. Advanced techniques for domain-specific software reuse.—I. (I.) Devanbu

261. Program Verification (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 125 or Philosophy 112 or familiarity with first-order logic; knowledge of an iterative and functional programming language. Methods of proving correctness of programs with respect to formal specifications, with attention to those suited for employing automated deduction. Logic background, symbolic execution, techniques suited to iterative programming, methods from denotational semantics, termination, dynamic logic and proofs of concurrent programs.—I. (I.) Levitt

262. Formal Specification (3)
Lecture—3 hours. Prerequisite: course 261. Formal specification of modules, and its relationship to top-

down programming development and verification. Abstract data types, together with methods for specifying them. Implementations and proofs of implementation. Using specifications to reason about programs. Parameterized types. Constructing good formal specifications. Offered in alternate years.—II. Levitt

265. Distributed Database Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 165A. Concepts of distributed database systems and architectures, distributed database design, distributed query processing and optimization, transaction management and concurrency control, heterogeneous and multidatabase systems.—I, III. (III.) Gertz

267. Wide-Area Distributed Information Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 152B or 165A. Wide-area distributed information systems, data broadcast, multicast, publish/subscribe, service differentiation, information retrieval, web caching. Offered in alternate years.—III. Askoy

270. Artificial Intelligence (3)
Lecture—3 hours. Prerequisite: courses 140A, 172. Concepts and techniques underlying the design and implementation of models of human performance on intelligent tasks. Representation of high-level knowledge structures. Models of memory and inference. Natural language and story understanding. Common sense planning and problem solving.—II. (II.) Levitt

271. Machine Learning and Discovery (4)
Lecture—3 hours; project—1 hour. Prerequisite: course 170. Artificial intelligence techniques for knowledge acquisition by computers. Fundamental problems in machine learning and discovery. Systems that learn from examples, analogies, and solved problems. Systems that discover numerical laws and qualitative relationships. Projects centering on implementation and evaluation.—III. Levitt, Vemuri

273. Applied Visual Computing (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Visual computing paradigms, current visualization technologies, principles of 3-D graphics, user interface designs, and exploratory visualization. Offered in alternate years.—I. Hamann, Joy, Ma, Max

274. Automated Deduction (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 125 or Philosophy 112 or familiarity with first-order logic. Techniques of mechanical theorem proving. Methods based on resolution and term-rewriting. Decision procedures. Induction. Applications to program verification, question/answering and plan generation. Study existing mechanical theorem provers. Offered in alternate years.—III. Levitt

275A. Advanced Computer Graphics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 175 or 177 or 178. Advanced topics in computer graphics. Hidden surface models, rendering of various surface types, subdivision methods, shading techniques, anti-aliasing, modeling techniques.—II. (II.) Joy, Hamann, Ma, Staadt

275B. Advanced Computer Graphics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 175 or 177 or 178. Advanced topics in computer graphics and geometric modeling. Topics taken from advanced research papers in computer graphics, image synthesis, visualization and geometric modeling. Discussion of current research in the field. Offered in alternate years.—(II.) Joy, Hamann, Ma, Staadt

276. Advanced Volume Visualization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 177. Applications, available tools and techniques, the challenges confronting the field of volume visualization, and some of the advanced topics in the field. Primary emphasis on advanced software and hardware techniques to achieve interactive visualization.—III. (III.) Hamann, Joy, Ma, Max

277. Advanced Visualization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 177. Visualization of 3D data, including scalar fields, vector fields, and medical data.—III. (III.) Hamann, Joy

278. Computer-Aided Geometric Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 175 or 177 or 178. Mathematical techniques for the definition and manipulation of curves and surfaces. Coon's patches, Bezier curves and surfaces. B-spline curves and surfaces, beta-splines, box-splines. Integration into various computer graphics rendering models, and computer-aided design systems. Offered in alternate years.—(III.) Joy, Hamann

279. Computer Animation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 175 or 177 or 178, or Applied Science 213A. Control of camera and object motion necessary to produce computer animation, modeling of articulated objects made from jointed segments, and of deformable objects. Students will complete a final animation project. (Same course as Applied Science Engineering 215.)—III. (III.) Joy, Hamann, Max

280. Virtual Reality Technology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 175. Fundamentals and principles of Virtual Reality (VR) technology. Potential and limits for its useful application. Developing a complete virtual reality application. Offered in alternate years.—III. Joy, Staadt

289A-M. Special Topics in Computer Science (1-5)
Lecture, laboratory, or combination. Prerequisite: consent of instructor. Special topics in **(A)** Computer Science Theory; **(B)** Architecture; **(C)** Programming Languages and Compilers; **(D)** Operating Systems; **(E)** Software Engineering; **(F)** Data Bases; **(G)** Artificial Intelligence; **(H)** Computer Graphics; **(I)** Networks; **(J)** Computer-Aided Design; **(K)** Scientific Computing; **(L)** Computer Science; **(M)** Security. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290. Seminar in Computer Science (1)
Seminar—1 hour. Participating seminar; discussion and presentation of current research and development in computer science. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Graduate Research Group Conference (1)
Discussion—1 hour. Research problems, progress and techniques in computer science. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
Lecture, laboratory, or combination. Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Courses

315. Teaching Computer Science (3)
Lecture—2 hours; discussion/laboratory—1 hour. Prerequisite: course 110. Fundamentals of instructional methodology applied to teaching computer science, especially at the introductory level. Behavioral objectives, testing methods, course design, evaluation, technology in instruction.—I. (I.)

390. The Teaching of Computer Science (1)
Discussion—1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in Computer Science. Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Engineering: Electrical and Computer Engineering

(College of Engineering)

Norman Tien, Ph.D., Chairperson of the Department

Jean-Pierre Colinge, Ph.D., Vice Chairperson for Undergraduate Studies

Zhi Ding, Ph.D., Vice Chairperson for Graduate Studies

Department Office, 2064 Kemper Hall (530-752-0583)

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Bevan Bass, Ph. D., Assistant Professor
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Tsu-Shuan Chang, Ph.D., Professor
Chen-nee Chuah, Ph.D., Assistant Professor
Jean-Pierre Colinge, Ph.D., Professor
K. Wayne Current, Ph.D., Professor
Zhi Ding, Ph.D., Professor
Gary E. Ford, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
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S.J. Ben Yoo, Ph.D., Professor

Emeriti Faculty

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Robert W. Bower, Ph.D., Professor Emeritus
John N. Churchill, Ph.D., Professor Emeritus
Andrew J. Dienes, Ph.D., Professor Emeritus
Richard C. Dorf, Ph.D., Professor Emeritus
Herman J. Fink, Ph.D., Professor Emeritus
William A. Gardner, Ph.D., Professor Emeritus
Mohammed S. Ghausi, Ph.D., Professor Emeritus/Dean Emeritus
S. Louis Hakimi, Ph.D., Professor Emeritus
T.C. Steve Hsia, Ph.D., Professor Emeritus
Ronald F. Soohoo, Ph.D., Professor Emeritus

Affiliated Faculty

Andre G. Chakhovskoi, Ph.D., Adjunct Assistant Professor
Shu Lin, Ph.D., Adjunct Professor
Rosemary Smith, Ph.D., Adjunct Professor
Diego Yankelevich, Ph.D., Associate Adjunct Professor

The Electrical and Computer Engineering Major Programs

The department administers three curricula in the College of Engineering: (1) the Electrical Engineering curriculum, (2) the Computer Engineering curriculum, and (3) the Electrical Engineering/Materials Science and Engineering curriculum.

The *Electrical Engineering, Computer Engineering, and Electrical Engineering/Materials Science and Engineering* curricula are all accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Integrated Degree Program. The IDP leads to both the Bachelor of Science and the Master of Science degrees. The program provides a student the opportunity to obtain superior breadth and depth of technical material. The IDP program in the Department of Electrical and Computer Engineering is available only to UC Davis undergraduates with strong academic records enrolled in the Electrical Engineering, Computer Engineering, or Electrical Engineering/Materials Science curricula. Applicants in their junior year must apply for the IDP by March 31. Further information on IDP can be found on the departmental Web site at http://www.ece.ucdavis.edu.

Mission. Under its land grant status, the University of California has a mission to provide the state with the trained workforce it needs and to advance knowledge and research in directions that contribute to the general welfare of the state and the nation. The Department of Electrical and Computer Engineering contributes to the mission of the University in three ways: First, its undergraduate and graduate education programs seek to provide students with an understanding of the fundamental principles of electrical and a computer engineering, the skills needed to solve the complex technological problems of modern society and the ability to continue to learn and develop throughout their careers. Second, through its research programs, the department contributes to the development and progress of electronics, communications, and computer technology. Finally, the department helps to transfer research results to the industry through publication, public service and professional activities.

Objectives. *Teaching*—To provide undergraduate students with sufficient breadth to allow them to participate in teams, continue their own education after graduation and select a focus area intelligently; to provide undergraduate students with sufficient depth in a narrower discipline to allow them to develop the ability to solve complex engineering problems; to educate the students in the graduate program to be leaders in industry or to do meaningful research in industry, government or academia. *Research*—To develop and maintain research programs that produce useful technological advances while simultaneously training the next generation of researchers and leaders; to update and/or shift the foci of these programs frequently in response to the needs of our constituency and the nation; to provide a stimulating environment that encourages our graduate students to develop their abilities as far as possible.

Electrical Engineering Program

The Electrical Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Electrical Engineering involves the design, analysis, and effective use of electrical systems including electronic computers. Electrical systems and computers play a central role in nearly all aspects of modern life, including communication, medicine, education, environmental protection, space exploration, defense, and home entertainment.

Students who complete the Electrical Engineering curriculum will obtain a Bachelor of Science in Electrical Engineering, one of the engineering degrees recognized in all fifty states as eligible for registration as a Professional Engineer.

Objectives. The Electrical Engineering program has adopted the following objectives to serve the long-term interests of our students and the industries of Northern California and the nation. *Foundation*—To provide our graduates with a solid foundation in engineering science, including mathematics, physical science, and the fundamentals of electrical engineering. This foundation is necessary to succeed in more advanced engineering courses and to be able to continue learning throughout a career. *Breadth*—To provide our graduates with sufficient breadth in electrical engineering. This breadth is required for students to understand engineering tradeoffs that cross disciplines, for them to contribute effectively to multidisciplinary projects and for them to make an informed decision about their area of specialization. *Depth*—To provide our graduates with sufficient depth in a specific area of electrical engineering. This depth is necessary to solve complex real-world engineering problems and to prepare to contribute to a specific discipline within electrical engineering. *Ethics*—To provide our graduates with a basic understanding of, and ability to handle correctly, ethical problems that may arise during their careers. To provide them with an understanding of their obligations to society at large.

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C-9D	19
Chemistry 2A	5
Computer Science Engineering 30	4
Engineering 6	4
Computer Science Engineering 40 or Electrical and Computer Engineering 73	4
Electrical and Computer Engineering 1	1
Electrical and Computer Engineering 70 or Computer Science Engineering 50	4
Engineering 17	4
English 1 or 3, or Comparative Literature 1, 2, 3 or 4, or Native American Studies 5	4
Communication 1 or 3	4
General Education electives	12
Unrestricted electives	3
Minimum Lower Division Units	**90**

Upper Division Program

Electrical Engineering Curriculum

The Electrical Engineering curriculum prepares students for careers in electrical engineering or for graduate studies by providing a solid background in mathematics, physical sciences, and traditional electrical engineering subjects of (1) physical electronics, (2) electromagnetics, (3) analog electronics, (4) digital electronics, and (5) communication controls and signal processing. Through the proper choice of 29 units of flexible design and technical electives, you may focus on any of these five specialty areas or distribute the 29 units of electives among these areas.

Areas of Specialization

Physical Electronics: solid-state devices, circuits and fabrication and the theory courses supporting those subjects.

Recommended elective courses:

- Core electives: Electrical and Computer Engineering 130B, 140B
- Design Project Elective: Electrical and Computer Engineering 132B or 135
- Senior Design Sequence: Electrical and Computer Engineering 196A, 196B
- Design Electives with Lab: Electrical and Computer Engineering 114, 118, or 132A. Select remaining upper-division design electives from Electrical and Computer Engineering 110B, 146A, 146B
- Technical electives: Electrical and Computer Engineering 112, 180B

Suggested advisers: J.P. Colinge, C.E. Hunt, N. Tien.

Electromagnetics: microwave circuits and systems, and fiber optical systems.

Recommended elective courses:

- Core electives: Electrical and Computer Engineering 130B, 140B
- Design Project Elective: Electrical and Computer Engineering 132B
- Senior Design Sequence: Electrical and Computer Engineering 196A-196B
- Design Electives with Lab: Electrical and Computer Engineering 132A, 132C
- Select remaining upper-division design electives from Electrical and Computer Engineering 110B, 135, 136
- Technical electives: Select from Electrical and Computer Engineering 112, 114, and 133

Suggested advisers: G.R. Branner, J. Heritage, A. Knoesen, B. Yoo.

Analog Electronics: transistor- and system-level analog circuit design.

Recommended elective courses:

- Core electives: Electrical and Computer Engineering 140B, 150B
- Design Project Elective: Electrical and Computer Engineering 195A-195B-195C
- Senior Design Sequence: Electrical and Computer Engineering 195A-195B-195C
- Design Electives with Lab: at least two from Electrical and Computer Engineering 112, 114, 157A, 165, 195A-195B-195C
- Select remaining upper-division design electives from Electrical and Computer Engineering 110B, 118, 132A, 132B, 132C, 151, 157B, 160, 210
- Technical electives: Select from Electrical and Computer Engineering 130B, 146A, 194A-194B-194C

Suggested advisers: K.W. Current, P.J. Hurst, S.H. Lewis, R.R. Spencer.

Digital Electronics: transistor- and system-level digital circuit design

Recommended elective courses:

- Core electives: Electrical and Computer Engineering 140B, 150B
- Design Project Elective: Electrical and Computer Engineering 151 or 183 or 194A-194B-194C or 195A-195B-195C
- Senior Design Sequence: Electrical and Computer Engineering 195A-195B-195C
- Design Electives with Lab: Electrical and Computer Engineering 118 and 180B or 151 or 165 or 172 or 183 or 194A-194B-194C or 195A-195B-195C
- Select remaining upper-division design electives from Electrical and Computer Engineering 110B, 116, 170 or 171
- Technical electives: Select from Electrical and Computer Engineering 130B and 112 or 146A or 157A or 160 or 210

Suggested advisers. K.W. Current, P.J. Hurst, S.H. Lewis, V.G. Oklobzija.

Communication Controls and Signal Processing: digital communication, robotics, classical controls and communication, wireless and cellular digital communication systems, signal and image processing, and computer vision.

Recommended elective courses:

- Core electives: Electrical and Computer Engineering, 150B, 180B
- Senior Design Sequence: 196A-196B
- Design Project Elective: Electrical and Computer Engineering 151

Design Electives with lab: Electrical and Computer Engineering 157A and 157B or 165

Select remaining upper-division design electives from Electrical and Computer Engineering 158 or 106, 160

Technical Electives: select from Electrical and Computer Engineering 112, 194A-194B-194C, 195A-195B-195C

Suggested advisers: K.A. Abdel-Ghaffar, T.S. Chang, Z. Ding, G.E. Ford, A.N. Gündes, B.C. Levy, J. Tuqan, S. Wang.

Upper Division Required Courses

Electrical and Computer Engineering 100, 101, 110A, 130A, 140A, 150A, 180A ... 28
Statistics 120, 131A, Mathematics 131, or Civil and Environmental Engineering 114 4
Engineering 160, 190 or Applied Science Engineering 137 or Computer Science Engineering 188 3
Upper-division electives 28
Chose at least 8 courses for a minimum of 28 units from the following:

Two core electives: Electrical and Computer Engineering 110B*, 130B, 140B, 150B, 151*, 157A*, 160*, 170*, 180B*

Design electives: At least two design electives with lab: Electrical and Computer Engineering 106, 112, 114, 116, 118, 132A, 132B, 132C, 136, 146A, 146B, 151, 157A, 157B, 165, 172, 180B, 183, 194A-194B-194C (must be taken in consecutive quarters), 195A-195B-195C (must be taken in consecutive quarters),

At least one design elective with project**: Electrical and Computer Engineering 116, 132B, 135, 151, 157B, 165, 183, 194A-194B-194C, 195A-195B-195C***

One senior design sequence: Electrical and Computer Engineering 195A-195B-195C, 196A-196B

The remaining design electives may be chosen from the lists above or from the following courses: Electrical and Computer Engineering 110B, 133, 158,160, 166, 167, 170, 171; Computer Science and Engineering 110, 150, 152B, 163, 175, 177, 178

Technical electives 9
General Education electives 12
Unrestricted electives..... 6

Minimum Upper Division Units 90

Minimum Units Required for Major..... 180

*A maximum of one course appearing on both the core elective list and the design elective lists may be counted in both categories.

**One course appearing on both the laboratory elective list and the project elective list may be counted toward both the laboratory requirement and the project requirement simultaneously.

***195A-195B-195C will satisfy the laboratory elective requirement, the project elective requirement, and the senior design sequence requirement simultaneously. Computer Engineering Program

The Computer Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

The program in Computer Engineering provides the student with a broad and well-integrated background in the concepts and methodologies that are needed for the analysis, design, development, organization, theory, programming, and applications of information processing systems. Although such systems are popularly called "computers," they involve a far wider range of disciplines than merely computation, and the Computer Engineering curriculum is correspondingly broad. The program presents the essential material in electronic circuits, digital logic, discrete mathematics, computer programming, data structures, and other topics. Students who complete the Computer Engineering curriculum receive a Bachelor of Science in Computer Engineering.

Objectives. The Computer Engineering program has adopted the following objectives to serve the long-term interests of our students and the industries of Northern California and the nation. *Foundation*—To provide our graduates with a solid foundation in engineering science, including mathematics, physical science, and the fundamentals of computer engineering. This foundation is necessary to succeed in more advanced engineering courses and to be able to continue learning throughout a career. *Breadth*—To provide our graduates with sufficient breadth in computer engineering. This breadth is required for students to understand engineering tradeoffs that cross disciplines, for them to contribute effectively to multi-disciplinary projects and for them to make an informed decision about their area of specialization. *Depth*—To provide our graduates with sufficient depth in a specific area of computer engineering. This depth is necessary to solve complex real-world engineering problems and to prepare to contribute to a specific discipline within computer engineering. *Ethics*—To provide our graduates with a basic understanding of, and ability to handle correctly, ethical problems that may arise during their careers. To provide them with an understanding of their obligations to society at large.

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C-9D	19
Chemistry 2A	5
Computer Science Engineering 20, 30, 40	12
Engineering 6	4
Electrical and Computer Engineering 1	1
Electrical and Computer Engineering 70 or Computer Science Engineering 50	4
Engineering 17	4
English 1 or 3, or Comparative Literature 1, 2, 3 or 4, or Native American Studies 5	4
Communication 1 or 3	4
General Education electives	12
Total Lower Division Units	**91**

Upper Division Program

The Computer Engineering curriculum prepares students for careers in computer engineering or for graduate studies by providing a solid background in mathematics, physical sciences, and the traditional computer engineering subjects: electronics, computer hardware, and computer software. Here electronics refers to the five Electrical Engineering specialty areas: (1) physical electronics, (2) electromagnetics, (3) analog electronics, (4) digital electronics, and (5) communications, control, and signal processing. The 63 upper-division units in electronics, computer hardware and computer software consist of 13 units in electronics courses, 18 units in computer hardware courses, and 12 units in computer software courses. The remaining 20 units consist of 11 units of design electives and 9 units of technical electives. By carefully selecting these 20 design and technical electives, students can focus on electronics, computer hardware, or computer software, or can distribute these units among the three areas.

Areas of Specialization

Computer Systems and Software: computer architecture, design, networking, and systems software.

Recommended elective courses:

Design Project Elective: Electrical and Computer Engineering 183

Senior Design Sequence: Electrical and Computer Engineering 196A-196B

Remaining Upper-Division Design Electives: Computer Science Engineering 140A, 160

Technical electives: Select from Electrical and Computer Engineering 106, 150B, 194A-194B-194C, 195A-195B-195C, Computer Science Engineering 122B, 140B, 142, 152A, 152B, 153, 158, 163, 165A, 165B, 168, 175, 177

Suggested advisers: V. Akella, H. Al-Asaad, C. Chuah, V.G. Oklobdzija, G.R. Redinbo, K.D. Wilken.

Digital systems: design of computers and digital systems at various levels, including processor, functional unit circuit, and VLSI layout.

Recommended elective courses:

Project Design Elective: Electrical and Computer Engineering 183

Senior Design Sequence: Electrical and Computer Engineering 196A-196B

Remaining Upper-Division Design Electives: Electrical and Computer Engineering 110B, 118

Technical Electives: Select from Electrical and Computer Engineering 112, 116, 140B, 171, 194A-194B-194C, 195A-195A-195C

Suggested advisers: V. Akella, H. Al-Asaad, V.G. Oklobdzija, G.R. Redinbo, K.D. Wilken.

Upper Division Required Courses

Electrical and Computer Engineering 100, 101, 110A, 140A, 180A, 180B 25
Electrical and Computer Engineering 170*, 172 8
Computer Science Engineering 150 4
Computer Science Engineering 110, 122A 8
Statistics 120, 131A, Mathematics 131, or Civil and Environmental Engineering 114 4
Engineering 160, 190, Applied Science Engineering 137, or Computer Science Engineering 188 3
Upper-Division Elective Courses: 11
At least one design elective with project: Electrical and Computer Engineering 116, 132B, 135, 151, 157B, 165, 183, 194-194B-194C, 195A-195B-195C**

One senior design sequence: Electrical and Computer Engineering 195A-195B-195C, 196A-196B

The remaining design electives may be chosen from the list above or from the following list: Electrical and Computer Engineering 106, 110B, 112, 118, 132A, 132C, 133, 146B, 157A, 160, 166, 167, 171; Computer Science Engineering 122B, 140A, 140B, 142, 152B, 153, 158, 160, 163, 165A, 165B, 175, 177, 178

Technical electives 9
General Education electives 12
Unrestricted electives..... 5

Minimum Upper Division Units 89

Minimum Units Required for Major..... 180

* Computer Science Engineering 154B may be substituted for the Electrical and Computer Engineering 170 requirement.

**195A-195B-195C will satisfy the design project elective requirement and the senior design sequence simultaneously.

Electrical Engineering/Materials Science and Engineering Curriculum

The Electrical Engineering/Materials Science and Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

The Electrical Engineering/Materials Science curriculum is a combined major, including portions of

the Electrical Engineering curriculum in the Department of Electrical and Computer Engineering and the Materials Science curriculum in the Department of Chemical Engineering and Materials Science. In the past decade, the fields of solid-state electronics, opto-electronics, magnetics, and superconductors have developed to the point that demand for new materials now sets the pace for progress in these fields. Materials scientists with an electronics background are key to continued progress in these areas. The Electrical Engineering/Materials Science curriculum provides students with the background necessary to pursue careers in electrical engineering or materials science or to go on to graduate study. Students who complete the Electrical Engineering/Materials Science curriculum will receive a Bachelor of Science in Electrical Engineering/Materials Science.

Objectives. The Electrical Engineering/Materials Science and Engineering program has adopted the following objectives to serve the long-term interests of our students and the industries of Northern California and the nation. *Foundation*—To provide our graduates with a solid foundation in engineering science, including mathematics, physical science, and the fundamentals of electrical engineering/materials science and engineering. This foundation is necessary to succeed in more advanced engineering courses and to be able to continue learning throughout a career. *Breadth*—To provide our graduates with sufficient breadth in electrical engineering/materials science and engineering. This breadth is required for students to understand engineering tradeoffs that cross disciplines, for them to contribute effectively to multi-disciplinary projects and for them to make an informed decision about their area of study. *Depth*—To provide our graduates with sufficient depth in a specific area of electrical engineering/materials science and engineering. This depth is necessary to solve complex real-world engineering problems and to prepare to contribute to a specific discipline within electrical engineering/materials science and engineering. *Ethics*—To provide our graduates with a basic understanding of, and ability to handle correctly, ethical problems that may arise during their careers. To provide them with an understanding of their obligations to society at large.

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C-9D	19
Chemistry 2A-2B	10
Computer Science Engineering 30	4
Engineering 6	4
Computer Science Engineering 40 or Electrical and Computer Engineering 73	4
Electrical and Computer Engineering 1	1
Electrical and Computer Engineering 70 or Computer Science Engineering 50	4
Engineering 17, 35, 45	11
English 1 or 3, or Comparative Literature 1, 2, 3 or 4, or Native American Studies 5	4
Communication 1 or 3	4
General Education electives	12
Minimum Lower Division Units	**99**

Upper Division Required Courses

Electrical and Computer Engineering 100, 101, 110A, 110B, 130A, 130B, 140A, 140B, 150A, 180A	40
Materials Science and Engineering 160, 162, 164, 172, 174	20
Engineering 105	4
Statistics 120, 131A, Mathematics 131, or Civil and Environmental Engineering 114	4
Engineering 160, 190, Applied Science Engineering 137, or Computer Science Engineering 188	3
Design electives	7

Select two courses, one of which must be Materials Science and Engineering 188A-188B. Choose the second course from the following:

Electrical and Computer Engineering 106, 112, 114, 118, 132A, 133, 135, 136, 146B, 151, 157A, 160, 166, 170, 172, 180B, 194A-194B-194C (must be taken in consecutive quarters to count as one design elective), 195A-195B-195C (must be taken in consecutive quarters to count as one design elective); Materials Science and Engineering 180, 181, 182.

Laboratory courses—Materials Science and Engineering 162L or 172L, Electrical and Computer Engineering 146A	5
General Education electives	12
Minimum Upper Division Units	**95**
Minimum Units Required for Major	**194**

Courses in Engineering: Electrical and Computer Engineering (EEC)

Lower Division Courses

1. Introduction to Electrical and Computer Engineering (1)
Lecture—1 hour. Overview of Electrical and Computer Engineering programs and advising; setting and attaining goals; ethics; introduction to major topics in ECE. (P/NP grading only.)—III. (III.)

70. Computer Structure and Assembly Language (4)
Lecture—3 hours; workshop—1 hour. Prerequisite: Computer Science Engineering 30 or 35. Computer architecture; machine language; assembly language; macros and conditional macros; subroutine/parameter passing; input-output programming, interrupt and trap; direct-memory-access; absolute and relocatable code; re-entrant code; program development in an operating system. Only 1 unit of credit to students who have completed Computer Science Engineering 50.—I, II. (I, II.)

73. Applications of Object-Oriented Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Computer Science Engineering 30. Restricted to the following majors; Electrical Engineering, Computer Engineering, Electrical/Material Science Engineering; and Electrical Engineering graduate students. Non-majors accommodated on a space-available basis. Introduction to the modern programming paradigms of data abstraction and object-oriented programming for engineering applications. Introduction to object-oriented programming in C++/Java language. The technique of modeling an application by defining new types that match the concepts in the language. Not open for credit to students who have taken course 173.—III. (III.)

90C. Research Group Conference in Electrical and Computer Engineering (1)
Discussion—1 hour. Prerequisite: consent of instructor; lower division standing. Research group conferences. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

90X. Lower Division Seminar (1-4)
Seminar—1-4 hours. Prerequisite: consent of instructor. Examination of a special topic in a small group setting. May be repeated for credit.

92. Internship in Electrical and Computer Engineering (1-5)
Internship—3-15 hours. Prerequisite: lower division standing; project approval prior to period of internship. Supervised work experience in Electrical and Computer Engineering. May be repeated for credit. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)
(P/NP grading only.)

Upper Division Courses

100. Circuits II (5)
Laboratory—3 hours; lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 17, course 101 (may be taken concurrently). Theory, application, and design of analog circuits. Methods of analysis including frequency response, SPICE simulation, and Laplace transform. Operational amplifiers and design of active filters. Only 3.5 units of credit to students who have completed Engineering 100.—I, II. (I, II.)

101. Gateway to Electrical and Computer Engineering (2)
Lecture—2 hours. Prerequisite: Engineering 17. Gateway to the upper-division curricula in electrical and computer engineering. Applications of mathematics and physics to electrical and computer engineering. How to be a successful engineer.—I. (I.)

106. Introduction to Image Processing and Computer Vision (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 150B. Imaging geometry; transforms and sampling; enhancement, restoration, and conversion; image compression; time-varying image analysis; elementary pattern recognition; segmentation; multi-resolution analysis. III. (III.)

110A. Electronic Circuits I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100, 140A (may be taken concurrently). Operation of bipolar and field-effect transistors. Use and modeling of nonlinear solid-state electronic devices in basic analog and digital circuits. Introduction to the design of transistor amplifiers and logic gates.—II. (II.)

110B. Electronic Circuits II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110A. Frequency response of amplifiers using open-and short-circuit time constraints. Analysis and design of multistage and feedback amplifiers. Stability and compensation of feedback systems. Introduction to oscillators and data converters (analog-to-digital and digital-to-analog converters).—III. (III.)

112. Communication Electronics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 110B and 150A. Electronic circuits for analog and digital communication, including oscillators, mixers, tuned amplifiers, modulators, demodulators, and phase-locked loops. Circuits for amplitude modulation (AM) and frequency modulation (FM) are emphasized.—II. (II.)

114. Analog Integrated Circuits (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: courses 110B and 140B. Analysis and design of analog integrated circuits. Emphasis on bipolar transistor circuits. Single-stage amplifiers, cascaded amplifier stages, current sources, differential pair, frequency response, and feedback amplifiers.—I. (I.)

116. VLSI Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 110A and 180A. CMOS devices, layout, circuits, and functional units; VLSI fabrication and design methodologies.—III. (III.)

118. Digital Integrated Circuits (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: courses 110A, 180A. Analysis and design of digital integrated circuits. Emphasis on MOS logic circuit families. Logic gate construction, voltage transfer characteristics, and propagation delay. Regenerative circuits, RAMs, ROMs, and PLAs.—III. (III.)

130A. Electromagnetics I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D, Physics 9D, Engineering 17, course 101 (may be taken concurrently). Basics of static electric and magnetic fields and fields in materials. Work and scalar potential. Maxwell's equations in integral and differential form. Plan waves in lossless media. Lossless transmission lines.—I, II. (I, II.)

130B. Introductory Electromagnetics II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 130A. Plane wave propagation in lossy

media, reflections, guided waves, simple modulated waves and dispersion, and basic antennas.—III. (III.)

132A. High Frequency Systems, Circuits and Devices (5)
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 110B, 130B, 140B. Application of electromagnetic theory to analysis and design of practical devices, circuits, and systems operating at radio frequencies. Energy transfers at high-frequencies, transmission lines, microwave integrated circuits, circuit analysis of electromagnetic energy transfer systems, the scattering parameters.—I. (I.)

132B. High-Frequency Systems, Circuits and Devices (5)
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 132A. Passive high frequency device analysis, design. Microwave circuit and filter design. Introduction to analysis and design of microwave transistor and tunnel diode amplifiers.—II. (II.)

132C. RF Amplifiers, Oscillators, Mixers and Antennas (5)
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 132B. Microwave amplifier theory and design, including transistor circuit models, stability considerations, noise models and low noise design. Theory and design of microwave transistor oscillators and mixers. Analysis and design of linear, loop, waveguide and horn radiators.—III. (III.)

133. Electromagnetic Radiation and Antenna Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisites: course 130B. Properties of electromagnetic radiation; analysis and design of antennas: ideal cylindrical, small loop, aperture, and arrays; antenna field measurements.—I. (I.)

135. Optical Communications I: Fibers (3)
Lecture—3 hours. Prerequisite: course 130B. Principles of optical communication systems. Dispersion broadening of pulses. Planar dielectric guides. Optical fibers: single-mode, multi-mode, step and graded index. Attenuation and dispersion limitations. Design of zero dispersion fibers.—II. (II.)

136. Opto-Electronics and Fiber Optics Laboratory (3)
Lecture—1 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: courses 135 and 150A. Characteristics and applications of state-of-the-art optoelectronic components (semiconductor detectors, optical modulators and optical fibers), and fiber optic communication systems.—III. (III.)

140A. Principles of Device Physics I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 17, Physics 9D, course 101 (may be taken concurrently). Semiconductor device fundamentals, equilibrium and non-equilibrium statistical mechanics, conductivity, diffusion, density of states, electrons and holes, p-n junctions, Schottky junctions, and junction field effect transistors.—I, II. (I, II.)

140B. Principles of Device Physics II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 140A. Electrical properties, design, and models for Bipolar and MOS devices.—III. (III.)

145A. Solid-State Electronics (3)
Lecture—3 hours. Prerequisite: course 140B. Semiconductor device physics, the principal techniques employed in creating device structures, materials for thin film devices, and heterostructure devices.—I. (I.)

145B. Solid-State Electronics (3)
Lecture—3 hours. Prerequisite: course 140A. Magnetism and superconductivity. Design of devices and their associated circuits utilizing the magnetic and superconducting properties of solids. Magnetic devices studied include masers and magnetic media: disk, tape and bubbles. Superconducting devices studied include Josephson junctions, SQUIDS, and SC microcircuits.—II. (II.)

146A. Integrated Circuits Fabrication (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 140B. Restricted to Electrical, Computer, and Electrical/Materials Science majors and Electrical Engineering graduate students. Non-majors accommodated when space available. Basic fabrication processes for metal oxide semiconductor (MOS) integrated circuits. Laboratory assignments covering oxidation, photolithography, impurity diffusion, metallization, wet chemical etching, and characterization work together in producing metal-gate PMOS test chips which will undergo parametric and functional testing.—I. (I.)

146B. Advanced Integrated Circuits Fabrication (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 146A. Restricted to Electrical, Computer, and Electrical/Materials Science majors and Electrical Engineering graduate students. Non-majors accommodated when space available. Fabrication processes for CMOS VLSI. Laboratory projects examine deposition of thin films, ion implantation, process simulation, anisotropic plasma etching, sputter metallization, and C-V analysis. Topics include isolation, projection alignment, epilayer growth, thin gate oxidation, and rapid thermal annealing.—II. (II.)

150A. Introduction to Signals and Systems I (4)
Lecture—4 hours. Prerequisite: Engineering 6 (may be taken concurrently), course 100. Characterization and analysis of continuous-time linear systems. Fourier series and transforms with applications. Introduction to communication systems. Transfer functions and block diagrams. Elements of feedback systems. Stability of linear systems.—II, III. (II, III.)

150B. Introduction to Signals and Systems II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150A. Characterization and analysis of discrete time systems. Difference equation models. Z-transform analysis methods. Discrete and fast Fourier transforms. Introduction to digital filter design.—I. (I.)

151. Instrumentation Interfacing, Signals and Systems (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: courses 100, 150A, 180A. Study of instrumentation interfacing systems, including software development, hardware interfacing, transducers, dynamic response, signal conditioning, A/D conversion, and data transmission.—II. (II.)

157A. Control Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 150A. Analysis and design of feedback control systems. Examples are drawn from electrical and mechanical systems as well as other engineering fields. Mathematical modeling of systems, stability criteria, root-locus and frequency domain design methods.—I. (I.)

157B. Control Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 157A. Control system design; transfer-function and state-space methods; sampled-data implementation, digital control. Laboratory includes feedback system experiments and simulation studies.—II. (II.)

158. Control System Design Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 157A. Design methods for feedback control systems, including quantitative feedback theory and linear quadratic regulators.—III. (III.)

160. Signal Analysis and Communications (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150A. Signal analysis based on Fourier methods. Fourier series and transforms; time-sampling, convolution, and filtering; spectral density; modulation: carrier-amplitude, carrier-frequency, and pulse-amplitude.—I. (I.)

165. Statistical and Digital Communication (4)
Lecture—3 hours; project—3 hours. Prerequisite: course 160, Statistics 120. Random process models of modulated signals and noise, and analysis of receiver performance. Analog and digitally modulated signals. Signal-to-noise ratio, probability of error, matched filters. Intersymbol interference, pulse shaping and equalization. Carrier and clock synchronization.—II.

166. Digital Communication Design Techniques (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 160. Baseband digital signal processing for digital MODEMS (modulators-demodulators). Digital modulation techniques including BPSK, QPSK, MSK and QAM. Spread spectrum, TDMA and FDMA access methods. Satellite, cellular-mobile, microwave and personal communications systems (PCS) applications. Computer-aided and hardware design projects.—II. (II.)

167. Telecommunications Measurements and Instrumentation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 160. Design of hardware- and software-based instrumentation components for digital communications and wireless/cellular systems. Analysis and design of spectrum, interference, bit error rate, eye and constellation diagram instrumentation. Test, evaluation and design of noise and jitter measurement test sets. Expert applications (artificial intelligence). Design project of new instrumentation subsystems.—III.

170. Introduction to Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 180A; course 70 or Computer Science Engineering 50. Introduces basic aspects of computer architecture, including computer performance measurement, instruction set design, computer arithmetic, pipelined/non-pipelined implementation, and memory hierarchies (cache and virtual memory). Presents a simplified Reduced Instruction Set Computer using logic design methods from the prerequisite course.—I. (I.)

171. Parallel Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 170. Organization and design of parallel processors including shared-memory multiprocessors, cache coherence, memory consistency, snooping protocols, synchronization, scalable multiprocessors, message passing protocols, distributed shared memory and interconnection networks.—III. (III.)

172. Microcomputer-Based System Design (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 170 or Computer Science Engineering 154B, course 180A; course 180B recommended. Microprocessor architecture and its software conventions. I/O interface design with emphasis on devices such as transceivers, A-D/D-A converters and timers. System design using polling, interrupts, and DMA as I/O techniques. Programming in both assembly and high-level languages.—I, II. (I, II.)

180A. Digital Systems I (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: course 70 or Computer Science Engineering 50, courses 100 and 101 (may be taken concurrently). Introduction to digital system design including combinational logic design, sequential and asynchronous circuits, computer arithmetic, memory systems and algorithmic state machine design; computer aided design (CAD) methodologies and tools.—I, II, III. (I, II, III.) Akella, Al-Asaad, Oklobdzija, Redinbo, Wilken

180B. Digital Systems II (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: course 110A, 180A. Restricted to majors in Electrical Engineering, Computer Engineering, Computer Science and Engineering, Electrical Engineering/Materials Science, Engineering, and Electrical Engineering and Computer Science graduate students. Computer aided design of digital systems with emphasis on hardware description languages (VHDL), logic synthesis, and field programmable gate arrays (FPGA). The pipelining, memory system design, and testing digital circuits.—I, III. (I, III.)

183. Testing and Verification of Digital Systems (5)
Lecture—3 hours; laboratory—4 hours. Prerequisite: courses 170 and 180B. Computer aided testing and design verification techniques for digital systems; physical fault testing; simulation-based design verification; formal verification; timing analysis.—II. (II.)

189A-V. Special Topics in Electrical Engineering and Computer Science (1-5)
Lecture, laboratory, or combination. Prerequisite: course 101, consent of instructor. Special topics in **(A)** Computer Science; **(B)** Programming Systems; **(C)** Digital Systems; **(D)** Communications; **(E)** Signal Transmission; **(F)** Digital Communication; **(G)** Control Systems; **(H)** Robotics; **(I)** Signal Processing; **(J)** Image Processing; **(K)** High-Frequency Phenomena and Devices; **(L)** Solid-State Devices and Physical Electronics; **(M)** Systems Theory; **(N)** Active and Passive Circuits; **(O)** Integrated Circuits; **(P)** Computer Software; **(Q)** Computer Engineering; **(R)** Microprocessing; **(S)** Electronics; **(T)** Electromagnetics; **(U)** Opto-Electronics; **(V)** Computer Networks. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

190C. Research Group Conferences in Electrical and Computer Engineering (1)
Discussion—1 hour. Prerequisite: upper division standing in Electrical and Computer Engineering, course 101, consent of instructor. Research group conferences. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship in Electrical and Computer Engineering (1-5)
Internship—3-5 hours. Prerequisite: course 101, completion of a minimum of 84 units, project approval before period of internship. Supervised work experience in electrical and computer engineering. May be repeated for credit if project is different. (P/NP grading only.)—I, II, III. (I, II, III.)

194A-194B-194C. Micromouse Design Project (2-2-1)
Discussion—1 hour; laboratory—3 hours (194A, 194B only). Prerequisite: course 70 or Computer Science Engineering 50, Engineering 17 (may be taken concurrently); course 100 or Engineering 100 recommended (may be taken concurrently), course 180A recommended (may be taken concurrently). Design of robotic mouse for the IEEE Micromouse competition. Limited enrollment. May be repeated once for credit. (Deferred grading only, pending completion of sequence.)—I-II-III. (I-II-III.)

195A-195B-195C. Student Design Project (2-2-1)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 110A. Design projects and/or contests sponsored by industry. Topics vary; check with department for availability. Course offering subject to demand/availability of resources. Limited enrollment. May be repeated twice for credit if project is different. (Deferred grading only pending completion of sequence.)—I-II-III. (I-II-III.)

196A-196B. Senior Design Project (1-1)
Lecture/discussion—1 hour. Prerequisite: English 101, 102 or 104 or successful completion of English Composition Examination; senior standing in Electrical or Computer Engineering. Integration of principles and capstone design project for Electrical and Computer Engineering. Project incorporates engineering standards and realistic constraints including economic, manufacturability, sustainability, ethical, health and safety, environmental, social, and political. Completion of portfolio of upper division course work. (Deferred grading only, pending completion of sequence.)—I. (I.)

197T. Tutoring in Electrical and Computer Engineering (1-3)
Discussion—1 hour; discussion/laboratory—2-8 hours. Prerequisite: upper division standing, consent of instructor, course 101. Tutoring in Electrical and Computer Engineering courses, especially introductory circuits. For upper-division undergraduate students who will provide tutorial assistance. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)
Prerequisite: course 101, consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: course 101, consent of instructor. (P/NP grading only.)

Graduate Courses

201. Digital Processing of Signals (4)
Lecture—4 hours. Prerequisite: course 150B. Theory and applications of digital processing of signals. Z-transform analysis of discrete-time systems, filter design techniques, structures for discrete-time systems, discrete Fourier transform, and Hilbert transforms.—II. (II.)

206. Digital Image Processing (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 150B. Two-dimensional systems theory, image perception, sampling and quantization, transform theory and applications, enhancement, filtering and restoration, image analysis, and image processing systems.—II. (II.)

207. Pattern Recognition and Classification (3)
Lecture—3 hours. Prerequisite: Statistics 120. Topics in statistical pattern recognition and classification: linear decision functions and minimum distance classification, Bayes decision theory, clustering algorithms, the generalized perceptron, multi-layer neural networks, and feature extraction. Offered in alternate years.—(III.)

208. Image Analysis and Computer Vision (3)
Lecture—3 hours. Prerequisite: course 150B. Geometry of two-dimensional objects. Edge detection and image segmentation. Image formation and fundamental principles of computer vision. Recovery of three-dimensional structure from shading or stereo information. Analysis of motion and estimation of motion parameters. Geometry and representation of three-dimensional objects. Offered in alternate years.—(III.)

209. Image Sequence Processing (3)
Lecture—3 hours. Prerequisite: course 106. Basic video concepts and image sequences as spatio-temporal data; three-dimensional linear systems; perception of visual motion; enhancement of image sequences; image sequence representation; resolution issues; the computation of motion; image sequence compression. Offered in alternate years.—III.

210. MOS Analog Circuit Design (3)
Lecture—3 hours. Prerequisite: courses 110B, 111B and 140B. Analysis and design of MOS amplifiers, bias circuits, voltage references and other analog circuits. Stability and compensation of feedback amplifiers. Introduction to noise analysis in MOS circuits.—I. (I.)

211. Advanced Analog Circuit Design (3)
Lecture—3 hours. Prerequisite: course 210; Statistics 131A and course 112 recommended. Noise and distortion in electronic circuits and systems. Application to communication circuits. Specific applications include mixers, low-noise amplifiers, power amplifiers, phase-locked loops, oscillators and receiver architectures.—II.

212. Analog MOS IC Design for Signal Processing (3)
Lecture—3 hours. Prerequisite: course 210. Analysis and design of analog MOS integrated circuits. Passive components, single-ended and fully differential op amps, sampled-data and continuous-time filters.—II. (II.)

213. Data-Conversion Techniques and Circuits (3)
Lecture—3 hours. Prerequisite: course 210. Digital-to-analog and analog-to-digital conversion; component characteristics and matching; sample-and-hold, comparator, amplifier, and reference circuits.—III. (III.)

214. Computer-Aided Circuit Analysis and Design (3)
Lecture—3 hours. Prerequisite: courses 110A, 110B and knowledge of FORTRAN or C. Network equation formulations. Nonlinear DC, linear AC, time-domain (both linear and nonlinear), steady-state (nonlinear) and harmonic analysis. DC, AC, and time-domain sensitivities of linear and nonlinear circuits. Gradient-based design optimization. Behavioral simulations. Extensive CAD project.—II. (II.)

215. Circuits for Digital Communications (3)
Lecture—3 hours. Prerequisite: courses 150B and 210 (may be taken concurrently); course 165, 166 or 265 recommended. Analog, digital, and mixed-signal CMOS implementations of communication-circuit blocks; gain control, adaptive equalizers, sampling detectors, clock recovery. Offered in alternate years.—III.

218A. Introduction to VLSI Circuits (3)
Lecture—3 hours. Prerequisite: courses 110A and 110B. Theory and practice of VLSI circuit and system design. Extensive use of VLSI computer-aided design aids to undertake a VLSI design example.—I. (I.)

218B. Multiproject Chip Design (1)
Laboratory—3 hours. Prerequisite: course 218A. CMOS and NMOS multiproject chip layouts of projects begun in courses 218A, 212, and 219 are assembled and submitted to the DARPA/NSF MOSIS program for fabrication.—II. (II.)

218C. IC Testing and Evaluation (1)
Laboratory—3 hours. Prerequisite: courses 218A and 218B. Chips submitted in course 218B are tested and evaluated. Issues involving design of ICs for testibility are discussed.—III. (III.)

219. Advanced Digital Circuit Design (3)
Lecture—3 hours. Prerequisite: course 118 or 218A. Analysis and design of digital circuits. Both bipolar and MOS circuits are covered. Dynamic and static RAM cells and sense amplifiers. Advanced MOS families. Multi-valued logic.—III. (III.)

221. Analog Filter Design (3)
Lecture—3 hours. Prerequisite: courses 100 and 150A. Design of active and passive filters including filter specification and approximation theory. Passive LC filter design will cover doubly-terminated reactance two-port synthesis. Active filter design will include sensitivity, op-amp building blocks, cascade, multi-loop, ladder and active-R filter design. Offered in alternate years.—I.

222. RF IC Design (3)
Lecture—3 hours. Prerequisite: course 132C and 210. Radio frequency (RF) solid-state devices, RF device modeling and design rules; non-linear RF circuit design techniques; use of non-linear computer-aided (CAD) tools; RF power amplifier design.—II. (II.) Pham

228. Advanced Microwave and Antenna Design Techniques (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 132B. Theory, design, fabrication, analysis of advanced microwave devices, antennas. Includes wideband transformers, tapered networks, stripline and microstripline broadband, couplers, and hybrids. Lumped and distributed filter synthesis. Broadband matching theory applied to microwave devices. FET amplifiers. Antenna design, analysis of horns, microstrip, log periodic, arrays, spirals, and reflectors. Offered in alternate years.—III.

230. Electromagnetics (3)
Lecture—3 hours. Prerequisite: course 130B. Maxwell's equations, plane waves, reflection and refraction, complex waves, waveguides, resonant cavities, and basic antennas.—I. (I.)

232A. Advanced Applied Electromagnetics I (3)
Lecture—3 hours. Prerequisite: course 132B. The exact formulation of applied electromagnetic problems using Green's functions. Applications of these techniques to transmission circuits. Offered in alternate years.—II.

232B. Advanced Applied Electromagnetics II (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 132B. Advanced treatment of electromagnetics with applications to passive microwave devices and antennas. Offered in alternate years.—III.

235. Photonics (4)
Lecture—3 hours; project—1 hour. Prerequisite: course 230. Optical propagation of electromagnetic waves and beams in photonic components and the design of such devices using numerical techniques.—III.

236. Nonlinear Optical Applications (3)
Lecture—3 hours. Prerequisite: course 130B, course 230 (may be taken concurrently). Nonlinear optical interactions in optical communication, optical information processing and integrated optics. Basic concepts underlying optical nonlinear interactions in materials and guided media. Not open for credit to students who have completed course 233. Offered in alternate years.—I.

237A. Lasers (3)
Lecture—3 hours. Prerequisite: course 130B or the equivalent and course 235. Theoretical and practical description of lasers. Theory of population inversion, amplification and oscillation using semiclassical oscillator model and rate equations. Description and design of real laser system (Not open for credit to students who have completed course 226A.) Offered in alternate years.—I.

237B. Advanced Lasers (3)
Lecture—3 hours. Prerequisite: course 237A. Quantum mechanical description of lasers and interactions of materials with laser light. Relationship to rate equation approach. Optical Bloch equations and coherent effects. Theory and practice of active and passive mode-locking of lasers. Injection locking. Not open for credit to students who have completed course 226B. Offered in alternate years.—(II.)

238. Semiconductor Diode Lasers (3)
Lecture—3 hours. Prerequisite: course 245A. Understanding of fundamental optical transitions in semiconductor and quantum-confined systems are applied to diode lasers and selected photonic devices. The importance of radiative and non-radiative recombination, simulated emission, excitons in quantum wells, and strained quantum layers are considered. Offered in alternate years.—III.

239A. Optical Fiber Communications Technologies (4)
Lecture—4 hours. Prerequisite: course 130B. Physical layer issues for component and system technologies in optical fiber networks. Sources of physical layer impairments and limitations in network scalability. Enabling technologies for wavelength-division-multiplexing and time-division-multiplexing networks. Optical amplifiers and their impact in optical networks (signal-to-noise ratio, gain-equalization, and cascadability).—I. (I.)

239B. Optical Fiber Communications Systems and Networking (4)
Lecture—4 hours. Prerequisite: course 239A. Physical layer optical communications systems in network architectures and protocols. Optical systems design and integration using optical component technologies. Comparison of wavelength routed WDM, TDM, and NGI systems and networks. Case studies of next generation technologies. Offered in alternate years.—II.

240. Semiconductor Devices Physics (3)
Lecture—3 hours. Prerequisite: course 140B. Physical principles, characteristics and models of fundamental semiconductor device types, including P-N and Schottky diodes, MOSFETs and MESFETs Bipolar Junction Transistors, and light emitters/detectors.—I. (I.)

241. Advanced Silicon Devices (3)
Lecture—3 hours. Prerequisite: course 140B; course 240 recommended. Use of modern electron device design to enhance performance of basic device architectures to satisfy specific requirements in circuits. High-performance field-effect, and bipolar transistors, high-frequency devices, solid-state power devices and field-emission triodes are considered. Offered in alternate years.—II.

242. Heterojunction Semiconductor Devices (3)
Lecture—3 hours. Prerequisite: course 140B; course 240 recommended. Use of materials engineering and device design/fabrication techniques to emphasize particular performance issues in electron devices. Particular emphasis on compound semiconductors and column-IV elemental alloy heterostructures and their applications in quantum, microwave, and photonic devices. Offered in alternate years.—II.

243. Silicon-on-Insulator (SOI) Technology (3)
Lecture—3 hours. Prerequisite: course 140B or 240 recommended. SOI (Silicon-on-Insulator) technology from all major points of view: materials fabrication, processing technology, device physics, and circuit basics. Offered in alternate years.—III.

244A. Design of Microelectromechanical Systems (MEMS) (3)
Lecture—3 hours. Prerequisite: course 140A, 140B or consent of instructor. Theory and practice of MEMS design. Micromechanical fundamentals, CAD tools, and case studies. A MEMS design project is required. The designs will be fabricated in a commercial foundry and tested in course 244B. Offered in alternate years.—(I.)

244B. Design of Microelectromechanical Systems (MEMS) (1)
Laboratory—3 hours. Prerequisite: course 244A. Testing of surface micromachined MEMS devices including post-processing, design of test fixtures and test methodology, measurements, and data analysis. (S/U grading only.) Offered in alternate years.—(III.)

245. Applied Solid-State Physics (3)
Lecture—3 hours. Prerequisite: course 140A and Physics 115A. Physics of solids relevant to device applications. Topics include atomic structure of solids, quantum theory of electronic and vibrational states in crystals and heterostructures, electron dynamics, and quantum transport theory.—II.

246. Advanced Projects in IC Fabrication (3)
Discussion—1 hour; laboratory—6 hours. Prerequisite: course 146B. Individualized projects in the fabrication of analog or digital integrated circuits. Offered in alternate years.—III.

247. Advanced Semiconductor Devices (3)
Lecture—3 hours. Prerequisite: course 240. Physics of various semiconductor devices, including metal-oxide-semiconductor field-effect transistors (MOSFETs), IMPATT and related transit-time diodes, transferred-electron devices, light-emitting diodes, semiconductor lasers, photodetectors, and solar cells. Offered in alternate years.—I.

248. Microsensor Design and Fabrication (3)
Lecture—3 hours. Prerequisite: graduate standing in engineering. Design and fabrication of sensors using microfabrication techniques. Topics include transduction principles, fabrication technologies specific to microsensors, and design of microsensor systems, including packaging. Offered in alternate years. Same course as Biomedical Engineering 249.—II.

249. Microfabrication (3)
Lecture—3 hours. Prerequisite: course 140B. Theory and practices of several major technologies of microfabrication, used for producing integrated circuits, sensors, and microstructures. Major topics include sputtering, chemical vapor deposition, plasma processing, micromachining, and ion implantation. Offered in alternate years.—(II.)

250. Linear Systems and Signals (4)
Lecture—4 hours. Prerequisite: course 150A. Mathematical description of systems. Selected topics in linear algebra. Solution of the state equations and an analysis of stability, controllability, observability, realizations, state feedback and state estimation. Discrete-time signals and systems, and the Z-transform.—I. (I.)

251. Nonlinear Systems (3)
Lecture—3 hours. Prerequisite: course 250. Nonlinear differential equations, second-order systems, approximation methods, Lyapunov stability, absolute stability, Popov criterion, circle criterion, feedback linearization techniques. Offered in alternate years.—III.

252. Multivariable Control System Design (3)
Lecture—3 hours. Prerequisite: course 250. Review of single-loop feedback design. Stability, performance and robustness of multivariable control systems. LQG design. H design. Frequency response methods. Optimization-based design.—II. (II.)

253. Adaptive Systems (3)
Lecture—3 hours. Prerequisite: course 150B; course 250 (may be taken concurrently.) Theory and practice of adaptive systems. Concepts of learning and adaptation. Structure of adaptive filters and the related parameter adaptive algorithms. Applications to system identification, adaptive signal processing and adaptive control.—I.

254. Optimization (3)
Lecture—3 hours. Prerequisite: Mathematics 22A, knowledge of FORTRAN or C. Modeling optimization problems in engineering design and other applications; optimality conditions; unconstrained optimization (gradient, Newton, conjugate gradient and quasi-Newton methods); duality and Lagrangian relaxation constrained optimization. (Primal method and an introduction to penalty and augmented Lagrangian methods.) Offered in alternate years.—II.

255. Robotic Systems (3)
Lecture—3 hours. Prerequisite: course 157A. Introduction to robotic systems. Mechanical manipulators, kinematics, manipulator positioning and path planning. Dynamics of manipulators. Robot motion programming and control algorithm design.—(I.)

256. Multivariable Feedback Systems (3)
Lecture—3 hours. Prerequisite: course 250. Analysis and synthesis of feedback control systems using a factorization approach. Q-parametrization, all stabilizing controllers, all achievable input-output maps. Robustness, asymptotic tracking and disturbance rejection. Offered alternate years.—(III.)

257. Topics in Optimization (3)
Lecture—3 hours. Prerequisite: Computer Science Engineering 30 or 40 or the equivalent or familiarity with MATLAB as a programming language; Mathematics 22A; Mathematics 131 or course 150A. Advanced topics in the theoretical foundations of optimization and its applications, such as, semi-infinite and nondifferentiable optimization in engineering design, optimal control, global optimization, convex analysis and optimization, linear and integer programming, VLSI physical design automation. May be repeated for credit when topic differs. Offered in alternate years.—(II.)

259. Fuzzy Systems and Control (3)
Lecture—3 hours. Prerequisite: course 157A. Fuzzy sets and relations, fuzzy logic and approximate reasoning. Fuzzy systems and properties. Design of fuzzy systems from input/output data. Fuzzy control systems. Fuzzy logic and soft computing. Offered in alternate years.—(III.)

260. Random Signals and Noise (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 120, course 150A; course 250 recommended. Random processes as probabilistic models for signals and noise. Review of probability, random variables, and expectation. Study of correlation function and spectral density, ergodicity and duality between time averages and expected values, filters and dynamical systems. Applications.—II. (II.)

261. Signal Processing for Communications (4)
Lecture—4 hours. Prerequisite: course 165, 260 or consent of instructor. Signal processing in wireless and wireline communication systems. Characterization and distortion of wireless and wireline channels. Channel equalization and maximum likelihood sequence estimation. Channel precoding and pre-equalization. OFDM and transmit diversity. Array processing. Offered in alternate years.—III.

263. Optimal and Adaptive Filtering (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 260. Geometric formulation of least-squares estimation problems. Theory and applications of optimum Wiener and Kalman filtering. MAP and maximum likelihood estimation of hidden Markov models, Viterbi algorithm. Adaptive filtering algorithms, properties and applications. Offered in alternate years.—(III.)

264. Estimation and Detection of Signals in Noise (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 260. Introduction to parameter estimation and detection of signals in noise. Bayes and Neyman-

Pearson likelihood-ratio tests for signal detection. Maximum-likelihood parameter estimation. Detection of known and Gaussian signals in white or colored noise. Applications to communications, radar, signal processing. Offered in alternate years.—I.

265. Principles of Digital Communications (4)
Lecture—4 hours. Prerequisite: courses 165 and 260, or consent of instructor. Introduction to digital communications. Coding for analog sources. Characterization of signals and systems. Modulation and demodulation for the additive Gaussian channel. Digital signaling over bandwidth-constrained linear filter channels and over fading multipath channels. Spread spectrum signals.—I. (I.)

266. Information Theory and Coding (3)
Lecture—3 hours. Prerequisite: Statistics 120. Information theory and coding. Measure of information. Redundancy reduction encoding of an information source. Capacity of a communication channel, error-free communications. Offered in alternate years.—II.

267. Cellular Digital Mobile Communications (3)
Lecture—3 hours. Prerequisite: courses 150A, 160, and Statistics 120 (or the equivalent). Wireless cellular, digital mobile and personal communication systems (PCS). Radio propagation, digital modulation and error control. Access methods: spread spectrum, FDMA and TDMA. Antenna diversity. Computer-aided system and hardware design.—I. (I.)

268. Digital Modulation Techniques (3)
Lecture—3 hours. Prerequisite: course 267. MODEM (modulator–demodulator) signal processing and complete radio transmitter/receiver analysis, design and application for digital cellular mobile radio satellite, microwave, and cable systems. Study of advanced /4-QPSK, GMSK, coded QAM and of correlative/coded modems. Computer-aided and hardware design of advanced communications and synchronization systems. Offered in alternate years.—III.

269A. Error Correcting Codes I (3)
Lecture—3 hours. Prerequisite: Mathematics 22A and course 160. Introduction to the theory and practice of block codes, linear block codes, cyclic codes, decoding algorithms, coding techniques.—I. (I.)

269B. Error Correcting Codes II (3)
Lecture—3 hours. Prerequisite: course 165 and 269A. Introduction to convolutional codes, turbo codes, trellis and block coded modulation codes, soft-decision decoding algorithms, the Viterbi algorithm, reliability-based decoding, trellis-based decoding, multistage decoding. Offered in alternate years.—III.

270. Computer Architecture (3)
Lecture—3 hours. Prerequisite: course 170 or Computer Science Engineering 154B. Introduction to modern techniques for high-performance single and multiple processor systems. Topics include advanced pipeline design, advanced memory hierarchy design, optimizing pipeline and memory use, and memory sharing among multiprocessors. Case studies of recent single and multiple processor systems.—II. (II.)

272. High-Performance Computer Architecture and Implementation (3)
Lecture—3 hours. Prerequisite: course 170 or Computer Science Engineering 154A, 154B and course 270 or Computer Science Engineering 250A. Architectural issues in achieving high-performance via concurrent execution of instructions and associated problems and limitations. Specialized architectures. Offered in alternate years.—(III.)

273. Computer Networks (4)
Lecture—3 hours; project. Prerequisite: Mathematics 131or Statistics 120 or 131A, Computer Science Engineering 152A. Concepts and design principles of computer networks. Network architectures, protocol mechanisms and implementation principles (transport/network/data-link layers), network algorithms, router mechanisms, design requirements of applications, network simulation, modeling and performance analysis. Examples primarily from the Internet protocol suite.—II. (II.) Chuah

274. Advanced Topics in Networking (4)
Lecture—3 hours; project. Prerequisite: Computer Science Engineering 252 or course 273. Advanced topics in the theoretical foundations of network measurements, modeling, and statistical inferencing. Applications to Internet engineering, routing optimization, load balancing, traffic engineering, fault tolerance, anomaly detection, and network security. Individual project requirement. Offered in alternate years.—(III.) Chuah

276. Fault-Tolerant Computer Systems: Design and Analysis (3)
Lecture—3 hours. Prerequisite: courses 170, 180A. Introduces fault-tolerant digital system theory and practice. Covers recent and classic fault-tolerant techniques based on hardware redundancy, time redundancy, information redundancy, and software redundancy. Examines hardware and software reliability analysis, and example fault-tolerant designs. Not open for credit to students who have completed course 276A. Offered in alternate years.—(II.)

277. Graphics Architecture (3)
Lecture—3 hours. Prerequisite: Computer Science Engineering 154B or course 170, Computer Science Engineering 175. Design and analysis of the architecture of computer graphics systems. Topics include the graphics pipeline with a concentration on hardware techniques and algorithms, exploiting parallelism in graphics, and case studies of noteworthy and modern graphics architectures. Offered in alternate years.—(II.) Owens

278. Computer Arithmetic for Digital Implementation (3)
Lecture—3 hours. Prerequisite: courses 170, 180A. The design and implementation of computer arithmetic logic units are studied with particular emphasis on high-speed performance requirements. Addition (subtraction), multiplication and division operations are covered, and fixed and floating-point representations are examined. Offered in alternate years.—III.

280. High-Performance System Design (3)
Lecture—3 hours. Prerequisite: course 118, 180B. Advanced digital circuits. Logic families of high-performance systems: processors and DSP. Timing, clock generation, clock distribution and clock storage elements. Pipelining in high-performance systems. Power issues and design for low-power. VLSI arithmetic and implementation in digital systems.—I. (I.)

281. VLSI Digital Signal Processing (3)
Lecture—3 hours. Prerequisite: courses 150B, 170, 180B or consent of instructor. Digital signal processors, building blocks, and algorithms. Design and implementation of processor algorithms, architectures, control, functional units, and circuit topologies for increased performance and reduced circuit size and power dissipation.—II. (II.) Baas

282. Hardware Software Codesign (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 170, 180B. Specification and design of embedded systems; modeling and performance estimation; hardware/software partitioning; co-simulation; design re-use; platform-based design; reconfigurable computing.—III.

283. Advanced Design Verification of Digital Systems (4)
Lecture—3 hours; project. Prerequisite: courses 170 and 180A. Design verification techniques for digital systems; simulation-based design verification techniques; formal verification techniques, including equivalence checking, model checking, and theorem proving; timing analysis and verification; application of design certification techniques to microprocessors. Offered in alternate years.—II.

286. Introduction to Digital System Testing (3)
Lecture—3 hours. Prerequisite: course 180A; Statistics 120 or 131A. A review of several current techniques used to diagnose faults in both combinational and sequential circuits. Topics include path sensitization procedures, Boolean difference, D-algorithm random test generation, TC testing and an analysis of the effects of intermittent faults. Not open for credit to students who have completed course 276A. Offered in alternate years.—II.

289A-V. Special Topics in Electrical and Computer Engineering (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topics in **(A)** Computer Science, **(B)** Programming Systems, **(C)** Digital Systems **(D)** Communications, **(E)** Signal Transmission, **(F)** Digital Communication, **(G)** Control Systems, **(H)** Robotics, **(I)** Signal Processing, **(J)** Image Processing, **(K)** High Frequency Phenomena and Devices, **(L)** Solid-State Devices and Physical Electronics, **(M)** Systems Theory, **(N)** Active and Passive Circuits, **(O)** Integrated Circuits, **(P)** Computer Software, **(Q)** Computer Engineering, **(R)** Microprocessing, **(S)** Electronics, **(T)** Electromagnetics, **(U)** Optoelectronics, **(V)** Computer Networks. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290. Seminar in Electrical and Computer Engineering (1)
Seminar—1 hour. Discussion and presentation of current research and development in Electrical and Computer Engineering. May be repeated for credit. (S/U grading only.)—I. (I.)

290C. Graduate Research Group Conference in Electrical and Computer Engineering (1)
Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress, and techniques in electrical and computer engineering. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291. Solid-State Circuit Research Laboratory Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Lectures on solid-state circuit and system design by various visiting experts in the field. May be repeated for credit. (S/U grading only.)—III. (III.)

292. Seminar in Solid-State Technology (1)
Seminar—1 hour. Prerequisite: graduate standing. Lectures on solid-state technology by various visiting experts in the field. May be repeated for credit. (S/U grading only.)—III. (III.)

293. Computer Engineering Research Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Lectures, tutorials, and seminars on topics in computer engineering. May be repeated for credit up to four times. (S/U grading only.)—II, III. (II, III.)

294. Communications, Signal and Image Processing Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Communications, signal and image processing, video engineering and computer vision. May be repeated for credit. (S/U grading only.)—I, II, III.

295. Systems, Control and Robotics Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Seminars on current research in systems and control by faculty and visiting experts. Technical presentations and lectures on current topics in robotics research and robotics technology. May be repeated for credit. (S/U grading only.)—II. (II.)

296. Photonics Research Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Lectures on photonics and related areas by faculty and visiting experts. May be repeated for credit. (S/U grading only.)—II, III. (II, III.)

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Course

390. The Teaching of Electrical Engineering (1)
Discussion—1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in Electrical Engineering. Participation as a teaching assistant or associate-in in a designated engineering course.

Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated for credit. (S/U grading only.)—I. (I.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Engineering: Mechanical and Aeronautical

(College of Engineering)

Rida Farouki, Ph.D., Chairperson of the Department

Ronald A. Hess, Ph.D., Vice Chairperson of the Department

Department Office, 2132 Bainer Hall (530-752-0580; Fax: 530-752-4158)

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Faculty

Ralph C. Aldredge, III, Ph.D., Associate Professor
Abdul I. Barakat, Ph.D., Associate Professor
James W. Baughn, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Jean-Jacques Chattot, Ph.D., Professor
Harry H. Cheng, Ph.D., Associate Professor
Roger Davis, Ph.D., Professor
Harry A. Dwyer, Ph.D., Professor *(Aeronautical Science and Engineering)*
Paul A. Erickson, Ph.D., Assistant Professor
Fidelis O. Eke, Ph.D., Associate Professor
Rida T. Farouki, Ph.D., Professor
Andrew A. Frank, Ph.D., Professor
Mohamed M. Hafez, Ph.D., Professor *(Aeronautical Science and Engineering), Academic Senate Distinguished Teaching Award*
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Michael R. Hill, Ph.D., Assistant Professor
David A. Horseley, Ph.D., Assistant Professor
Mont Hubbard, Ph.D., Professor
Maury L. Hull, Ph.D., Professor
Sanjay S. Joshi, Ph.D., Assistant Professor
Dean C. Karnopp, Ph.D., Professor
Ian M. Kennedy, Ph.D., Professor
Wolfgang Kollmann, Dr-ing, Professor *(Aeronautical Science and Engineering)*
Donald L. Margolis, Ph.D., Professor
Ellis F. Meng, Ph.D., Assistant Professor
Bahram Ravani, Ph.D., Professor
Lawrence W. Rehfield, Ph.D. Professor *(Aeronautical Science and Engineering)*
Nesrin Sarigul-Klijn, Ph.D., Professor *(Aeronautical Science and Engineering)*
Benjamin D. Shaw, Ph.D., Professor
Cornelis P. van Dam, Ph.D., Professor *(Aeronautical Science and Engineering)*
Steven A. Velinsky, Ph.D., Professor
Anthony S. Wexler, Ph.D., Professor
Bruce R. White, Ph.D., Professor *(Aeronautical Science and Engineering)*
Kazuo Yamazaki, Ph.D., Professor

Emeriti Faculty

Charles W. Beadle, Ph.D., Professor Emeritus
Harry Brandt, Ph.D., Professor Emeritus
Clyne F. Garland, M.S., Professor Emeritus
Warren H. Giedt, Ph.D., Professor Emeritus
Jerald M. Henderson, D.Engr., Professor Emeritus
Myron A. Hoffman, Sc.D., Professor Emeritus
John D. Kemper, Ph.D., Professor Emeritus
Allan A. McKillop, Ph.D., Professor Emeritus

Affiliated Faculty

Oleg Ryzhof, Ph.D., Visiting Professor
Billy Sanders, Ph.D., Lecturer
James Schaaf, Ph.D., Lecturer

Division of Aeronautical Science and Engineering

Faculty

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Wolfgang Kollmann, Dr-ing, Professor *(Mechanical Engineering)*
Lawrence W. Rehfield, Ph.D., Professor
Nesrin Sarigul-Klijn, Ph.D., Professor
Cornelis P. van Dam, Ph.D., Professor
Bruce R. White, Ph.D, Professor *(Mechanical Engineering)*

Mission. The Department of Mechanical and Aeronautical Engineering is committed to educating future engineers so they may contribute to the economic growth and well-being of both the state and the nation and to the advancement of knowledge in the mechanical and aeronautical sciences.

Objectives. We provide: a foundation in the mathematical and physical sciences appropriate for the solution of engineering problems; competitive engineering design experiences in an interdisciplinary environment that emphasize written and oral communication skills, team work, and team and individual decision making; an environment and approach to the requisite engineering disciplines that allow and encourage life-long learning; the basic computational, experimental and manufacturing skills necessary for the conduct and assessment of engineering tasks; an awareness of the ethical, societal, and business responsibilities that accompany the practice of engineering, including pertinent legal issues such as intellectual property; an awareness of current research and state-of-the-art in the field.

The Aeronautical Science and Engineering Major Program

Aeronautical Science and Engineering is the branch of engineering that applies scientific knowledge to the design, manufacture and operation of aircraft. Our Bachelor of Science degree in Aeronautical Science and Engineering provides a broad background and fundamental education in mathematics, the physical sciences, and the engineering sciences. These fundamentals, when complemented by the required technical courses, prepare you for employment in government or industry, while simultaneously establishing an excellent foundation for graduate studies.

The fundamental disciplines of this branch of engineering apply to all bodies and vehicles whose applied loads are influenced by aerodynamic forces.

Courses in fundamental engineering principles are supplemented with courses in aircraft propulsion, aerodynamics, performance, stability and control, aircraft preliminary design, aeronautical structures, and aeroelasticity.

Aeronautical Science and Engineering Program

The Aeronautical Science and Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Lower Division Required Courses

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C-9D	19
Chemistry 2A-2B or 2AH-2BH	10
Engineering 4	3
Engineering 6 or Mechanical Engineering 5	4
Engineering 17, 35, 45	11
English 1 or 3, or Comparative Literature 1, 2, 3 or 4, or Native American Studies 5	4
Communication 1 or 3	4
General Education electives	16
Minimum Lower Division Units	**93**

Upper Division Program

A broad range of technical elective courses is available. Some students choose these electives from one area of study in order to begin developing a specialty. Others choose from several areas in order to broaden their background in the sciences and engineering. Typical aeronautical science and engineering specialties include aero-thermodynamics, propulsion systems, aircraft performance, stability and control, aeronautical structures, aeroelasticity, flight testing, or component and mechanism design. There are a number of electives that could be recommended to all aeronautical science and engineering students regardless of their chosen area of specialization.

Suggested technical electives:

Aeronautical Science and Engineering 131, 137, 139

Suggested advisers: J.J. Chattot, M.M. Hafez, R.A. Hess, L.W. Rehfield, N. Sarigul-Klijn, C.P. van Dam, B.R. White.

Upper Division Required Courses

Engineering 100, 102, 103, 104, 105	19
Mechanical Engineering 106, 107, 165, 171, 172	20
Aeronautical Science and Engineering 126, 127, 129, 130A, 130B, or 130C, 133, 135, 138	32
Select one course from Applied Science Engineering 115, Engineering 180 or Mathematics 128C	4
Engineering 190	3
Technical electives A combined maximum of four units may be selected from project/independent study courses (184A, 184B, 185A, 185B, 192, 199).	7
General Education electives	8
Minimum Upper Division Units	**93**
Minimum Units Required for Major	**186**

The Mechanical Engineering Major Programs

The mechanical engineer uses basic science in the design and manufacture of complex engineering systems requiring the application of physical and mechanical principles to the development of machines, energy conversion systems, materials, and equipment for guidance and control.

Work in this broad field of engineering requires a thorough knowledge of mathematics, physics, chemistry, fluid mechanics, thermodynamics, heat transfer, mass transfer, electricity, manufacturing processes, and economics.

Mechanical Engineering Program

The Mechanical Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Lower Division Required Courses
Requirements for the Mechanical Engineering and Mechanical Engineering/Materials Science and Engineering programs.

	UNITS
Mathematics 21A-21B-21C-21D	16
Mathematics 22A-22B	6
Physics 9A-9B-9C-9D	19
Chemistry 2A-2B or 2AH-2BH	10
Engineering 4	3
Engineering 6 or Mechanical Engineering 5	4
Engineering 17, 35, 45	11
Mechanical Engineering 50	4
English 1 or 3, or Comparative Literature 1, 2, 3 or 4, or Native American Studies 5	4

Communication 1 or 3 4
General Education electives 12
Minimum Lower Division Units 93

Upper Division Programs

You spend your third year in further study of fundamental courses, and in the fourth year you may tailor your studies to your own interests by selecting courses in controls and systems analysis, fluid mechanics, heat transfer, mechanical design or thermodynamics. You can either prepare for graduate study in Mechanical Engineering or obtain a broad background for entering engineering practice at the bachelor's level.

You are encouraged to select elective courses from among the areas of specialization listed below.

Areas of Specialization

Mechanical Design. The creation and improvement of products, processes, or systems that are mechanical in nature are the primary activities of a professional mechanical engineer. The development of a product from concept generation to detailed design, manufacturing process selection and planning, quality control and assurance, and life cycle considerations are areas of study and specialization in the area of mechanical design.

Solutions to such major social problems as environmental pollution, the lack of mass transportation, the lack of raw materials, and energy shortages, will depend heavily on the engineer's ability to create new types of machinery and mechanical systems.

The engineer-designer must have a solid and relatively broad background in the basic physical and engineering sciences and have the ability to synthesize the information from such a background in creative problem solving. In addition to having technical competence, the designer must be able to consider the socioeconomic consequences of a design and its possible impact on the environment. Product safety, reliability, and economics are other considerations.

Suggested technical electives:

Aeronautical Science and Engineering 130A, 130B, 130C, 133, 137, 139
Biological Systems Engineering 165
Applied Science Engineering 115
Engineering 111, 122, 160 (only one unit of credit towards Technical Electives requirement)
Materials Science and Engineering 180, 181, 182
Mechanical Engineering 134, 150B, 151, 152, 161, 162, 184A with 184B (both courses must be taken), 185A with 185B (both courses must be taken)

Suggested advisers: H.H. Cheng, R.T. Farouki, A.A. Frank, M.R. Hill, M.L. Hull, B. Ravani, S. Velinsky, K. Yamazaki.

Biomedical and Engineering Fluid Mechanics. This field of study is based on the fundamentals of fluid mechanics and their broad range of applications in the biomedical and engineering areas. Areas of current research include blood circulation and its potential role in the regulation of normal physiological function and in the development of disease; groundwater and atmospheric flows and their implications for pollutant transport and environmental concerns; aerodynamic flow around transportation vehicles and its impact on vehicle performance; and flow in combustion engines and other energy systems with considerations of efficiency and environmental impact. These areas are investigated both experimentally and computationally.

Suggested technical electives:

Aeronautical Science and Engineering 138
Engineering 160 (only one unit of credit towards technical requirements); Engineering 180
Chemical Engineering 161A, 161B
Civil and Environmental Engineering 144, 149
Mechanical Engineering 161, 162, 163

Suggested advisers: R.C. Aldredge, A.I. Barakat, J.W. Baughn, J.-J. Chattot, H.A. Dwyer, M. Hafez, I.M. Kennedy, W. Kollmann, L.W. Rehfield, B.D. Shaw, C.P. van Dam, A.S. Wexler, B.R. White.

Combustion and the Environment. Combustion is widely used for energy generation, propulsion, heating, and waste disposal, as well as for many other applications. Mechanical engineers are often heavily involved with the design of combustion systems (internal combustion engines, gas turbines, furnaces, etc.) and deal with aspects of combustion ranging from increasing efficiencies to reducing pollutant emissions. This specialization is for those who would like to work in fields that use combustion, or that deal with pollution related to combustion. With the current increased emphasis on reducing pollutants while maintaining or increasing efficiency, the efforts of mechanical engineers in designing and improving combustion systems are becoming more important.

Suggested technical electives:

Mechanical Engineering 161, 163, 184A with 184B (both courses must be taken)
Civil and Environmental Engineering 149, 150

Suggested advisers: R.C. Aldredge, H.A. Dwyer, P. A. Erickson, I.M. Kennedy, W. Kollmann, B.D. Shaw.

Heat Transfer, Thermodynamics, and Energy Systems. This specialization emphasizes the fundamentals of heat transfer and thermodynamics, and their application to the design of advanced engineering systems. The objective of the program is to introduce you to the fundamental processes of heat transfer and thermodynamics in complex engineering systems so that you are able to design more efficient, cost effective, and reliable systems with less environmental pollution and impact. An understanding of heat transfer and thermodynamics is required for the design of efficient, cost effective systems for power generation, propulsion, heat exchangers, industrial processes, refining, and chemical processing. This area of specialization is important to many industries—aerospace, defense, automotive—as well as to the thermal design of electronic and computer packages.

Suggested technical electives:

Aeronautical Science and Engineering 138
Engineering 111; Mechanical Engineering 161, 162, 163

Suggested advisers: R.C. Aldredge, J.W. Baughn, R. Davis, H.A. Dwyer, P.A. Erickson, M.A. Hoffman, I.M. Kennedy, W. Kollman, E.F. Meng, B.D. Shaw

Manufacturing. Manufacturing is concerned with the conversion of raw materials into finished products by a variety of processes, such as machining, forming, casting, and molding. Modern manufacturing technology is increasingly dependent upon integration with computer-aided design systems and precision computer controls. State-of-the-art laboratories offer the opportunity for hands-on experience with a wide spectrum of manufacturing equipment. Manufacturing engineers must have expertise in design, materials, controls, statistical methods, computer software, and microprocessor applications.

Suggested technical electives:

Electrical and Computer Engineering 160, 174
Materials Science and Engineering 180, 181
Mechanical Engineering 151, 154

Suggested advisers: H.H. Cheng, R.T. Farouki, D.A. Horseley, E.F. Meng, B. Ravani, K. Yamazaki.

Systems Dynamics and Control. Engineers are increasingly concerned with the performance of integrated dynamics systems in which it is not possible to optimize component parts without considering the overall system.

Systems Dynamics and Control specialists are concerned with the modeling, analysis, and simulation of all types of dynamic systems and with the use of automatic control techniques to change the dynamic characteristics of systems in useful ways. The emphasis in this program is on the physical systems that are closely related to mechanical engineering, but the techniques for studying these systems apply to social, economic, and other dynamic systems.

Ongoing research includes projects on continuously variable transmissions, active and semi-active suspension systems, modeling and control of vehicle dynamics, electromechanical actuator design, electronically controlled steering, the analysis of fuel management systems, and the design of flight-control systems with humans in the loop.

An Automotive System Dynamics Laboratory is being used for testing components such as engines, transmissions, brakes, and steering systems as well as testing complete vehicles.

Suggested technical electives:

Aeronautical Science and Engineering 129, 131, 139
Engineering 122
Mechanical Engineering 134, 152, 184A with 184B (both courses must be taken)

Suggested advisers: F.O. Eke, A.A. Frank, R.A. Hess, M. Hubbard, S. Joshi, D.C. Karnopp, D.L. Margolis.

Ground Vehicle Systems. An important aspect of mechanical engineering is the design of more environmentally benign surface vehicles that provide efficient individual and public transportation. Innovations in the field require competence in vehicle dynamics, control of vehicle dynamics, power sources and power transmission, lightweight structures and systems, alternatively fueled power systems, including electrical drives and fuel cells, and mechanical systems.

Transportation Systems. As society recognizes the increasing importance of optimizing transportation systems to minimize environmental degradation and energy expenditure, engineers will need to consider major innovations in the way people and goods are moved. Such innovations will require competence in vehicle dynamics, propulsion and control, and an understanding of the problems caused by present-day modes of transportation. Vehicle control requires an understanding of sensors and actuator, and the integration of yet-to-be-proposed concepts into overall vehicular dynamics. Competence in these areas allows for the development of alternative propulsion concepts, such as electric, hybrid, and fuel cell.

Suggested technical electives:

Aeronautical Science and Engineering 127, 129
Civil and Environmental Engineering 131A, 149
Engineering 122, 160 (only one unit of credit towards Technical Electives requirement)
Mechanical Engineering 134, 150B, 161, 162, 163

Suggested advisers: P.A. Erickson, A.A. Frank, M. Hubbard, D.C. Karnopp, D.L. Margolis, S. Velinsky.

Mechanical Engineering Upper Division Required Courses

Engineering 100, 102, 103, 104, 105 19
Mechanical Engineering 150A and 172; and one course chosen from 185A with 185B (both courses must be taken in consecutive quarters), or Aeronautical Science and Engineering 130A 12
Mechanical Engineering 106, 107, 165, 171 16
Engineering 190 3
Select one course from Applied Science Engineering 115; Engineering 180; Mathematics 128C, 131; Statistics 120, 131A 4
Technical electives 24
Sixteen of the 24 units must be selected from upper division courses in engineering; of these units, one course must be chosen from the following: Engineering 122, Mechanical Engineering 150B, 154 (Mechanical Engineering and Aeronautical Science and Engineering double majors may petition to substitute Aeronautical Science and Engineering 137 or 139).

Two additional courses must be chosen from the following design courses: Aeronautical Science and Engineering 129, 130B, 130C, 137, 138, 139, Materials Science and Engineering 180, 182; Mechanical Engineering 134, 151, 152,

154, 161, 162, 163. You may also choose from Mechanical Engineering 150B, 184A with 184B (these courses must be taken in consecutive quarters). 185A with 185B (these courses must be taken in consecutive quarters, if these courses are not used in satisfaction of the core design requirement above.

A combined maximum of 4 units may be selected from project/independent study courses (184A, 184B, 185A, 185B, 192, 199) not used in satisfaction of core degree requirements.

The remaining units may be selected from the technical electives list.

General Education electives 12

Minimum Upper Division Units 90

Minimum Units Required for Major 183

Mechanical Engineering/Materials Science and Engineering Upper Division Required Courses

Engineering 100, 102, 103, 104, 105 19

Mechanical Engineering 106, 107, 165, 171 16

Mechanical Engineering 150A, 172; and one course chosen from 185A with 185B (both courses must be taken in consecutive quarters), or Aeronautical Science and Engineering 130A 12

Materials Science and Engineering 160, 162, 164, 174 16

One course chosen from Materials Science and Engineering 172, 180, 181, 182, 188; and one laboratory course chosen from Materials Science and Engineering 162L, 174L 6

Select one course from Applied Science Engineering 115; Engineering 180; Mathematics 128C, 131; Statistics 120, 131A4

Engineering 190 3

Technical electives 11

One course must be chosen from the following: Engineering 122, Mechanical Engineering 150B, 154. In order to satisfy design requirements, two courses must be chosen from Aeronautical Science and Engineering 129, 130B, 130C, 137, 138, 139, Materials Science and Engineering 147, 180, 181, 182; Mechanical Engineering 134, 151, 152, 154, 161, 162, 163. You may also choose from Mechanical Engineering 150B, 184A with 184B (these courses must be taken in consecutive quarters). 185A with 185B (these courses must be taken in consecutive quarters), if these courses are not used for a core design requirement above.

A maximum of 4 units of courses numbered 184A, 184B, 185A, 185B may be applied to the technical elective degree requirement.

General Education electives 12

Minimum Upper Division Units 99

Minimum Units Required for Major 192

Courses in Engineering: Mechanical (EME)

(Courses in Mechanical Engineering (EME) are listed below; courses in Aeronautical Science and Engineering (EAE) are listed immediately following; graduate courses in Mechanical and Aeronautical Engineering (MAE) follow.)

Lower Division Courses

1. Mechanical Engineering (1)
Lecture—1 hour. Description of the field of mechanical engineering with examples taken from industrial applications, discussions of the practice with respect to engineering principles, ethics, and responsibilities. (P/NP grading only.)—I.

5. Computer Programming for Engineering Applications (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16A or 21A (may be taken concurrently). Structured programming in C for solving problems in engineering. Introduction to MATLAB and comparison study of C/C++ with MATLAB. Not open for credit to students who have completed course 124.—I. (I.) Cheng

50. Manufacturing Processes (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: Engineering 4 with grade of C or better, Physics 9A. Modern manufacturing methods, safety, manufacturing instructions, computer-aided manufacturing and their role in the engineering design and development process.—I, II. Yamazaki, Schaaf

92. Internship in Mechanical Engineering (1-5)
Internship. Prerequisite: lower division standing; approval of project prior to period of internship. Supervised work experience in engineering. May be repeated for credit. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor; lower division standing. (P/NP grading only.)

Upper Division Courses

106. Thermo-Fluid Dynamics (4)
Lecture—4 hours. Prerequisite: Engineering 103 and 105. Restricted to Mechanical Engineering, Aeronautical Engineering and Mechanical Engineering/Materials Science Engineering majors. Inviscid incompressible flow, compressible flow, thermodynamic relations, ideal gas mixtures, psychrometrics, reacting mixtures and combustion.—I, II, III. (I, II, III.)

107. Thermo Fluids Laboratory (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: Engineering 103, 105, course 106. Restricted to Mechanical Engineering, Aeronautical Engineering and Mechanical Engineering/Materials Science Engineering majors. Experiments to illustrate the first and second laws of thermodynamics, thermodynamic cycles, combustion, fluid dynamic and compressible flows, and principles of thermal and flow measurements.—I, II, III. (I, II, III.)

134. Vehicle Stability (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 171. Introduction to the static and dynamic stability characteristics of transportation vehicles with examples drawn from aircraft, high-performance automobiles, rail cars and boats. Laboratory experiments illustrate the dynamic behavior of automobiles, race cars, bicycles, etc.—III. (III.) Hubbard

150A. Mechanical Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 and 104; Mechanical Engineering 50 (may be taken concurrently). Principles of engineering mechanics applied to mechanical design. Theories of static and fatigue failure of metals. Design projects emphasizing the progression from conceptualization to hardware. Experimental stress analysis and mechanical measurements using strain gages.—I, III. (I, III.) Ravani

150B. Mechanical Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150A. Principles of engineering mechanics applied to the design and selection of mechanical components. Design projects, which concentrate on conceptual design, engineering analysis, methods of manufacture, material selection, and cost. Introduction to Computer-Aided Design.—II. (II.)

151. Statistical Methods in Design and Manufacturing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 107 and 150A. Methods of statistical analysis with emphasis on applications in mechanical design and manufacturing. Applications include product evaluation and decision making, stress-strength interference, probabilistic design, systems reliability, and fatigue under random loading.—II. Hull

152. Computer-Aided Mechanism Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 5 or Engineering 6 and 102. Principles of computer-aided mechanism design. Computer-aided kinematic, static, and dynamic analysis and design of planar mechanisms such as multiple-loop linkages and geared linkages. Introduction to kinematic synthesis of mechanisms.—II. (II.) Cheng

154. Mechatronics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100, 102, course 50. Mechatronics system concept and overview, control system design overview, control software architecture, control hardware architecture, microcontroller and interface technology for mechatronics control, sensor for mechatronics systems, actuator drives.—III. (III.) Yamazaki

161. Combustion and the Environment (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 and 105. Introduction to combustion kinetics; the theory of premixed flames and diffusion flames; turbulent combustion; formation of air pollutants in combustion systems; examples of combustion devices which include internal combustion engines, gas turbines, furnaces and waste incinerators; alternative fuel sources.—III. (III.) Kennedy

162. Modern Power Plants (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106. Modern power plants for electric power generation and cogeneration. Thermodynamic analysis of different types of power plants using various fuels. Design studies of specific power plants.—II. Hoffman

163. Internal Combustion Engines and Future Alternatives (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 103 and 105. Fundamentals of internal combustion engine design and performance. Future needs to adapt to environmental concerns, and the feasibility of better alternatives in the future.—I. (III.) Dwyer

165. Heat Transfer (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 5 or Engineering 6, 103 and 105. Conduction, convection, and radiation heat transfer. Computational modeling of heat transfer in engineering. Applications to engineering equipment with the use of digital computers.—I, II, III. (I, II, III.) Baughn

171. Analysis, Simulation and Design of Mechatronic Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100 and 102, upper division standing. Modeling of dynamic engineering systems in various energy domains. Analysis and design of dynamic systems. Response of linear systems. Digital computer simulation and physical experiments.—I, II. Karnopp, Margolis

172. Automatic Control of Engineering Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 171, Engineering 100. Classical feedback control; block diagrams; control systems performance specifications; steady state errors; rise and settling times; root locus; PID controllers; control design with Bode and Nyquist plots; stability; phase and gain margin; lead and lag compensators; state variable feedback controllers.—II, III. Farouki, Eke

184A. Senior Design Project (2)
Laboratory—6 hours. Prerequisite: courses 150B, 165, and 172, consent of instructor, senior standing in Mechanical Engineering. Performance of practical mechanical engineering projects which include one or more of the following: analysis, design, development and evaluation of mechanism engineering system. (Deferred grading only, pending completion of sequence.)—I, II, III. (I, II, III.)

184B. Senior Design Project (2)
Laboratory—6 hours. Prerequisite: course 184A in a previous quarter from the same instructor; consent of instructor. Performance of practical mechanical engineering projects which include one or more of the following: analysis, design, development, and evaluation of a mechanical engineering system.—I, II, III. (I, II, III.)

185A-185B. Mechanical Engineering Systems Design Project (2-2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 150A, 165, senior standing in Mechanical Engineering or Aeronautical Science and Engineering. Capstone mechanical engineering design course; the mechanical engineering design process and its use in the design of engineering systems. (Deferred grading only, pending completion of sequence.)—I-II, II-III. (I-II, II-III.)

189A-B. Selected Topics in Mechanical Engineering (1)
Lecture/discussion—1 hour biweekly; laboratory—3 hours biweekly. Prerequisite: consent of instructor. Directed group study of selected topics with separate sections in **(A)** Fluid Mechanics Laboratory; **(B)** Thermodynamics Laboratory.—II, III. (II, III.)

192. Internship in Engineering (1-5)
Internship. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in mechanical engineering. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Courses in Aeronautical Science and Engineering (EAE)

Lower Division Courses

1. Introduction to Aerospace Science Engineering (1)
Lecture—1 hour. Description of the field of aerospace engineering with examples from industry, government, and research. Aerospace engineering principles, ethics, and responsibilities. (P/NP grading only.)—I. (I.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor and lower division standing. (P/NP grading only.)

Upper Division Courses

126. Theoretical and Computational Aerodynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 106, Engineering 180, Applied Science Engineering—Davis 115, or Mathematics 128C. Development of general equations of fluid motion. Study of flow field kinematics and dynamics. Flow about a body. Thin airfoil theory. Viscous effects. Applications of numerical methods to wing analysis and design.—III. (III.) Hafez

127. Applied Aircraft Aerodynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 126. Experimental characteristics of wing sections. High-lift devices. Lift and drag at high Mach numbers. Drag aerodynamics. Total aircraft drag estimation. Aerodynamic design procedures.—I. (I.) Chattot

129. Stability and Control of Aerospace Vehicles (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 102. Aircraft and spacecraft stability and control. Derivation of fundamental equations of motion for aircraft/spacecraft. Specialization of equations for aircraft. Fundamentals of feedback. Aircraft flight control systems. Specialization of equations of motion for orbiting spacecraft. Spacecraft attitude control systems.—II. (II.) Hess

130A. Aircraft Performance and Design (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 127. Aircraft design including aerodynamics, performance analysis, weight estimation, and stability and control.—II. (II.) van Dam

130B. Aircraft Performance and Design (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 130A. Aircraft design including refinement and iteration of initial design; cost analysis, detailed design, and analysis of aircraft structure; propulsion system; aerodynamics, stability, and control/handling qualities; or manufacturing. Offered in alternate years.—III. van Dam

130C. Space Systems Design (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 130A. Space systems design including space project organization, requirements definition and specification, concepts formulation, system tradeoffs, and subsystem design. Prototype space mission concepts and a multidisciplinary mission design is developed. Offered in alternate years.—Joshi

131. Flight Test Engineering (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 128. Flight testing of aircraft performance and flying qualities in flight and with flight simulator.—III. (III.)

133. Finite Element Methods in Structures (4)
Lecture—3 hours; laboratory—3 hours. Prerequisites: Engineering 104. Open to Engineering students only. An introduction to the aerospace structural design process. History of aircraft materials. Effects of loading beyond elastic limit. Deflections and stresses due to combined loading. Virtual work principles, and finite element methods. Applications to aerospace structures.—III. (III.) Sarigul-Klign

135. Aerospace Structures (4)
Lecture—4 hours. Prerequisite: course 133. Analysis and design methods used in aerospace structures. Shear flow in open, closed and multicell beam cross-sections, buckling of flat and curved sheets, tension field beams, local buckling.—I. (I.) Sarigul-Klign

137. Structural Composites (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: Engineering 104. Overview of materials and technology for creating structures from fiber reinforced resin matrix composite material systems. Elementary design analysis and case studies emphasizing aeronautical applications.—II. (II.) Rehfield

138. Aircraft Propulsion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45, 103 and 105. Analysis and de-sign of modern aircraft gas turbine engines. Development and application of cycle performance prediction techniques for important engine configurations. Introduction to the operation and design of inlets, compressors, burners, turbines, and nozzles. Cycle design studies for specific applications.—II. (II.) Baughn

139. Structural Dynamics and Aeroelasticity (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 103 and 102. Structural dynamics of flexible structures. Introduction to fluid-structure interaction. Design of subsystems or systems under aeroelastic constraints. Dynamics instabilities. Control effectiveness. Unsteady aerodynamics. Flutter. Aeroelastic tailoring in design, Applications to aerospace, mechanical and biomedical systems.—III. (III.) Sarigul-Klign

189A. Rocket Propulsion (4)
Lecture—4 hours. Prerequisite: Engineering 103 and 105, upper division standing. Fluid and thermodynamics of rocket engines, liquid and solid rocket propulsion. Space propulsion concepts and space mission requirements.—White

189B. Orbital Mechanics (4)
Lecture—4 hours. Prerequisite: course 102, upper division standing. Satellite orbits, multistage rockets, current global boosters, and new technologies. Design application problems include satellites, trajectory optimizations, and interplanetary trajectories.—N. Sarigul-Klijn

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Courses in Mechanical and Aeronautical Engineering (MAE)

(Formerly courses in Aeronautical Science and Engineering and Mechanical Engineering.)

Graduate Courses

207. Engineering Experimentation and Uncertainty Analysis (4)
Lecture—3 hours; term paper. Prerequisite: Engineering 107. Design and analysis of engineering experiments with an emphasis on measurement standards, data analysis, regressions and general and detailed uncertainty analysis, including statistical intervals, propagation of bias and precision errors, correlated bias approximations, and using jitter programs.—II. (II.) Baughn

208. Measurement Methods in Fluid Mechanics and Combustion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 165 and Engineering 103. Application of shadow, schlieren and other flow visualization methods. Introduction to optics and lasers. Measurement of velocity and concentrations in reacting and non-reacting flows with laser diagnostic techniques including LDV, Rayleigh, Raman and fluorescence scattering and CARS. Offered in alternate years.—III. Kennedy

210A. Advanced Fluid Mechanics and Heat Transfer (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103, 105 and Mechanical Engineering 165. Development of differential equations governing continuity, momentum and energy transfer. Solutions in laminar flow for exact cases, low and high Reynolds numbers and lubrication theory. Dynamics of inviscid flow.—I. (I.) White

210B. Advanced Fluid Mechanics and Heat Transfer (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 210A. Study of stability and transition to turbulence. Introduction to the physics of turbulence. Modeling of turbulence for numerical determination of momentum and heat transfer.—II. (II.) Kollmann

211. Fluid Flow and Heat Transfer (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103, 105 and Mechanical Engineering 165 or the equivalent. Design aspects of selected topics; heat conduction, fins; heat transport in ducts, boundary layers and separated flows; heat exchangers.—I. (I.) Hoffman, Baughn

212. Biomedical Heat and Mass Transport Processes (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 165, Biological Systems Engineering 125, Chemical Engineering 153 or the equivalent. Application of principles of heat and mass transfer to biomedical systems related to heat exchange between the biomedical system and its environment, mass transfer across cell membranes and the design and analysis of artificial human organs. (Same course as Biomedical Engineering 212.) Offered in alternate years.—(II.)

213. Advanced Turbulence Modeling (4)
Lecture—4 hours. Prerequisite: course 210B. Methods of analyzing turbulence; kinematics and dynamics of homogeneous turbulence; Reynolds stress and heat-flux equations; second order closures and their simplification; numerical methods; application to boundary layer-type flows; two-dimensional and three-dimensional hydraulic and environmental flows. Offered in alternate years.—(III.) Aldredge, Kollman

215. Biomedical Fluid Mechanics and Transport Phenomena (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or Chemical Engineering 150B or Civil and Environmental Engineering 141. Applica-

tion of fluid mechanics and transport to biomedical systems. Flow in normal physiological function and pathological conditions. Topics include circulatory and respiratory flows, effect of flow on cellular processes, transport in the arterial wall and in tumors, and tissue engineering. (Same course as Biomedical Engineering 215.)—(III.) Barakat

216. Advanced Thermodynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 105. Study of topics important to energy conversion systems, propulsion and other systems using high temperature gases. Classical thermodynamics and quantum statistical mechanics of nonreacting and chemically reacting gases, gas mixtures, and other substances.—I.

217. Combustion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 and 105. Review of chemical thermodynamics and chemical kinetics. Discussions of reacting flows, their governing equations and transport phenomena; detonations; laminar flame structure and turbulent combustion. Offered in alternate years.—II. Shaw

218. Advanced Energy Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 and 105, or the equivalent. Review of options available for advanced power generation. Detailed study of basic power balances, component efficiencies, and overall powerplant performance for one advanced concept such as a fusion, magnetohydrodynamic, or solar electric powerplant. Offered in alternate years.—(I.) Hoffman

219. Introduction to Scientific Computing in Solid and Fluid Dynamics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 103 and 104. Scientific calculations with finite element and finite difference methods for multi-dimensional problems in solid and fluid dynamics are performed with examples in C, C++, FORTRAN, and MATLAB script files. Derivation of the basic equations of motion in finite volume form with applications to elasticity, waves. Offered in alternate years.—(III.)

220. Mechanical Vibrations (4)
Lecture—4 hours. Prerequisite: Engineering 122. Multiple degrees of freedom; damping measures; Rayleigh's method; vibration absorbers; eigenvalues and modeshapes; modal coordinates; forced vibrations; random processes and vibrations; autocorrelation; spectral density; first passage and fatigue failure; nonlinear systems; phase plane.—III. (III.) Margolis

222. Advanced Dynamics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Dynamics of particles, rigid bodies and distributed systems with engineering applications; generalized coordinates; Hamilton's principle; Lagrange's equations; Hamilton-Jacobi theory; modal dynamics orthogonality; wave dynamics; dispersion.—I. (I.) Eke

223. Multibody Dynamics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Coupled rigid-body kinematics/dynamics; reference frames; vector differentiation; configuration and motion constraints; holonomicity; generalized speeds; partial velocities; mass; inertia tensor/theorems; angular momentum; generalized forces; comparing Newton/Euler, Lagrange's, Kane's methods; computer-aided equation derivation; orientation; Euler; Rodrigues parameters. (Same course as Biomedical Engineering 223.)—II. (II.) Eke, Hubbard

225. Spatial Kinematics and Robotics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C Language and course 222. Spatial kinematics, screw theory, spatial mechanisms analysis and synthesis, robot kinematics and dynamics, robot workspace, path planning, robot programming, real-time architecture and software implementation. (Same course as Biomedical Engineering 225.) Offered in alternate years.—(II.) Ravani

226. Acoustics and Noise Control (4)
Lecture—4 hours. Prerequisite: Engineering 122. Description of sound using normal modes and waves; interaction between vibrating solids and sound fields; sound absorption in enclosed spaces; sound transmission through barriers; applications in design, acoustic enclosures and sound walls, room acoustics, design of quiet machinery. Offered in alternate years.—III. Karnopp, Sarigul-Klijn

227. Research Techniques in Biomechanics (4)
Lecture—2 hours; laboratory—4 hours; term paper or discussion—1 hour. Prerequisite: Mathematics 22B and consent of instructor; Exercise Science 115 recommended. Experimental techniques for biomechanical analysis of human movement. Techniques evaluated include data acquisition and analysis by computer, force platform analysis, strength assessment, planar and three-dimensional videography, data reduction and smoothing, body segment parameter determination, electromyography, and biomechanical modeling. (Same course as Biomedical Engineering 227/Exercise Science 227.)—II. (II.) William, Hawkins

231. Musculo-Skeletal System Biomechanics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Mechanics of skeletal muscle and mechanical models of muscle, solution of the inverse dynamics problem, theoretical and experimental methods of kinematic and kinetic analysis, computation of intersegmental load and muscle forces, applications to gait analysis and sports biomechanics. (Same course as Biomedical Engineering 231.)—III. (III.) Hull

232. Skeletal Tissue Mechanics (3)
Lecture—3 hours; laboratory—1 hour. Prerequisite: Engineering 104B. Overview of the mechanical properties of the various tissues in the musculoskeletal system, the relationship of these properties to anatomic and histologic structure, and the changes in these properties caused by aging and disease. The tissues covered include bone, cartilage and synovial fluid, ligament and tendon. (Same course as Biomedical Engineering 232.)—III. (III.) Martin

234. Design and Dynamics of Road Vehicles (4)
Lecture—4 hours. Prerequisite: Mechanical Engineering 134. Analysis and numerical simulation of road vehicles with on design applications. Offered in alternate years.—(III.) Velinsky

236. Aerodynamics in Nature and Technology (4)
Lecture—4 hours. Prerequisite: Engineering 103. Introduction to aerodynamics in nature, fundamentals of turbulence in atmospheric flows, planetary boundary layers, pedestrian-level winds in urban areas. Criteria for laboratory modeling of atmospheric flows, wind-tunnel testing. Offered in alternate years.—(III.) White

237. Analysis and Design of Composite Structures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Aeronautical Science and Engineering 137. Modeling and analysis methodology for composite structures including response and failure. Laminated plate bending theory. Introduction to failure processes. Offered in alternate years.—(III.) Rehfield

238. Advanced Aerodynamic Design and Optimization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Application of aerodynamic theory to obtain optimum aerodynamic shapes. Both analytic solutions and solutions obtained with numerical optimization techniques will be examined. In-cludes introduction to the calculus of variations and numerical optimization techniques. Offered in alternate years.—I. van Dam

240. Computational Methods in Nonlinear Mechanics (4)
Lecture—4 hours. Prerequisite: Applied Science Engineering 115 or Mathematics 128B or Engineering 180. Deformation of solids and the motion of fluids treated with state-of-the-art computational methods. Numerical treatment of nonlinear dynamics; classification of coupled problems; applications of finite element methods to mechanical, aeronautical, and biological systems. Offered in alternate years. (Same course as Biomedical Engineering 240.)—(II.) Sarigul-Klign

241. Advances in Finite Elements and Optimization (4)
Lecture—4 hours. Prerequisite: Engineering 180 or Applied Science 115 or Mathematics 128C. Advanced formulations for new finite elements. Transfinite elements and transition elements for steep gradient problems. State-of-the-art in finite element and optimization methods as applied to control of flow induced vibrations and noise. Multi-disciplinary optimization methods. Offered in alternate years.—I. Sarigul-Klijn, Rehfield

242. Stability of Thin-Walled Structures (4)
Lecture—4 hours. Prerequisite: Civil and Environmental Engineering 202 or consent of instructor. Static stability of thin-walled aerospace structures treated from both theoretical and practical design perspectives. Both monolithic and composite construction considered. Buckling of stiffened panels, shells, and thin-walled beams, experimental methods and failure/crippling processes. Offered in alternate years.—(III.) Rehfield

248. Advanced Turbomachinery (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 and 105. Preliminary aerodynamic design of axial and radial flow compressors and turbines. Design of diffusers. Selection of turbomachine and configurations and approximations to optimum dimensions and flow angles. Introduction to through flow analysis. Rotating stall and surge, and aeromechanical considerations. Offered in alternate years.—I.

250A. Advanced Methods in Mechanical Design (4)
Lecture—4 hours. Prerequisite: Mechanical Engineering 150A and 150B or the equivalents, or consent of instructor. Applications of advanced techniques of solid mechanics to mechanical design problems. Coverage of advanced topics in stress analysis and static failure theories with emphasis in design of machine elements. Design projects emphasizing advanced analysis tools for life cycle evaluation.—I. (I.) Farouki

250B. Advanced Methods in Mechanical Design (4)
Lecture—4 hours. Prerequisite: course 250A. Applications of advanced techniques of solid mechanics to mechanical design problems. Coverage of advanced topics in variational methods of mechanics with emphasis in design of machine elements. Design projects emphasizing advanced analysis tools.—II. (II.) Hill

250C. Mechanical Performance of Materials (4)
Lecture—4 hours. Prerequisite: undergraduate course in stress analysis and mechanical behavior of materials. Occurrence, mechanisms, and prediction of fatigue and fracture phenomenon. Use of stress and strain to predict crack initiation. Use of fracture mechanics to predict failure and crack propagation. Effects of stress concentration, manufacturing, load sequence, irregular loading, and multi-axial loading. Offered in alternate years.—III. (III.) Hill

251. Mechatronics System Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 154 and 172 or Electrical and Computer Engineering 157A, 157B. Motion mechanism design, electric actuator, power electronics motion control, sensor technologies, personal computer-based control systems design, motion control general operating system and real time operating systems, motion control software design, discrete event control software design. Offered in alternate years.—I. Yamazaki

254. Engineering Software Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanical Engineering 5, Engineering 180. Principle and design of engineering software. Advanced topics in engineering software design, applications of object-oriented programming, very high-level languages, real-time multi-thread computing and sensor fusion, Web-based network computing, graphics, and GUI in engineering. Offered in alternate years.—(III.) Cheng

255. Computer-Aided Design and Manufacturing (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: consent of instructor. Representation and processing of geometrical information in design and manufacturing. Numeric and symbolic computations. Coordinate systems and transformations. Bezier and B-spline curves and surfaces. Interpolation and approximation methods. Intersections, offets, and blends. Path planning for machining, inspection, and robotics applications. Offered in alternate years.—III. Farouki, Ravani

258. Hybrid Electric Vehicle System Theory and Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanical Engineering 150B, graduate standing in Mechanical and Aeronautical Engineering. Advanced vehicle design for fuel economy, performance, and low emissions, considering regulations, societal demands and manufacturability. Analysis and verification of computer design and control of vehicle systems in real vehicle tests. Advanced engine concepts. Offered in alternate years.—(III.) Frank

261. Gas Dynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or the equivalent. Flow of compressible fluids. Isentropic flow. Flow with friction, heat transfer, chemically reacting gas and particle mixtures. Normal and oblique shock waves, combustion, blast and expansion waves. Method of characteristics. Offered in alternate years.—(II.)

262. Advanced Aerodynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Aeronautical Engineering 126. Study of invicid and viscous flows about aerodynamic shapes at subsonic, transonic and supersonic conditions. Application of aerodynamic theory to design for reduced drag and increased lift. Offered in alternate years.—(II.) van Dam, Hafez, Chattot, White

263. Introduction to Computational Aerodynamics and Fluid Dynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or consent of instructor. Introduction to numerical methods for solution of fluid flow problems. Discretization techniques and solution algorithms. Finite difference solutions to classical model equations pertinent to wave phenomena, diffusion phenomena, or equilibrium. Application to the incompressible Navier-Stokes equation. Offered in alternate years.—(II.) Chattot

264. Computational Aerodynamics (4)
Lecture—4 hours. Prerequisite: Aeronautical Science and Engineering 126, Engineering 180, or consent of instructor. Numerical methods for aerodynamics flow simulation in the transonic regime. Solutions of steady and unsteady potential and compressible boundary layer equations. Numerical schemes for mixed type equations and shock waves/numerical grid generation. Viscous/inviscid interaction and coupling procedures. Offered in alternate years.—(III.)

266. Advanced Wind-Tunnel Testing (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: undergraduate course in fluid dynamics. Aspects of low-speed wind-tunnel testing for solving aeronautical and non-aeronautical problems including tunnel corrections, scale effects, force and moment measurements, and flow visualization. Offered in alternate years.—(III.) van Dam

271. Modeling and Simulation of Engineering Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanical Engineering 172 or the equivalent. Multiport models of mechanical, electrical, hydraulic, and thermal devices; bond graphs, block diagrams and state space equations; modeling of multiple energy domain systems; 3-dimensional mechanics; digital simulation laboratory.—I. (I.) Karnopp, Margolis

272. Theory and Design of Control Systems (4)
Lecture—4 hours. Prerequisite: Mechanical Engineering 172 or the equivalent. Mathematical representations of linear dynamical systems. Feedback principles; benefits and cost of feedback. Analysis and design of control systems based on classical and modern approaches, with emphasis on applications to mechanical and aeronautical systems.—II. (II.) Eke, Margolis

274. Analysis and Design of Digital Control Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 172. Discrete systems analysis; digital filtering; sample data systems; state space and transform design techniques; quantization effects; multi-input, multi-output systems.—III. (III.) Hess

275. Advance Aircraft Stability and Control (4)
Lecture—3 hours; discussion—1 hour. Development and analysis of aircraft equations of motion. Flexible modes. Response to control actuation. Random inputs and disturbances. Stability and control augmentation system design. Handling qualities. Offered in alternate years.—(III.) Hess

276. Data Acquisition and Analysis (4)
Lecture—3 hours; discussion—1 hour. Application of computers for data acquisition and control. Topics include computer architecture, characteristics of transducers, hardware for laboratory applications of computers, fundamentals of interfaces between computers and experimental equipment, programming techniques for data acquisition and control, basic data analysis. Offered in alternate years.—I.

290C. Graduate Research Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Individual and/or group conference on problems, progress, and techniques in mechanical and aeronautical engineering research. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

297. Seminar (1)
Discussion—1 hour. Prerequisite: consent of instructor. Current topics in engineering including developments in mechanical and aeronautical engineering with presentations by students, faculty, and visitors. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Course

390. The Teaching of Aeronautical Science and Engineering (1)
Discussion—1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in Aeronautical Science and Engineering. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

English

(College of Letters and Science)

David A. Robertson, Ph.D., Chairperson of the Department

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Peter A. Dale, Ph.D., Professor
Joanne F. Diehl, Ph.D., Professor
Gregory Dobbins, Ph.D., Assistant Professor
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Margaret W. Ferguson, Ph.D., Professor
Lynn R. Freed, Ph.D., Professor
Elizabeth S. Freeman, Ph.D., Associate Professor
Bishnupriya Ghosh, Ph.D., Assistant Professor
Sandra M. Gilbert, Ph.D., Professor
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Pam Houston, B.A., Associate Professor
Alessa Johns, Ph.D., Associate Professor
Elizabeth Langland, Ph.D., Professor
Richard A. Levin, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Clarence Major, Ph.D., Professor
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Marijane Osborn, Ph.D., Professor
Riché D. Richardson, Ph.D., Assistant Professor
David A. Robertson, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Catherine M. Robson, Ph.D., Associate Professor
Winfried Schleiner, Ph.D., Professor
Scott C. Shershow, Ph.D., Professor
Karen Shimakawa, Ph.D., Associate Professor *(English, Asian American Studies)*
Scott Simmon, Ph.D., Professor
David Simpson, Ph.D., Professor
David Van Leer, Ph.D., Professor
Raymond B. Waddington, Ph.D., Professor
Claire Waters, Ph.D., Assistant Professor
Evan Watkins, Ph.D., Professor
Joe Wenderoth, M.F.A., Associate Professor
Alan B. Williamson, Ph.D., Professor
Karl F. Zender, Ph.D., Professor
Michael Ziser, Ph.D., Assistant Professor

Emeriti Faculty

William E. Baker, Ph.D., Professor Emeritus
Max Byrd, Ph.D., Professor Emeritus
Thomas A. Hanzo, Ph.D., Professor Emeritus
Wayne Harsh, Ph.D., Professor Emeritus
John O. Hayden, Ph.D., Professor Emeritus
Peter L. Hays, Ph.D., Professor Emeritus
Michael J. Hoffman, Ph.D., Professor Emeritus
Robert H. Hopkins, Ph.D., Professor Emeritus
James J. Murphy, Ph.D., Professor Emeritus
Gwendolyn Schwabe, M.A., Senior Lecturer Emerita
Daniel Silvia, Ph.D., Professor Emeritus
Gary Snyder, B.A., Professor Emeritus
James L. Woodress, Ph.D., Professor Emeritus

University Writing Program (UWP)

————, Director

171 Voorhies Hall; (530-752-6283)

Gary Sue Goodman, Ph.D., Associate Director

383 Voorhies Hall; (530-752-4947)

http://writingprogram.ucdavis.edu

Affiliated Faculty—UWP

Cynthia J. Bates, M.A., Lecturer
Mary E. Bly, M.A., Lecturer
John Boe, Ph.D., Lecturer, *Academic Federation Excellence in Teaching Award*
Marlene B. Clarke, Ph.D., Lecturer
Mardena E. Creek-Michelson, Ph.D., Lecturer
Elizabeth Davis, Ph.D., Lecturer
Pamela Demory, Ph.D., Lecturer
Aliki Dragona, Ph.D., Lecturer
Dale B. Flynn, Ph.D., Lecturer
Laurie Glover, Ph.D., Lecturer
Gary S. Goodman, Ph.D., Lecturer
Jared Haynes, M.A., Lecturer
Donald B. Johns, Ph.D., Lecturer, *Academic Federation Excellence in Teaching Award*
Andy Jones, Ph.D., Lecturer and Academic Coordinator
Pamela J. Major, Ph.D., Lecturer
James McElroy, Ph.D., Lecturer
Nancy V. Morrow, Ph.D., Lecturer
Janet L. Papale, M.A., Lecturer, *Academic Federation Excellence in Teaching Award*
Raquel Scherr, Ph.D., Lecturer, *Academic Federation Excellence in Teaching Award*
Eric J. Schroeder, Ph.D., Lecturer, *Academic Federation Excellence in Teaching Award*

John Stenzel, Ph.D., Lecturer
Jayne L. Walker, Ph.D., Lecturer

The Major Program

The study of English develops skills in reading analytically and perceptively and in writing clearly and effectively.

The Program. The English department offers three kinds of courses: composition courses, undergraduate courses, and graduate courses. Composition courses develop skills in reading analytically and in writing persuasively. Undergraduate and graduate courses cover the entire range of English and American literature, as well as creative writing. Students majoring in English may elect a teaching emphasis, a creative writing emphasis, or a general literature emphasis. The teaching emphasis focuses on the study of composition and of language. The writing emphasis focuses on fiction, poetry, and article writing. Creative writing majors have an opportunity to work with distinguished professional writers of fiction and poetry. The general literature emphasis focuses on a series of related courses in various historical periods of English and American literature.

Career Alternatives. Graduates have found the major excellent pre-professional training for graduate study in English, as well as for careers in teaching, writing, law, medicine, and library work. Many graduates are employed in journalism, publishing, advertising, and public information. Others have worked in local, state, and federal government agencies, as well as in industry and agriculture. Some have established their own businesses.

A.B. Degree Requirements:

UNITS

Preparatory Subject Matter 20
English 1 or 3..... 4
Two courses from English 42, 43, 44, 45 ... 8
Two courses from English 30A, 30B, 46A, 46B, 46C 8

Depth Subject Matter..... 44
English 110A or 110B..... 4
English 117A, 117B, or 117C 4
One course from five of the following six historical fields..... 20
(a) Medieval: English 111, 113A, 113B
(b) Renaissance: English 115, 122
(c) British Literature—Restoration through Romantic period: English 123, 130, 155A
(d) British Literature—Victorian or Twentieth Century: English 133, 137N, 138, 155B, 155C
(e) American Literature pre-1865: English 142, 143, 158A
(f) American Literature post-1865: English 144, 146N, 147, 158B, 166, 167, 181B, 182
The following courses may be used to satisfy the above requirement if they fall into that category for subject, time period, etc. (Please refer to quarterly expanded course descriptions.): English 150A, 150B, 152, 159, 165, 178, 179, 181A, 185A, 185B, 186
Upper Division Seminar, one course selected from English 187, 188, 189, 194H..... 4
Area of Emphasis (choose one)..... 12
General Emphasis:
Three upper division English electives 12
Creative Writing Emphasis:
Three sections of English 100F, 100P and/or 100NF 12
(Students pursuing the Creative Writing Emphasis may replace the upper division seminar portion of the core requirement with an upper division English elective.)
Teaching Emphasis:
English 101 or 104A, 104B, 104C, 104D, 104E, or 104F..... 4
English 105 or 106/Linguistics 106 .. 4
One course selected from English 178, 179, 181A, 181B, or an upper division ethnic literature course from outside the English department..... 4

Total Units for the Major 64

English Majors. Up to four upper division units in a national literature other than English or American, or in Comparative Literature, may count toward the requirements of the major.

Major Advisers. D. P. Abbott, S. Chaganti, J. Clover, P. Dale, J.F. Diehl, G. Dobbins, F. Dolan, M. Ferguson, L. Freed, E. Freeman, B. Ghosh, S.M. Gilbert, W.J. Hicks, P. Houston, A. Johns, R.A. Levin, C. Major, S.J. McPherson, P.L. Moran, L.A. Morris, T. Morton, M. Osborn, R. Richardson, C.M. Robson, W. Schleiner, S. Shershow, K. Shimakawa, S. Simmon, D. Simpson, D. Van Leer, R.B. Waddington, C. Waters, E. Watkins, J. Wenderoth, A.B. Williamson, K.F. Zender, M. Ziser.

Meeting for Majors. All new and prospective English majors are invited to attend a general meeting for majors at the beginning of each year; all English majors should see their advisers, individually, in the spring quarters of their sophomore and junior years.

Foreign Languages. Students who contemplate advanced study in English should prepare for foreign language requirements for higher degrees and should consult with the graduate adviser.

Undergraduate Adviser: See Department Web site at http://wwwenglish.ucdavis.edu

Minor Program Requirements:

UNITS

English..... 20
Five upper division courses, at least four of which will be literature courses..... 20

Honors and Honors Program. A Senior Honors Program is available to an invited group of English majors, who prepare and write a Senior Thesis (either a research paper or creative writing) in their final year. The honors program consists of four units of 194H and four units of 195H, normally taken during the fall and winter quarters of the senior year. Completion of the program is a prerequisite for High or Highest Honors at graduation. Eligibility criteria and application materials may be obtained at the Undergraduate Office, 176 Voorhies Hall. Refer to the Academic Information chapter for Dean's Honors List information.

Education Abroad options. The department strongly encourages interested students to pursue their studies abroad. It is possible for students to complete significant portions of the English major provided that the course is evaluated as at least four UC Davis units; the course is considered upper division by the standards set forth by the Education Abroad Center; the student presents copies of the coursework, syllabus, and writing assignments to the department's advising staff.

University Writing Program. The University Writing Program (UWP) offers writing courses and seeks to improve writing instruction across campus, through a variety of programs. The UWP coordinates first year, intermediate, and advanced writing courses that satisfy college composition requirements and offers courses in writing across the curriculum, writing in specific disciplines, and writing in the professions. The UWP also administers the English Composition Examination, an alternative way to satisfy the advanced writing requirement. The UWP publishes an annual anthology of exemplary student writing, Prized Writing, and a journal for writing instructors, Writing on the Edge. The Writing in the Disciplines Workshop Program presents workshops on teaching writing for faculty and TAs and workshops on writing for students. The Writing Ambassadors Program trains advanced undergraduates and places them as interns in K-12 classrooms, to improve writing instruction.

Teaching Credential Subject Representative. L. Morris. See also under Teacher Education Program.

Graduate Study. The Department of English offers programs of study and research leading to the M.A. in literature and creative writing and the Ph.D. in literature. Detailed information may be obtained from the graduate adviser or the Chairperson of the Department.

The department's affiliation with the Critical Theory Program also provides the opportunity for students in English to prepare for the designated emphasis in Critical Theory (an interdisciplinary program in theories and methodologies in the humanities and social sciences).

Graduate Director. See Department Web site at http://wwwenglish.ucdavis.edu.

Subject A. Students must have met the Subject A requirement before taking any course in English.
C. Bates, Director

Prerequisites. English 1 or 3 is required for admission into courses 18, 19, 30A, 30B, 42, 43, 44, 45, 46A, 46B, 46C, and all upper division courses, unless otherwise stated in the course listings. Course 45 is recommended as preparation for the 46 series and all upper division literature courses. Comparative Literature 1, 2, 3, or 4 or Native American Studies 5 may normally be substituted for English 1 or 3.

Courses in English (ENL)

Lower Division Courses

1. Expository Writing (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. Composition, the essay, paragraph structure, diction, and related topics. Frequent writing assignments will be made. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

3. Introduction to Literature (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: completion of Subject A requirement. Introductory study of several genres of English literature, emphasizing both analysis of particular works and the range of forms and styles in English prose and poetry. Frequent writing assignments will be made. GE credit: ArtHum, Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

4. Critical Inquiry and Literature: Freshman Seminar (4)
Seminar—4 hours. Prerequisite: completion of Subject A requirement and consent of instructor; enrollment limited to freshmen. Critical inquiry into significant literary texts. Emphasis on close reading, classroom dialogue, and the writing of several papers or a longer seminar paper. GE credit: ArtHum, Wrt.—I, II, III.

5F. Introduction to Creative Writing: Fiction (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. The elementary principles of writing fiction. Students will write both in prescribed forms and in experimental forms of their own choosing. No final examination. GE credit: Wrt.—I, II, III. (I, II, III.)

5P. Introduction to Creative Writing: Poetry (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. The elementary principles of writing poetry. Students will write both in prescribed forms and in experimental forms of their own choosing. No final examination.—I, II, III. (I, II, III.)

18. Style in the Essay (4)
Lecture/discussion—4 hours. Prerequisite: course 1 or 3 or the equivalent. Style, language, and structure in the essay. Instruction in analyzing style, developing a written voice, revising sentences, developing effective paragraphs and arguments, and writing with force and clarity. GE credit: Wrt (cannot be used

to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

19. Writing Research Papers (4)
Lecture/discussion—4 hours. Prerequisite: course 1 or 3 or the equivalent. Development of skills in critical reading, analysis, documentation, and writing needed for research-based assignments. Instruction provided in formulating research topics and in developing effective arguments. Reading and writing assignments may focus on a single theme. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II. (I, II.)

30A. Survey of American Literature (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 3. American literature from the seventeenth century to 1865. GE credit: ArtHum, Div, Wrt.—III.

30B. Survey of American Literature (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 3. American literature from 1865 to the present. GE credit: ArtHum, Div, Wrt.—I.

42. Approaches to Reading (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 3 or the equivalent. Close reading and interpretation of literature from a variety of traditional and contemporary approaches. Topics include textual and historical approaches; new criticism; formalism; psychological criticism; feminism and gender; reader-response; materialist approaches. Frequent written assignments. GE credit: Wrt.—I, II, III.

43. Introduction to the Study of Drama (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 3 or the equivalent. Close reading of selected works of British and American drama from a range of historical periods. Introduction to critical terminology and dramatic genres. Frequent written assignments. GE credit: Wrt.—I, II.

44. Introduction to the Study of Fiction (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 3 or the equivalent. Close reading of British and American fictional forms (short stories, novellas, novels). Frequent written exercises. GE credit: Wrt.—II, III.

45. Introduction to the Study of Poetry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 3 or the equivalent. Close reading of selections from English and American poetry. Frequent written exercises. GE credit: Wrt.—I, II, III.

46A. Masterpieces of English Literature (4)
Lecture—3 hours; discussion—I hour. Prerequisite: course 1 or 3. Selected works of principal writers to 1640. History of literary conventions and backgrounds in religious thought, intellectual and social history, and related art forms. GE credit: Wrt.—I.

46B. Masterpieces of English Literature (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 3. Selected works of principal writers from 1640 to 1832. History of literary conventions and backgrounds in religious thought, intellectual and social history, and related art forms. GE credit: Wrt.—I, II.

46C. Masterpieces of English Literature (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 3. Selected works of principal writers from 1832 to present. The history of literary conventions and backgrounds in religious thought, intellectual and social history, and related art forms. GE credit: Wrt.—III.

92. Internship in English (1-12)
Internship—3-36 hours. Prerequisite: course 1 or 3. Internships in fields where students can practice their skills. May be repeated for credit for a total of 12 units. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: course 1 or 3. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

100F. Creative Writing: Fiction (4)
Discussion—4 hours; development and evaluation of written materials, and conferences with individual students. Prerequisite: course 5F or 5P, or consent of instructor; priority given to English (Creative Writing) majors. Writing of fiction. May be repeated for credit with consent of instructor. No final examination.—I, II, III. (I, II, III.)

100NF. Creative Writing: Non-Fiction (4)
Discussion—4 hours; development and evaluation of written materials, and conferences with individual students. Prerequisite: course 1 or 3, or consent of instructor; priority given to English (Creative Writing) majors. Writing of non-fiction. May be repeated for credit with consent of instructor. No final examination.—III.

100P. Creative Writing: Poetry (4)
Discussion—4 hours; development and evaluation of written materials, and conferences with individual students. Prerequisite: course 5F or 5P, or consent of instructor; priority given to English (Creative Writing) majors. Writing of poetry. May be repeated for credit with consent of instructor. No final examination.—I, II, III. (I, II, III.)

101. Advanced Composition (4)
Lecture/discussion—3 hours. Prerequisite: course 1 or 3 or the equivalent and upper division standing. Instruction for students in all disciplines in advanced principles of expository writing. Focus on writing tasks both within and beyond the academy. Assignments provide practice in a variety of modes of writing: narrative, analysis, explanation, argument, critique. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

102A. Writing in the Disciplines (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or 3 or the equivalent; concurrent enrollment in a specified course in a subject-matter discipline, acceptance into a specified major, or consent of instructor. Advanced instruction in the elements of expository writing, with special emphasis on their application to writing projects in a specified academic discipline. May be repeated once for credit if taken in conjunction with a different subject-matter course. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

102B. Writing in the Disciplines: Biological Sciences (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or 3 or the equivalent, upper division standing. Open to majors in a biological science or to students concurrently enrolled in an upper division biological science course. Advanced instruction in writing in the discipline of biology. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III.

102C. Writing in History (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or 3 or the equivalent, upper division standing. Open to majors in history or to students concurrently enrolled in an upper division course accepted for the major. Advanced instruction in writing in the discipline of history. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—II, III. (II, III.)

102D. Writing in International Relations (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or 3 or the equivalent, upper division standing. Open to majors in international relations or to students concurrently enrolled in an upper division course accepted for the major. Advanced instruction in writing in the discipline of international relations. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—III. (III.)

102E. Writing in Engineering (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or 3 or the equivalent, upper division standing. Open to upper division students in the College of Engineering and to student enrolled in an upper division engineering or computer science course. Advanced instruction in writing in the discipline of engineering. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

102F. Writing in Food Science and Technology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or 3 or the equivalent, upper division standing. Open to majors in food science and technology or to students concurrently enrolled in an upper division course in food science and technology. Advanced instruction in writing in the discipline of food science and technology. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).

102G. Writing: Bioregion (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or 3 or the equivalent, upper division standing. Open to majors in Land, Air and Water Resources, Nature and Culture, Wildlife, Fish, and Conservation Biology or concurrent enrollment in an upper division course that focuses to some extent on the bioregion (e.g., botany, geology, or literature of California). Advanced instruction in writing in those disciplines that focus on the intertwined human and non-human communities of the Putah and Cache Creek watersheds in which the university is located. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—III. (III.)

104A. Writing in the Professions: Business Reports and Technical Communication (4)
Lecture/discussion—3 hours. Prerequisite: course 1 or 3 or the equivalent, and upper division standing. Instruction designing, writing, and documenting formal and informal reports directed toward a variety of work-related audiences. Instruction in presenting data graphically. Suitable for students planning careers in science, government, business, engineering, or industry. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

104B. Writing in the Professions: Law (4)
Lecture/discussion—3 hours. Prerequisite: course 1 or 3 or the equivalent and upper division standing. Instruction in advanced principles of critical thinking, argumentation, and style, with special emphasis on their application to situations in the legal profession. Suitable for students planning careers in law, business, administration, or management. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

104C. Writing in the Professions: Journalism (4)
Lecture/discussion—3 hours. Prerequisite: course 1 or 3 or the equivalent and upper division standing. Advanced instruction in writing non-fiction for magazines and newspapers, including problems of style and language. Special emphasis on conducting research, interviewing, analyzing markets, and writing query letters. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

104D. Writing in the Professions: Elementary and Secondary Education (4)
Lecture/discussion—3 hours. Prerequisite: course 1 or 3 or the equivalent and upper division standing. Advanced instruction in a variety of modes of expository writing, concentrating on topics related to teaching and issues in contemporary American education. Strongly recommended for teaching credential candidates. GE credit: Wrt (cannot be used to satisfy a college or university composition require-

ment and GE writing experience simultaneously).—I, II, III. (I, II, III.)

104E. Writing in the Professions: Science (4)
Lecture/discussion—3 hours. Prerequisite: course 1 or 3 or the equivalent and upper division or graduate science curriculum. Advanced instruction in writing abstracts, research proposals, scientific papers, other forms of scientific communication and in presenting data graphically. Primarily for students engaged in or planning careers in basic or applied research. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

104F. Writing in the Health Profession (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or 3 or the equivalent, advanced standing. Advanced instruction in several forms of expository writing common in the health professions, focusing on topics related to health, disability, and disease and emphasizing effective communication between the writer and different audiences. Suitable for students planning careers in such health professions as medicine, dentistry, physical therapy, genetic counseling, and optometry. GE credit: Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

105. History of the English Language (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3 or the equivalent. History of the English language. Examination of the language as recorded from Old English to present-day English. Relationship of English to other languages; development of vocabulary, phonology, and grammatical patterns. GE credit: ArtHum, Wrt.—II.

106. English Grammar (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 3 or Linguistics 1 or consent of instructor. Survey of present day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation across dialects, styles, and registers, their development, and their usefulness in describing the conventions of English. (Same course as Linguistics 106.) Not open for credit to students who have completed Linguistics 104. GE credit: ArtHum.—I, III.

106P. English Grammar Practicum (2)
Discussion—2 hours. Prerequisite: course 106/Linguistics 106 (may be taken concurrently). Practice in teaching the principles of grammar to the kinds of audiences teachers encounter in California. Discussions with teachers who teach in these areas. Examination of pedagogical research on teaching grammar. (P/NP grading only.)

107. Freedom of Expression (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or 3 or the equivalent. Historical development of fundamental issues and contemporary controversies about freedom of expression, with emphasis on literary and artistic censorship. Not open for credit to students who have completed Rhetoric and Communication 125 or Communication 107. (Former course Rhetoric and Communication 125.) GE credit: ArtHum, Wrt.

110A. Introduction to Principles of Criticism (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Essentials of literary criticism and its history from Aristotle to the modern era, with emphasis on the major critics. GE credit: Wrt.—I, II, III.

110B. Introduction to Principles of Criticism (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 3. The history of literary criticism in the modern era, with emphasis on the ties with the past and the special problems presented by modern literary theory.—II, III.

111. Topics in Medieval Literature (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 1 or 3 or the equivalent. Historically or thematically focused intensive examination of selected topics in Medieval British literature. May be repeated once for credit when topic differs. GE credit: ArtHum, Wrt.—II.

113A. Chaucer: Troilus and the "Minor" Poems (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 1 or 3 or the equivalent. Development of the poet's artistry and ideas from his first work to his masterpiece, "Troilus and Criseyde". GE credit: ArtHum, Wrt.—I.

113B. Chaucer: The Canterbury Tales (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 1 or 3 or the equivalent. Literary analysis of the complete "Canterbury Tales." Courtly love, literary forms, medieval science and astrology, theology and dogma as they inform the reading of Chaucer's work. GE credit: ArtHum, Wrt.—III.

115. Renaissance Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Historically or thematically focused study of works of the Renaissance. May be repeated for credit when content differs. GE credit: Wrt.—I.

117A. Shakespeare: The Early Works (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 1 or 3 or the equivalent. Selected major works from Shakespeare's early period, up to 1599. GE credit: ArtHum, Wrt.—II.

117B. Shakespeare: The Middle Works (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 1 or 3 or the equivalent. Selected major works from Shakespeare's middle period, between 1599 and 1604. GE credit: ArtHum, Wrt.—I, II, III.

117C. Shakespeare: The Later Works (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 1 or 3 or the equivalent. Selected major works from Shakespeare's later period, between 1604 and the end of his career. GE credit: ArtHum, Wrt.—I.

118. Shakespeare (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Selected major works by Shakespeare. Recommended for non-majors. May not be applied toward the English major. GE credit: ArtHum, Wrt.

122. Milton (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Selected major works, including Paradise Lost. GE credit: Wrt.—II.

123. 18th-Century British Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Historically or thematically focused study of 18th-century English literature. May be repeated for credit when content differs. GE credit: Wrt.—III.

130. British Romantic Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Historically or thematically focused study of works of Romantic English literature. May be repeated for credit when content differs. GE credit: Wrt.—II.

133. 19th-Century British Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Historically or thematically focused study of works of 19th-century English literature. May be repeated for credit when content differs. GE credit: Wrt.—III.

137N. British Literature, 1900-1945 (4)
Lecture—3 hours; extensive writing. Prerequisite: course 1 or 3. Historically or thematically focused study of works of British literature (drama, poetry, prose fiction) from the period between 1900 and the end of World War II. May be repeated twice for credit when topic differs. Only 2 units of credit to students who have completed course 137. GE credit: Wrt.—III.

138. British Literature: 1945 to Present (4)
Lecture—3 hours; extensive writing. Prerequisite: course 1 or 3. Historically or thematically focused study of works of British literature (drama, poetry, prose fiction) from the period between 1945 and the present. May be repeated twice for credit when topic differs. Only 2 units of credit to students who have completed course 137. GE credit: Wrt.—I.

139. World Literatures in English (4)
Lecture—3 hours; extensive writing. Prerequisite: course 1 or 3. Historically or regionally focused study of world literatures in English (other than the national literatures of the British Isles and the United States), particularly from post-colonial regions in Africa, the Caribbean, and Asia, and immigrant cultures in the English-speaking world. GE credit: ArtHum, Div, Wrt.—II.

142. Early American Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Historically or thematically focused study of American literature of the 17th and 18th centuries. May be repeated for credit when content differs. GE credit: Wrt.—II.

143. 19th-Century American Literature to the Civil War (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Historically or thematically focused study of works of 19th-century American literature. May be repeated for credit when content differs. GE credit: Wrt.—I.

144. Post-Civil War American Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Historically or thematically focused study of works of post-Civil War American literature. May be repeated for credit when content differs. GE credit: Wrt.

146N. American Literature: 1900-1945 (4)
Lecture—3 hours; extensive writing. Prerequisite: course 1 or 3. Historically or thematically focused study of American literature (drama, poetry, prose fiction) from the period between 1900 and the end of World War II. May be repeated twice for credit when topic differs. Only 2 units of credit to students who have completed course 146. GE credit: Wrt.

147. American Literature, 1945 to the Present (4)
Lecture—3 hours; extensive writing. Prerequisite: course 1 or 3. Historically or thematically focused study of American literature (drama, poetry, prose fiction) from the period between 1945 and the present. May be repeated twice for credit when topic differs. Only 2 units of credit to students who have completed course 146. GE credit: Wrt.

149. Topics in Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Intensive examination of literature considered in topical terms, not necessarily historically. May be repeated for credit when content differs. GE credit: Wrt.—I, III.

150A. British Drama to 1800 (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3 or the equivalent. Historically or thematically focused study of works of English drama prior to 1800. May be repeated for credit when content differs. GE credit: Wrt.

150B. British Drama from 1800 to the Present (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3 or the equivalent. Historically or thematically focused study of works of British drama from 1800 to the present. May be repeated for credit when topic differs. GE credit: Wrt.

152. American Drama (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Study of American dramatic literature. Either a historical survey from 18th-century beginnings to the present or an in-depth analysis of fewer playwrights, such as O'Neill, Miller, Williams. May be repeated for credit when content differs. GE credit: Wrt.

153. Topics in Drama (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Historical or thematic study of drama. May be repeated for credit when topic differs. GE credit: Wrt.—I.

155A. 18th-Century British Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3 or the equivalent. Historically

or thematically organized examination of the 18th-century British novel, with particular emphasis on its evolution, including the epistolary novel, the picaresque novel, and the Gothic novel: Richardson, Fielding, Sterne, Austen. GE credit: Wrt.—I.

155B. 19th-Century British Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3 or the equivalent. Historically or thematically organized examination of 19th-century British novelists, with emphasis on the historical novel, the social novel, and novels by women: Scott, Dickens, the Brontes, Eliot, Hardy. GE credit: Wrt.—II.

155C. 20th-Century British Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3 or the equivalent. Historically or thematically organized examination of the 20th-century British novel, with emphasis on impressionism; the revolt against naturalism; the experimental novel; the anti-modernist reaction: Conrad, Joyce, Woolf, Lawrence, Drabble, Rhys. GE credit: Wrt.—III.

156. The Short Story (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. The short story as a genre; its historical development, techniques, and formal character as a literary form. European as well as American writers. GE credit: ArtHum, Wrt.—II.

158A. The American Novel to 1900 (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3 or the equivalent. Historically or thematically organized examination of the rise and development of the American novel from its beginnings; Hawthorne, Melville, Twain, James, and others. GE credit: Wrt.—III.

158B. The American Novel from 1900 to the Present (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3 or the equivalent. Historically or thematically organized examination of American novelists of the twentieth century; Faulkner, Hemingway, Fitzgerald, Morrison, and others. GE credit: Wrt.—II.

159. Topics in the Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Examination of major novels arranged thematically. Topics might include Bildungsroman, stream-of-consciousness novel, Gothic novel, historical novel. May be repeated for credit when topic differs. GE credit: Wrt.—I.

160. Film as Narrative (4)
Lecture—3 hours; film viewing: 3 hours. Prerequisite: course 1 or 3. A study of modern film (1930 to present) as a storytelling medium. Offered in alternate years. GE credit: ArtHum, Wrt.—III.

161A. Film History I: Origins to 1945 (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 1 or 3. Cultural and aesthetic history of filmmaking from its origins in the 1890's through 1945. (Courses 161A and 161B need not be taken in sequence.) Offered in alternate years. GE credit: ArtHum, Wrt.—I.

161B. Film History II: 1945 to present (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 1 or 3. Cultural and aesthetic history of filmmaking from 1945 through the present. (Courses 161A and 161B need not be taken in sequence.) Offered in alternate years. GE credit: ArtHum, Wrt.—II.

162. Film Theory and Criticism (4)
Lecture—1 hour; discussion—2 hours; laboratory—3 hours. Prerequisite: course 1 or 3. Film theory and criticism, with a study of ten major works of international film art. Offered in alternate years. GE credit: ArtHum, Wrt.

163S. Topics in British Literature and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 3. Study of writers, playwrights and novelists who worked in London. Examination of Elizabethan, Restoration, Augustan, Romantic/Victorian, and the Modernist/Post-Modernist periods. To be taught in London. GE credit: ArtHum, Wrt.

165. Topics in Poetry (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3 and course 45. Intensive examination of various topics expressed in poetry from all periods of English and American literature. May be repeated for credit when topic covers different poets and poems. GE credit: Wrt.—I, II.

166. Love and Desire in Contemporary American Poetry (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Close reading of contemporary American poems on the theme of love and desire by poets of diverse ethnicities and of gay, lesbian, and heterosexual orientations. Offered in alternate years. GE credit: Div, Wrt.—III.

167. Twentieth-Century African American Poetry (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3 or the equivalent. Twentieth-century African American poetry, including oral and literary traditions. Authors covered may include Gwendolyn Brooks, Countee Cullen, Robert Hayden, and Langston Hughes. Offered in alternate years. GE credit: Div, Wrt.

171A. The Bible as Literature: The Old Testament (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. May be taken independently of course 171B. Selected readings from the Old Testament illustrating various literary forms. Emphasis on the Pentateuch, the Historical Books, and the Wisdom Books. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

171B. The Bible as Literature: Prophets and New Testament (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. May be taken independently of course 171A. Selected readings from the Old Testament prophets and the New Testament. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

173. The Literature of Science Fiction (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Study of the literary modes and methods of science fiction. The course will analyze representative novels and short stories which exemplify major themes and styles in this genre—e.g., time travel; alternative universes; utopian, anthropological, sociological science fiction. GE credit: ArtHum, Wrt.

175. American Literary Humor (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3, or standing above freshman level. American humorous vision of man, nature, and the supernatural. Includes one or more of the following: colonial humor; southwestern and New England humor; pre- and post-Civil War masters; local colorists; journalistic gadflies; anti-provincialists; modernist poets and prose writers; black humor. GE credit: ArtHum, Wrt.

177. Study of an Individual Author (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Survey of the works of an individual author other than Chaucer, Shakespeare, or Milton. May be repeated for credit when a different author is studied. GE credit: Wrt.—I.

178. Special Topics in Ethnic Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Intensive study of a topic drawn from multiethnic literature. Course may focus on particular ethnic groups, historical periods, writers, genres, and/or themes. May be repeated once for credit when topic differs. GE credit: Div, Wrt.—II.

179. Multi-Ethnic Literature of the United States (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 1 or 3 or standing above freshman level. Writings by American authors of diverse races and ethnicities (African American, Asian, Jewish, Latin American, Native American, and mixed ancestry) clarifying the roles of story-telling and cultural heritage in constructing identity, experiencing displacement, recovering history, and cultivating an inclusive society. GE credit: ArtHum, Div, Wrt.

180. Children's Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Historical backgrounds and development of types of children's literature, folklore and oral tradition, levels of interest, criticism and evaluation, illustration and bibliography. GE credit: ArtHum, Wrt.—I.

181A. African American Literature to the Harlem Renaissance (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3 or the equivalent. African American literature from the slavery period to the end of the 1930s. Particular attention to the rapid development of the African American literary culture from a primarily oral tradition. Offered in alternate years. GE credit: Div, Wrt.—III.

181B. African American Literature from the Harlem Renaissance to the Present (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3 or the equivalent. Major African American writers in the context of cultural history from 1940 to the present. Writers may include Richard Wright, Ann Petry, James Baldwin, Ralph Ellison, Paule Marshall, Toni Morrison, Alice Walker, Clarence Major. Offered in alternate years. GE credit: Div, Wrt.—I.

182. Literature of California (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. California literature in the context of California's social, political, and intellectual history. Reading of poetry, fiction, and essays. Emphasis on nineteenth- and twentieth-century naturalists, turn of the century novelists, the Beats, and writers of the last two decades. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—III.

183. Adolescent Literature (4)
Lecture—3 hours; term paper. Prerequisite: acceptance to the English Department Subject Matter Preparation Program or consent of instructor. The theoretical, critical, and literary complexities that inform the study and teaching of American adolescent literature.

184. Literature of the Wilderness (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Study of the theme of wilderness primarily in American Literature, with some consideration of Biblical and European antecedents. Major attention given to Thoreau, Muir, London, Austin, Faulk-ner, Snyder, and Abbey. Offered in alternate years. GE credit: ArtHum, Wrt.

185A. Literature by Women I (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. English language literature by women from Bradstreet and Behn to the Brontes, Eliot, and Dickinson. The effects of social constraints upon women's art; the rise of feminism; new trends in literary criticism. GE credit: Div, Wrt.

185B. Literature by Women II (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3; course 185A recommended. English language literature by women from Chopin and Woolf to Plath, Rich, and Morrison. The effects of social constraints upon women's art; the rise of feminism; new trends in literary criticism. GE credit: Div, Wrt.—III.

186. Literature, Sexuality, and Gender (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 3. Historically or thematically focused intensive examinations of gender and sexuality in British and American literature. May be repeated for credit when content differs. GE credit: Div, Wrt.—III.

187. Literature and the Other Arts (4)
Seminar—3 hours; term paper. Prerequisite: junior or senior standing with a major in English or consent of instructor. Group study of the relationship between the forms of literature and the forms of the other arts, with detailed study of one of the crucial periods of artistic development in western culture. GE credit: Wrt.—I.

188. Special Topics in Literary Studies (4)
Seminar—3 hours; term paper. Prerequisite: junior or senior standing with a major in English or consent of instructor. Group study of a special topic drawn from English or American literature. Course will be offered in sections according to the topic studied, and papers will be assigned. Limited enrollment. GE credit: Wrt.—I, II, III. (I, II, III.)

189. Seminar in a Major Writer (4)
Seminar—3 hours; term paper. Prerequisite: junior or senior standing; a major in English or consent of instructor. One major writer's artistic development with attention to intellectual and literary milieu. Limited enrollment. GE credit: Wrt.—I, II, III. (I, II, III.)

192. Internship in English (1-12)
Internship—3-36 hours. Prerequisite: course 1 or 3. Internships in fields where students can practice their skills. A maximum of 4 units is allowed toward the major in English. May be repeated for credit for a total of 12 units. (P/NP grading only.)

194H. Special Study for Honors Students (4)
Seminar—3 hours; term paper. Prerequisite: admission to English Department Senior Honors Program. Study of a special literary topic or of the works of a major writer, and preparation for writing an honors thesis in course 195H.—I.

195H. Honors Thesis (4)
Independent study—12 hours. Prerequisite: course 194H. Preparation of a thesis, under the supervision of an instructor. Students satisfying requirements for the general major or the teaching emphasis write on a scholarly or critical subject; creative writing students submit a volume of poems or fiction.

197T. Tutoring in English (1-5)
Tutoring—1-5 hours. Prerequisite: upper division standing and consent of Chairperson. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. Does not fulfill requirement for major. May be repeated for credit for a total of 8 units. (P/NP grading only.)

197TC. Community Tutoring in English (1-4)
Tutoring—1-4 hours. Prerequisite: upper division standing and a major in English; consent of hairperson. Field experience, with individuals or in classroom in instruction of English language, literature, and composition. Does not fulfill requirement for major. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: one course from courses 1, 3, 5F, 5P. (P/NP grading only.)

198S. Directed Group Study (4)
Lecture/discussion—4 hours. Prerequisite: course 163S concurrently. Group study will be closely tied to the texts and periods studied in course 163S. Investigations of historical sites, museums, galleries, and performances. To be taught in London. (P/NP grading only.)—II, III. (II, III.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

200. Introduction to Graduate Studies in English (4)
Seminar—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing. Introduction to literary scholarship with special attention to the elements of professionalism and to different modes of literary investigation. (S/U grading only)—I. (I.)

205. Anglo-Saxon Language and Culture (4)
Lecture—3 hours; conference and term paper. The language and culture of Anglo-Saxon England; readings in Old English prose and poetry. Offered in alternate years.

206. Beowulf (4)
Discussion—3 hours; oral and written reports; conferences with students. Prerequisite: course 205 or the equivalent. A study of the poem and the Heroic Age of Germanic literature. Offered in alternate years.

207. Middle English (4)
Discussion—3 hours; term paper. Study of the phonology, morphology, syntax, and lexicon between 1100 and 1500 with investigation of the regional dialects; pertinent facts on both the internal and external linguistic history; intensive reading of texts.

210. Readings in English and American Literature (4)
Seminar—3 hours; conference—1 hour. Prerequisite: upper division English course in area to be studied. Offered in multiple sections each quarter. Content varies according to specialty of instructor. Course designed for students preparing for their comprehensive examinations. May be repeated for credit.—II.

225. Topics in Irish Literature (4)
Seminar—3 hours; conference—1 hour. Prerequisite: graduate standing. Varied topics, including the nineteenth-century novel, contemporary Irish poetry, rise of the drama, or a study of a major author. May be repeated for credit if topic differs.—III. (III.)

230. Study of a Major Writer (4)
Seminar—3 hours; conferences with individual students—1 hour; research papers. Artistic development of one major writer and his intellectual and literary milieu. May be repeated for credit when a different writer is studied.—I.

232. Problems in English Literature (4)
Seminar—3 hours; conferences with individual students—1 hour. Selected issues in the current study and critical assessment of a limited period or topic in English literature. May be repeated for credit when different period or topic is studied.

233. Problems in American Literature (4)
Seminar—3 hours; conferences with individual students—1 hour; research papers. Selected topics for intensive investigation. May be repeated for credit when different topic or period is studied.—II, III.

234. Dramatic Literature (4)
Lecture—3 hours; conference—1 hour. Historical introduction to dramatic theory; the genres of tragedy, comedy, and tragicomedy. May be repeated for credit if topic differs.

235. Theory of Fiction (4)
Seminar—3 hours; conference—1 hour. Prerequisite: graduate standing. Theories of fiction as they relate to the professional writer's practice of the craft. For students in the creative writing program. May be repeated for credit when focus differs.

236. Poetics (4)
Seminar—3 hours; conference—1 hour. Prerequisite: graduate standing. Theories of poetry as revealed in structure, prosody, and idiom of British and American poems, variably approached—through intensive study of a single poet, historically, or theoretically—at the instructor's discretion. For students in the Creative Writing Program. May be repeated for credit when focus differs.—I.

238. Special Topics in Literary Theory (4)
Seminar—3 hours; term paper. Prerequisite: course 237 or the equivalent. Advanced topics in literary theory and criticism. Preparation and evaluation of re-search paper. May be repeated for credit when topic and/or reading list differs. Offered in alternate years.—II, III.

240. Medieval Literature (4)
Seminar—3 hours; conference—1 hour. Studies of Medieval literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.—I, II.

242. Sixteenth-Century Literature (4)
Seminar—3 hours ; conference—1 hour. Studies in sixteenth-century literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

244. Shakespeare (4)
Seminar—3 hours; conference—1 hour. Studies in Shakespeare. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.—I.

246. Seventeenth-Century Literature (4)
Seminar—3 hours; conference—1 hour. Studies in seventeenth-century literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.—II.

248. Eighteenth-Century Literature (4)
Seminar—3 hours; conference—1 hour. Studies in eighteenth-century literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.—I, III.

250. Romantic Literature (4)
Seminar—3 hours; conference—1 hour. Studies in Romantic literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.—III.

252. Victorian Literature (4)
Seminar—3 hours; conference—1 hour. Studies in Victorian literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.—II, III.

254. Twentieth-Century British Literature (4)
Seminar—3 hours; conference—1 hour. Studies in twentieth-century British literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

256. Early American Literature (4)
Seminar—3 hours; conference—1 hour. Studies in Early American literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

258. American Literature: 1800 to the Civil War (4)
Seminar—3 hours; conference—1 hour. Studies in American literature from 1800 to Civil War. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.—III.

260. American Literature: Civil War to 1914 (4)
Seminar—3 hours; conference—1 hour. Studies in American literature from the Civil War to 1914. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

262. American Literature after 1914 (4)
Seminar—3 hours; conference—1 hour. Studies in American literature after 1914. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.—III.

264. Studies in Modern British and American Literature (4)
Seminar—3 hours; conference—1 hour. Studies in modern British and American literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.—I, II.

270. Studies in Contemporary World Literature (4)
Seminar—3 hours; conference—1 hour. Prerequisite: graduate standing, consent of instructor, with preference given to those enrolled in the masters program in Creative Writing. Emerging global, international or transnational techniques, theories, and individual works of contemporary world prose or poetry. Discussion, seminar reports, research papers. May be repeated for credit when topic differs.—II.

285. Literature by Women (4)
Seminar—3 hours; conference—1 hour. Studies in literature by women and the theoretical approaches to literature by women. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when topic and/or reading list differs.

290F. Seminar in Creative Writing of Fiction (4)
Seminar—3 hours; 1 additional hour of writing. Prerequisite: consent of instructor; graduate standing, with preference given to those enrolled in master's program in Creative Writing. Writing of prose. Evaluation of written materials and individual student conferences. May be repeated for credit.—I, II, III. (I, II, III.)

290NF. Seminar in Creative Writing of Non-Fiction (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor; graduate standing, with preference given to those enrolled in the master's program in Creative Writing. A workshop in the writing of literary non-fiction, with emphasis—according to staff and student interest—on autobiography, biography, memoir, the occasional or nature essay, or other non-fiction prose narratives.—III.

290P. Seminar in Creative Writing of Poetry (4)
Seminar—3 hours; 1 additional hour of writing. Prerequisite: consent of instructor; graduate standing, with preference given to those enrolled in master's program in Creative Writing. Writing of poetry. Evaluation of written materials and individual student conferences. May be repeated for credit.—I, II, III. (I, II, III.)

298. Directed Group Study (1-5)
(S/U grading only.)

299. Individual Study (1-12)
(S/U grading only.)

299D. Special Study for the Doctoral Dissertation (1-12)
(S/U grading only.)

Professional Courses

390. Theory and Practice of University-Level Composition Instruction (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing; appointment as Teaching Assistant in the Composition Program. Examination of current theories about the teaching of writing and their practical application to undergraduate writing courses at UC Davis. (S/U grading only.)—III. (III.)

391. Teaching Creative Writing (2)
Discussion—2 hours. Prerequisite: graduate standing, appointment as Teaching Assistant in the Composition Program. Designed for new instructors of English 5F or 5P; discussion of ways to facilitate creative writing workshops and to respond to student manuscripts. (S/U grading only.)—I. (I.)

392. Teaching Expository Writing (2)
Discussion—2 hours. Prerequisite: graduate standing, appointment as Teaching Assistant in the Composition Program; completion of course 390 or the equivalent. Discussion of problems related to teaching expository writing at the university level, with special emphasis on teaching reading and writing skills and responding to student papers. (S/U grading only.)—I. (I.)

393. Teaching Literature and Composition (2)
Discussion—2 hours. Prerequisite: graduate standing, appointment as Teaching Assistant in the Composition Program. Designed for new instructors of English 3 or the equivalent courses; discussion of problems related to teaching literature and composition to lower division students. (S/U grading only.)—III. (III.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Entomology

(College of Agricultural and Environmental Sciences)

Robert E. Page, Jr., Ph.D., Chairperson of the Department

Diane E. Ullman, Ph.D., Vice Chairperson

Department Office, 367 Briggs Hall (530-752-0475)

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Faculty

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John D. Edman, Ph.D., Professor
Lester E. Ehler, Ph.D., Professor
Jeffrey Granett, Ph.D., Professor
Penelope J. Gullan, Ph.D., Professor
Bruce D. Hammock, Ph.D., Professor
Richard Karban, Ph.D., Professor
Harry K. Kaya, Ph.D., Professor *(Entomology, Nematology)*
Lynn S. Kimsey, Ph.D., Professor
Sharon P. Lawler, Ph.D., Associate Professor
Walter S. Leal, Ph.D., Associate Professor
Fumio Matsumura, Ph.D., Professor *(Entomology, Environmental Toxicology)*
Robert E. Page Jr., Ph.D., Professor
Michael P. Parrella, Ph.D., Professor *(Entomology, Environmental Horticulture)*
Christine Y. S. Peng, Ph.D., Professor
Jay A. Rosenheim, Ph.D., Professor
Thomas W. Scott, Ph.D., Professor
Arthur Shapiro, Ph.D., Professor *(Entomology, Evolution and Ecology)*
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Philip S. Ward, Ph.D., Professor

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Richard M. Bohart, Ph.D., Professor Emeritus
Hugh Dingle, Ph.D., Professor Emeritus
Bruce F. Eldridge, Ph.D., Professor Emeritus
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Albert A. Grigarick, Jr., Ph.D., Professor Emeritus
Charles L. Judson, Ph.D., Professor Emeritus
Harry H. Laidlaw, Jr., Ph.D., Professor Emeritus
W. Harry Lange, Jr., Ph.D., Professor Emeritus
G. A. H. McClelland, Ph.D., Senior Lecturer Emeritus
Donald L. McLean, Ph.D., Professor Emeritus
Timothy Prout, Ph.D., Professor Emeritus
Richard E. Rice, Ph.D., Lecturer Emeritus
Robbin W. Thorp, Ph.D., Professor Emeritus
Robert K. Washino, Ph.D., Professor Emeritus

Affiliated Faculty

Anton Cornel, Ph.D., Lecturer
Mary L. Flint, Ph.D., Lecturer
Larry Godfrey, Ph.D., Lecturer
Robert Kimsey, Ph.D. Associate Adjunct Professor
Greg C. Lanzaro, Ph.D., Lecturer
Eric C. Mussen, Ph.D., Lecturer
Richard T. Roush, Ph.D., Lecturer
Charles G. Summers, Ph.D., Lecturer
Frank G. Zalom, Ph.D., Lecturer

The Major Program

The Entomology major is a general biological science program. The curriculum is designed to develop an understanding of fundamental biological concepts by studying insects. Insects offer unique opportunities to study biological systems and are model experimental animals. Many insects are either pests, or beneficial species that have great importance to the economy or public health. Students may focus on specific areas of interest including agricultural entomology, insect systematics and evolution; behavior and ecology; medical entomology; and insect molecular biology, physiology and toxicology.

The Program. Students begin their study in entomology with selected insect biology courses. After completing these courses, students may enroll in courses in their particular area of interest. A student interested in applied entomology, for example, could enroll in courses such as arthropod pest management, biological control, and apiculture.

Career Alternatives. Entomology graduates find careers in many different areas of applied or basic biology. Graduates have the opportunity to continue in professional graduate programs such as veterinary or human medicine, or get advanced degrees leading to careers in biotechnology, conservation biology, or academic teaching and research. Many graduates have participated in internship programs with the California Department of Food and Agriculture and found careers in insect diagnostic laboratories, conducting insect surveys, and/or developing entomological collections. Other graduates have worked in agriculture in the area of insect pest management. Graduates are prepared for managerial and technical positions with state and federal agencies and in agricultural production and supporting industries. Some entomology graduates pursue careers in primary, secondary, and college level science education.

B.S. Major Requirements:

English Composition Requirement..... 0-8
See College requirement

Preparatory Subject Matter 46-47
Biological Sciences 1A, 1B, 1C..... 15
Chemistry 2A, 2B, 8A, 8B..... 16
Mathematics 16A..... 3
Physics 1A, 1B 6
Statistics 13, 32, or Agricultural Systems and Environment 120 3-4
Agricultural Systems and Environment 21, Engineering 5, or Mathematics 16B..... 3

Breadth Subject Matter 6-24
Satisfaction of General Education requirement

Depth Subject Matter..... 32-36
Microbiology 102, Plant Biology 118, 148, or Plant Pathology 120 ..... 4 or 5
Pathology, Microbiology and Immunology 128 4-5
Biological Sciences 101 4
Environmental Science and Policy 100 or Evolution and Ecology 101..... 4
Evolution and Ecology 100..... 3-4
Biological Sciences 102 and 103 or Animal Biology 102 and 103 6
Entomology 100, 100L..... 5
At least 7 units from Entomology 101, 102, 103, 104, 107, 109, or 116 7

Restricted Electives 34
Upper division entomology courses..... 14
Upper division electives related to student's interest with approval of adviser 20
Note: No more than a total of 6 units from Entomology 192, 197T and 199 may count toward fulfilling depth subject matter or restricted elective units.

Unrestricted Electives..... 32-60

Total Units for the Major 180

Major Adviser. S. Lawler

Minor Program Requirements:

The Department of Entomology has five minor programs open to students in other disciplines who are interested in rounding out their academic study with a concentration in the area of entomology.

UNITS

Insect Biology..... 18-24
Entomology 100, 100L..... 5
At least two courses from Entomology 101, 102, 103, 104, 107 7-8
At least two additional upper division Entomology courses (except courses 192, 198, 199) 6-11

UNITS

Agricultural Entomology and Bee Biology ... 21
Entomology 100, 100L, 110, 119, 135..... 18
At least three units from Entomology 123, Evolution and Ecology 121, Plant Biology 102, 173, 174 3

UNITS

Insect Ecology and Evolution 19-20
Entomology 100, 100L, 104..... 8
Seven units from Entomology 103, 107, 109, 116, 158 7-8
Evolution and Ecology 149 or Environmental Science and Policy 121..... 4

UNITS

Medical-Veterinary Entomology 18
Entomology 100, 100L, 104, 153, 156..... 15
At least three units from Entomology 156L, 158; Pathology, Microbiology and Immunology 126, 126L, 128..... 3

Minor Adviser. S. Lawler

Graduate Study. The Department of Entomology offers a program of study and research leading to the M.S. and Ph.D. degrees. See the Graduate Studies section and the Graduate Announcement for further details.

Graduate Advisers. See *Class Schedule and Registration Guide.*

Related Courses. See courses in Nematology.

Courses in Entomology (ENT)

Lower Division Courses

1. Art, Science and the World of Insects (3)
Lecture—3 hours; laboratory—3 hours. Fusion of entomology and art to create an appreciation of insect biology, ecology, interactions with humans and importance in human culture. Multidisciplinary approaches in education and career paths in entomology and art. GE credit: ArtHum or SciEng.—I. (I.) Ullman

2. Biodiversity (3)
Lecture—2 hours; lecture/discussion—1 hour. Introduction to nature, scope and geographical distribution of biodiversity (the diversity of life, with emphasis on plants and animals, especially insects). Humans and biodiversity—domestication, aesthetics, ethics and valuation. Species richness and "success." Biodiversity through time; monitoring, evaluation and conservation. Biomes—global, continental and Californian. (Same course as Evolution and Ecology 2.) GE credit: SciEng, Wrt.—I. (I.) Gullan, Cranston, Sanderson, Shaffer, Shapiro

10. Natural History of Insects (3)
Lecture—3 hours. Designed for students not specializing in entomology. Not open for credit to students who have had course 100, but students who have taken this course may take course 100 for credit. An introduction to the insects detailing their great variety, structures and functions, habits, and their significance in relation to plants and animals including man. GE credit: SciEng.—II. (II.) Kaya, Ullman

50. Insects in the Environment (3)
Lecture—1 hour; discussion—1 hour; laboratory—3 hours. Prerequisite: course/Evolution and Ecology 2 or course 10 or Biological Sciences 1B or consent of instructor. Ecological roles of insects in different habitats and environmental systems. The uses of insects in terrestrial and aquatic surveys and environmental monitoring. Field and laboratory research, data analysis and scientific writing.—III. (III.) Cranston, Gullan

90X. Special Topics in Entomology (2)
Seminar—2 hours. Freshman seminar course for in-depth examination of a special topic within the subject area. May be repeated twice for credit. (P/NP grading only.)—I, II, III.

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work-learn experience on and off campus in all subject areas offered by the department, supervised by a member of the faculty. May be repeated up to 12 units of credit. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

100. General Entomology (4)
Lecture—3 hours; term paper. Prerequisite: Biological Sciences 1B. Biology, anatomy, physiology, development, classification, ecology and relation of insects to human welfare. GE credit: SciEng, Wrt.—I. (I.) Kimsey

100L. General Entomology Laboratory (2)
Laboratory—6 hours. Prerequisite: course 100 (may be taken concurrently). Anatomy, development, population ecology, methods of collecting, classification and identification of insects of all orders and of major families. GE credit with concurrent enrollment in course 100: Wrt.—I. (I.) Kimsey

101. Functional Insect Morphology (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 100. Study of the basic external and internal structures, organs and tissues of insects, with emphasis on functional systems. Functional anatomy, histology and fine structures of important organs and tissues will be discussed. GE credit: SciEng.—II. (II.)

102. Insect Physiology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or course in physiology or invertebrate zoology. Processes by which insects maintain themselves, reproduce, and adapt to environment. Insects as models for basic/applied research through detailed analysis of metabolic, physiological, and behavioral processes. Emphasis on analysis of methodology, fact, and theory. GE credit: SciEng.—III. (III.) Hammock, Leal

103. Insect Systematics (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: introductory course in zoology or entomology. Principles and methods of systematics, with particular reference to insects. Emphasis on different theories of classification, and analysis of phylogenetic relationships. GE credit: SciEng, Wrt.—III. Cranston, Gullan

104. Behavioral Ecology of Insects (3)
Lecture—3 hours. Prerequisite: introductory biology or zoology. Basic principles and mechanisms of insect behavior and ecology. An evolutionary approach to understanding behavioral ecology of insects. GE credit: SciEng.—II. (II.) Page

107. California Insect Diversity (5)
Lecture—1 hour; laboratory—6 hours; fieldwork—6 hours. Prerequisite: an introductory course in entomology. Survey of the diversity of insects from selected ecological zones in California with emphasis on collection, identification, and natural history. Offered in alternate years. GE credit: SciEng, Wrt.—III. Kimsey, Ward

109. Field Taxonomy and Ecology (7)
Lecture—2 hours; laboratory—36 hours; five-week course. Prerequisite: an introductory course in entomology or consent of instructor. The study of insects in their natural habitats; their identification and ecology. Offered in alternate years. GE credit: SciEng, Wrt.—(summer) Ward

110. Arthropod Pest Management (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: Biological Science 1B. Development of the ecological basis for the integrated pest management paradigm with emphasis on agriculture. Ecological and practical aspects of control tactics. Laboratory emphasizes identification of pests and beneficials of agriculture and urban situations. GE credit: SciEng, Wrt.—II. (II.) Granett, Ehler

116. Biology of Aquatic Insects (3-5)
Lecture—2 hours and laboratory (Saturday field trips); optional laboratory on identification and/or aquatic insect collection. Prerequisite: course 100 or consent of instructor. A study of the life history, ecology, and identification of insects associated with streams, ponds, and lakes. GE credit: SciEng.—III. (III.) Lawler

117. Longevity (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Nature, origin, determinants, and limits of longevity with particular reference to humans; emphasis on implications of findings from non-human model systems including natural history, ecology and evolution of life span; description of basic demographic techniques including life table methods. (Same course as Human Development 117.) GE credit: SciEng, Wrt.—I. Carey

119. Apiculture (3)
Lecture—3 hours; papers. Prerequisite: Biological Sciences 1C recommended. Biology and behavior of honeybees; communication, orientation, social organization, foraging activities, honey production, pollination activities. GE credit: SciEng, Wrt.—III. (III.)

123. Plant-Virus-Vector Interaction (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1C, 101; Plant Biology 105, Plant Pathology 120, and course 100 recommended. Analysis of the interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern experimental approaches to the interdiction of viral movement. Offered alternate years. (Same course as Plant Biology 123/Plant Pathology 123.)—(I.) Lucas, Gilbertson, Ullman

135. Introduction to Biological Control (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 100 or 110. Principles of biological control of arthropod pests and weeds. Biology of pathogens, entomopathogenic nematodes, parasitoids, and predators. Implementation in classical and augmentative biological control. Role of biological control in pest management. Offered in alternate years—III. Ehler, Kaya

153. Medical Entomology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, upper division standing in one of the biological sciences, or consent of instructor. Basic biology and classification of medically important arthropods with special emphasis on the ecology of arthropod-borne diseases and principles of their control. Relationships of arthropods to human health. GE credit: SciEng, Wrt.—III. (III.) Scott

156. Biology of Parasitism (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A or consent of instructors. Lectures on the biological and ecological aspects affecting host-parasite relationships using selected examples from protozoan and metazoan fauna. GE credit: SciEng.—III. (III.) Kimsey, Theis, Nadler

156L. Biology of Parasitism Laboratory (1)
Laboratory—3 hours. Prerequisite: course 156 (concurrently) or consent of instructor. Laboratory demonstrations using selected examples of protozoan and metazoan organisms along with various techniques used in parasitology to exemplify concepts presented in the lecture course. GE credit with concurrent enrollment in course 156: Wrt.—III. (III.) R. Kimsey

158. Forensic Entomology (3)
Lecture—2 hours; laboratory—4 hours. Prerequisite: Biological Sciences 1B or Entomology 100, upper division standing. Arthropods, their general biology, succession, developmental cycles and population biology in matters of criminal prosecution and civil litigation. Emphasis on basic arthropod biology, ecological and developmental concepts and methods, development of reasoning abilities, implication, development of opinions and evidence. GE Credit: SciEng or SocSci, Wrt.—III. (III.) R. Kimsey

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Laboratory experience or fieldwork off and on campus in all subject areas offered in the Department of Entomology. Internships supervised by a member of the faculty. (P/NP grading only.)

197T. Tutoring in Entomology (1-3)
Discussion—1-3 hours. Leading small discussion groups. Preview assignments and prepare guidelines for discussion. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

212. Molecular Biology of Insects and Insect Viruses (3)
Lecture—3 hours. Prerequisite: consent of instructor. A molecular biological analysis of insect systematics, physiology, and defense mechanisms. Molecular biology of insect viruses. Baculovirus expresion vectors and post-translation modification of expressed polypeptides. Biological control of using neuropeptides and toxin genes in insect viruses.—II. (II.)

225. Terrestrial Field Ecology (4)
Seminar—1 hour; field work—12 hours. Prerequisite: introductory ecology and introductory statistics or consent of instructor. A field course conducted over spring break and four weekends at Bodega Bay, emphasizing student projects. Ecological hypothesis testing, data gathering, analysis and written and oral presentation of results. (Same course as Ecology 225/Population Biology 225.)—III. (III.) Karban

230. Advanced Biological Control (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: graduate or upper division standing in biological science or consent of instructor. Principles and current issues in biological control of arthropod pests and weeds; laboratory devoted to identification and life history of the major groups of parasitic and predaceous arthropods. Offered in alternate years.—(I.) Ehler

253. Advanced Medical Entomology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: one upper division course in entomology (other than course 153) and one course in microbiology: course 153 strongly recommended. An analysis of several anthropod-borne human diseases with emphasis on the relationships of the biology of the vector to the ecology of the disease. Discussion includes demonstration of vectors and techniques. Offered in alternate years.—(III.)

290. Exploratory Topics in Entomology (2)
Seminar—2 hours. Interdisciplinary topics in entomology, including innovative applications of entomological concepts to other fields of research and human endeavor (e.g. medicine, technology, art, criminology). May be repeated for up to 8 units of credit when topic differs.—I, II, III.

291. Current Topics in Medical and Veterinary Entomology (2)
Seminar—2 hours. Prerequisite: course 153. Discussion of parasitology, ecology and epidemiology related to vectors of pathogens causing disease in humans and animals. May be repeated once for credit. Not offered every year.—I, II, III. Kimsey, Scott, Edman

292. Current Topics in Insect Physiology and Behavior (2)
Seminar—2 hours. Prerequisite: course 102 if topic is physiology, a course in behavior if topic is behavior, or either if topic bridges both. Analysis of contemporary advances in insect physiology, biochemistry and/or behavior. Interpretation and description of physiological and behavioral mechanisms and functions. Application of general principles to solution of problems in the laboratory and field. May be repeated for up to 8 units of credit if topic differs. Not offered every year.—I, II, III. Hammock, Leal, Page

293N. Current Topics in Insect Biotechnology and Genomics (2)
Seminar—2 hours. Prerequisite: course 212. Discussion of advances in insect biotechnology, including genetic engineering and genomics. May be repeated for up to 6 units of credit if topic differs. Not offered every year.—I, II, III. Hammock, Leal, Page

294. Current Topics in Insect Ecology, Evolution, and Systematics (2)
Seminar—2 hours. Prerequisite: course 103, general course in ecology or evolution. Discussions of advanced topics in ecology, evolution and systematics with emphasis on analysis of factors influencing the distribution, abundance, adaptations and evolutionary relationships of insects. Includes consideration of applications of basic theory (e.g. biological control). May be repeated for credit. Not offered every year.—I, II, III.

295. Current Topics in Agricultural Entomology and Bee Biology (2)
Seminar—2 hours. Prerequisite: course 110 if topic covers pests and beneficial predators, course 119 if topic is bee biology, or either if topic bridges both. Discussion of advanced topics about the biology, ecology, behavior, and management of pest and beneficial insects. May be repeated for up to 8 units of credit if topic differs. Not offered every year.—I, II, III. Ehler, Granett, Page, Parrella, Rosenheim

297N. Seminar in Entomology (1)
Seminar—1 hour. Weekly entomology seminar. May be repeated up to 9 units of credit if topic differs. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Environmental Biology and Management

(College of Agricultural and Environmental Sciences)

Faculty

See under the Department of Environmental Science and Policy.

The Major Program

The environmental biology and management major offers an education in the basic natural sciences, especially ecology, together with a set of management and public policy analysis courses. Students completing the program will understand the scientific basis for environmental decision making, and the legal, economic, and political issues involved in management of the environment in the United States and worldwide.

The Program. Courses in chemistry, physics, mathematics, biology, and earth sciences form the foundation of the curriculum; these are then tied together by courses in ecology. Computing, statistics, and other methods courses give the student basic quantitative research skills. Economics, political science, and techniques of quantitative management offerings dominate the management and public policy requirements.

A moderate degree of specialization is permitted in three upper division options. Students in the *Conservation Biology and Management* option take courses in conservation biology, genetics, evolution and biogeography, resource economics, environmental policy making, quantitative analysis and field experience. This option emphasizes the study of biological diversity and the natural and human processes that control it. Key areas of the option include the design of nature reserves, the management of small populations of endangered species, environmental law, policy and economics.

Students in the Environmental Biology option take course work in population ecology, physiology, and other biological specialties, as well as quantitative analysis.

Students in the Environmental Management option take courses in recreation, resource economics, planning and public policy, and, especially, quantitative management techniques. This option emphasizes the management of public lands and natural resources in wildland and rural areas. Practical courses in field level planning and management are featured. Students interested in urban problems and/or legislative approaches should examine the Environmental Policy Analysis and Planning major.

Career Alternatives. The major prepares students to enter careers in management of natural resources and public lands, as well as basic ecological research. Students interested in professional schools, e.g., medicine, should consult an adviser early to plan for their special requirements, such as organic chemistry. Graduates who choose the Environmental Biology option are prepared for graduate or professional training and, eventually, careers working for public agencies and private firms specializing in environmental quality, natural resources, or ecological research. Graduates with the Environmental Management option are prepared for jobs in public agencies at the federal, state, or local levels.

B.S. Major Requirements:

UNITS

English Composition Requirement..... 6-15
See College requirement..... 0-8
English 102A, 102B, 102C, 102D, 102E, 102F, or 102G..... 4
Communication 1 or Dramatic Art 10..... 3-4

Preparatory Subject Matter 49-54
Biological Sciences 1A, 1B, 1C..... 15
Chemistry 2A-2B or 2AH-2BH..... 10
Agricultural Management and Rangeland Resources 21, or Computer Science Engineering 10, 15, or 30..... 3-4
Environmental Science and Policy 1 or 30; choose Environmental Science and Policy 1 if the Environmental Management option is selected..... 3-4
Political Science 1 or Economics 1A; choose Economics 1A if Environmental Management option is selected..... 4-5
Mathematics 16A-16B or 21A-21B..... 6-8
Physics 7A-7B or 9A-9B..... 8

Breadth/General Education 12-24
Satisfaction of General Education requirement to include 12 units of humanities and/or Civilization and Culture..... 12-24

Depth Subject Matter..... 28-33
(These units must be taken for a letter grade attaining an overall grade-point average of 2.0 or higher.)
Select one of Plant Biology 117, Environmental Science and Policy 100, Evolution and Ecology 101, Wildlife, Fish, and Conservation Biology 151..... 4
Environmental Science and Policy 110 and 172..... 8
Select two courses from Atmospheric Science 120, Environmental Science and Policy 150A, Environmental and Resource Sciences 121, 131, Geology 134, Hydrologic Science 141, Soil Science 100, 118..... 6-8
Select one course from Environmental Science and Policy 161, 163, 166, 171, 179; Agricultural and Resource Economics 147, 175, 176..... 3-4
(Choose Agricultural and Resource Economics if Environmental Management option is selected.)
Select one course from: Mathematics 16C, 21C, 22A, 22B, Agricultural Management and Rangeland Resources 120, Statistics 102 or upper division mathematics, computing or statistics. Environmental Management students should enroll in Agricultural Systems and Environment 120, or Statistics 102..... 3-4
Environmental Science and Policy 123, 178, or Wildlife, Fish, and Conservation Biology 100. Management students should enroll in Environmental Science and Policy 178..... 4

Areas of Specialization 25-40

Conservation Biology and Management Option
Wildlife, Fish, and Conservation Biology 154 4
Biological Sciences 101 4
Choose one from Evolution and Ecology 100, 102, 138, 147, 149, Geology 107 3-4
Agricultural and Resource Economics 176 or Environmental Science and Policy 175 4
(Students must select a course that was not taken in "Depth Subject Matter.")
Choose one from Agricultural and Resource Economics 147, Environmental Science and Policy 161, 166, 171, 172 3-4
(Students must select a course that was not taken in "Depth Subject Matter.")
Environmental Science and Policy 121 or Wildlife, Fish, and Conservation Biology 122 4
Choose from Environmental Science and Policy 123, 124, 151L, 155L, Wildlife, Fish, and Conservation Biology 100, 102 3-10
(Students may select Biological Sciences 122 or a course at an approved field station or an off-campus field biology research site.)

Environmental Biology Option
Choose one of Anthropology 154A, Entomology 104, Neurobiology, Physiology, and Behavior 102, Psychology 122, Wildlife, Fish, and Conservation Biology141 .. 3-5
Choose one of Biological Sciences 101, Evolution and Ecology 100, Geology 107 3-4
Mathematics 22A-22B, upper division mathematics or statistics 6-8
Choose from Entomology 103, Evolution and Ecology 112-112L, Plant Biology 102, 108, 116, Wildlife, Fish, and Conservation Biology 110, 110L, 111, 111L, 120, 120L 4-8
Note: Most of these courses require one or two additional chemistry or basic physiology courses as prerequisites. Plan a sequence in consultation with adviser.
Choose from Entomology 102, Environmental Horticulture 102, Neurobiology, Physiology, and Behavior 101, 101L, Plant Biology 111, or Wildlife, Fish, and Conservation Biology 121 3-5
Choose two courses from the following: Avian Sciences 100, Environmental Science and Policy 121, 151, 151L, 150B, 150C, 155, 155L, Evolution and Ecology 149, Hydrologic Science 122, 122L, Plant Biology 102, 117, Wildlife, Fish, and Conservation Biology 100, 120, 120L, 122, 130 4-8

Environmental Management Option
Agricultural and Resource Economics 170 or Environmental Science and Policy 170 4
Economics 100 or 104 or Agricultural and Resource Economics 100A 4-5
Environmental Science and Policy 161, 166, 169, or 171 4
Environmental Science and Policy 179 3
Agricultural and Resource Economics 106 or Sociology 106 or Statistics 108 4
Management of a natural resource, choose two courses from one of the following three groups 6-8
Animal Resources:
Agricultural Management and Rangeland Resources 135, or Wildlife, Fish, and Conservation Biology 110, 111, 120, 122, 151, 154, or Environmental Science and Policy 123.
Forest and Rangeland Resources:
Agricultural Management and Rangeland Resources 131, 134.
Air, Water, and Soil Resources:
Environmental and Resource Sciences 131, or Hydrologic Science 103, 122, 141, or Soil Science 118, or Environmental Science and Policy 151 and 151L, 155 and 155L.

Unrestricted Electives 14-60

Total Units for the Degree 180

Major Adviser: M. Holyoak *(Environmental Science and Policy).*

Minor Program Requirements:

The faculty for Environmental Biology and Management offers a minor in Recreation for students in Physical Education, Psychology, Sociology, or Human Development; students in Landscape Architecture desiring to specialize in recreation area design; Community and Regional Development students wishing to work in educational and therapeutic recreation; Environmental Policy Analysis and Planning students seeking careers in public recreation policy analysis and management; Agricultural and Managerial Economics students wishing to go into the administration of commercial recreation enterprises; and those students in Plant Science interested in park landscape construction and maintenance.

UNITS

Recreation 18-20
Agricultural and Resource Economics 147, 176 3-4
Environmental Planning and Management 134 4
Recreation policy analysis (see adviser) 4
Agricultural and Resource Economics 112, Community and Regional Development 163, Political Science 183, 189 4
Internship in Recreation Management, Environmental Science and Policy 192 4

Minor Adviser. M. Holyoak *(Environmental Science and Policy).*

Courses. Questions pertaining to courses in Environmental Biology and Management should be directed to the Environmental Biology and Management advising office, 2134 Wickson Hall. See also Environmental Planning and Management listing following Environmental Horticulture.

Environmental Design

(College of Agricultural and Environmental Sciences)

Patricia Harrison, M.Arch., Chairperson, Design Program

Dean MacCannell, Ph.D., Chairperson, Landscape Architecture Program

Department Office, 142 Walker Hall (530-752-6223)

http://envdes.ucdavis.edu

Faculty. See faculty listings under Design and Landscape Architecture.

Programs of Study. See the undergraduate majors in Design and Landscape Architecture, the Graduate Group in Geography and the graduate program in Textile Arts and Costume Design (information pertaining to the Textile Arts and Costume Design graduate degree is listed under the Design major).

Related Courses. See Design and Landscape Architecture course lists.

Environmental Geology

(College of Letters and Science)

The minor in Environmental Geology examines the multidisciplinary factors of geology and related earth science fields, and planning and resources oriented programs. Students in the minor are encouraged to participate in internship programs that assist them in solidifying the Environmental Geology minor with their Geology major or other major field areas that include geologic components.

The minor is sponsored by the Department of Geology, 174 Physics/Geology Building.

Minor Program Requirements:

UNITS

Environmental Geology 22-24
Geology 130, 134, and Environmental and Resource Sciences 186 9
Soil Science 118 4
Hydrologic Science 141 or Civil and Environmental Engineering 142 3
Two courses chosen from Environmental Science and Policy 160, 171, 179, Geology 135, Hydrologic Science 144, 146 6-8

Minor adviser: K. Versosub, (Geology) 378 Physics/Geology Building, 752-6911.

Environmental Horticulture

(College of Agricultural and Environmental Sciences)

J. Heinrich Lieth, Ph.D., Chairperson of the Department

Department Office, 140 Environmental Horticulture Building (530-752-0130)

http://envhort.ucdavis.edu

Faculty

Michael G. Barbour, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Alison M. Berry, Ph.D., Professor
David W. Burger, Ph.D., Professor
Don J. Durzan, Ph.D., Professor
Richard Y. Evans, Ph.D., Lecturer
James A. Harding, Ph.D., Professor
J. Heinrich Lieth, Ph.D., Professor
James D. MacDonald, Ph.D., Professor *(Plant Pathology)*
Michael P. Parrella, Ph.D., Professor *(Entomology)*
Michael S. Reid, Ph.D., Professor
Lin L. Wu, Ph.D., Professor
Truman P. Young, Ph.D., Associate Professor

Emeriti Faculty

Thomas G. Byrne, M.S., Lecturer Emeritus
Seymour M. Gold, Ph.D., Professor Emeritus
Richard W. Harris, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
Charles E. Hess, Ph.D., Professor Emeritus
Anton M. Kofranek, Ph.D., Professor Emeritus
Andrew T. Leiser, Ph.D., Professor Emeritus
John H. Madison, Jr., Ph.D., Professor Emeritus
Jack L. Paul, Ph.D., Professor Emeritus
Roy M. Sachs, Ph.D., Professor Emeritus

Affiliated Faculty

Thomas Ledig, Ph.D., Lecturer
Greg McPherson, Ph.D., Lecturer
David B. Neale, Ph.D., Lecturer

The Program. Students of Environmental Horticulture learn how plants improve the environment and the quality of our lives. Plants are used to revegetate

and restore disturbed landscapes, control erosion, and reduce energy and water consumption. The ornamental use of plants to improve the aesthetic quality of urban and rural landscapes, recreational areas, and commercial sites is an important aspect of the study of environmental horticulture.

Students interested in Environmental Horticulture can obtain a B.S. degree in Environmental Horticulture and Urban Forestry and may specialize in Floriculture/Nursery Management, Urban Forestry, Landscape Management/Turf or Plant Biodiversity/Restoration. Students can develop an individual major with the help of an Environmental Horticulture faculty adviser and approval of the College's Individual Major Committee. A minor in Environmental Horticulture or Landscape Restoration is available to students in other majors.

Career Alternatives. Opportunities in this field include growing and/or managing plants in a variety of settings, consulting as an urban, landscape, or restoration horticulturist, business ownership, working for public agencies or private landscape firms/corporations, park management and landscape contracting. Students are encouraged to develop internships on or off campus to augment their activities in the classroom and laboratory.

Minor Program Requirements:

	UNITS
Environmental Horticulture	**22-24**
Environmental Horticulture 6	3
Plant Biology 171	4
Environmental Horticulture 105, 107, or 149	4
Select two courses from Environmental Horticulture 125, 130, 133	7-9
Environmental Horticulture 110 or 112	4

Minor Advisers: J.A. Harding or D.W. Burger.

Related Undergraduate Programs. See the undergraduate majors in Environmental Horticulture and Urban Forestry, Agricultural Mangement and Rangeland Resources, and Environmental Biology and Management.

Graduate Study. For graduate study, refer to the Graduate Studies chapter of this catalog.

Related Courses. See Plant Biology.

Courses in Environmental Horticulture (ENH)

Lower Division Courses

1. Introduction to Environmental Horticulture/ Urban Forestry (3)
Lecture—3 hours. Introduction to the use of plants to enhance the physical, visual and social environment. The use of ecological principles in developing sustainable, low maintenance landscape systems will be presented. Career opportunities will be discussed. GE credit: SciEng, Wrt.—I. (I.) Burger

6. Introduction to Environmental Plants (4)
Lecture—1 hour; discussion—2 hours; laboratory—3 hours. Classification, nomenclature and variation of environmental plants. The use of floral and vegetative characteristics and terminology to key unknown plants. Characteristics of plant groups and basics of climate, soils and plant selection. Identification of 150 common landscape plants.—I. (I.) Young

92. Internship in Environmental Horticulture (1-12)
Internship—3-36 hours. Prerequisite: course 1 or 6 or Biological Sciences 1C or Agricultural Management and Rangeland Resources 2 and consent of instructor. Work experience in an area of Environmental Horticulture and Urban Forestry, including flower and nursery production and marketing, landscape management, arboriculture, turf management, and landscape restoration. Internships supervised by a member of the faculty. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)
(P/NP grading only.)

Upper Division Courses

100. Urban Forestry (4)
Lecture—2 hours; laboratory—3 hours; term paper. Prerequisite: Biological Sciences 1C or Agricultural Management and Rangeland Resources 2. Principles and practices of planning and managing urban vegetation. Basics of tree appraisal, natural resource inventory, and development of long term urban forest management plans.—I. (I.)

101. Trees of the Urban Forest (2)
Lecture—1 hour; laboratory—2 hours. Prerequisite: course 6 or consent of instructor. Identification and evaluation of 200 tree species of the urban forest on campus, in the Arboretum, and in the city of Davis; appraised and aesthetic values, condition, and branch structure; contribution of trees to this ecosystem. Bicycle required.—I. (I.) Harding

102. Physiological Principles in Environmental Horticulture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1C. Physiological principles and processes essential to floriculture, nursery crop production, turfculture and landscape horticulture. Emphasis on the control of vegetative and reproductive development for a broad species range in greenhouse and extensive landscape environments.—III. (III.)

105. Taxonomy and Ecology of Environmental Plant Families (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 6 or consent of instructor. Classification and identification of introduced and native species used in urban forests, with emphasis on floral and vegetative characteristics of the prominent families of angiosperms and gymnosperms, adaptations to environmental variations in western landscapes, and horticultural classification.—III. (III.) Harding

110. Urban and Regional Planning (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing. Urban and regional planning principles, methods, and techniques; the planning process and the General Plan; historical perspective; urban design; policy issues, including land use and growth management. Not open for credit to students who have completed Environmental Planning and Management 110. (Former course Environmental Planning and Management 110.)

112. Recreation Planning (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110 or the equivalent recommended. Basic concepts, principles, techniques and methods used to prepare park, recreation, and open space plans for urban environments. Not open for credit to students who have completed Environmental Planning and Management 134. (Former course Environmental Planning and Management 134.)

120. Management of Container Media (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Soil Science 10. Principles of soil science and practices related to management of container media are taught, emphasizing appropriate use of soils and amendments, irrigation, and fertilizers. Physical and chemical properties are tested and effects of management on crops are evaluated in the laboratory.—I. (I.)

125. Greenhouse and Nursery Crop Production (5)
Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Agricultural Systems and Environment 2 or Biological Sciences 1C. Principles and techniques for the production of ornamental greenhouse and nursery crops. Hands-on experience producing greenhouse crops. Optional weekend field trip.—II. (II.) Lieth

129. Analysis of Horticultural Problems (4)
Lecture—1 hour; laboratory—6 hours. Prerequisite: course 102, Entomology 110, Plant Pathology 120, and Soil Science 100 or the equivalents. Methods of analysis of common plant disorders seen in the landscape, greenhouse, and nursery. Diagnosis of plant disorders caused by soil, water, insects, disease, chemical agents, climatic conditions or cultural practices. Approaches to diagnosis that emphasize acquisition and integration of information.—III. (III.) Burger

130. Turfgrass and Amenity Grassland Utilization and Management (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1C or Agricultural Systems and Environment 2. Utilization and management of amenity and landscape grassland systems. Emphasis on biology of grass species, ecology and culture practice of sports turf and landscape grassland systems, social and environmental benefits, environmental impacts, and integrated management systems.—III. (III.) Wu

133. Woody Plants in the Landscape: Growth, Ecology and Management (4)
Lecture—3 hours; laboratory—2 hours; discussion—1 hour. Prerequisite: Biological Sciences 1C or the equivalent preparation in plant biology. Principles and practices of managing trees and shrubs in the urban landscape and other managed environments. Topics include woody plant form; growth response and adaptation; tree management in relation to soil, moisture, climate; plant problems.—II. (II.) Berry

144. Trees and Forests (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1C. Biological structure and function of trees as organisms; understanding of forests as communities and as ecosystems; use of forests by humans; tree phenology, photosynthesis, respiration, soil processes, life histories, dormancy, forest biodiversity, and agroforestry. (Same course as Environmental and Resource Sciences 144 and Plant Biology 144.)—I. (I.) Barbour, Berry, Bledsoe

145. Tree Improvement and Utility (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 102 and Biological Sciences 1C; Plant Biology 160 recommended. Life histories, adaptive plasticity, longevity, utility of trees and the uniqueness of biological materials. Applications of cloning, secondary products, wood science, and space biology in the context of academic, governmental and industrial viewpoints.—(III.) Durzan

149. Evolution and Diversity of Environmental Plants (4)
Lecture—3 hours; laboratory—3 hours; optional field trips. Prerequisite: course 105, Plant Biology 102 or 108, or consent of instructor. Classification of environmental plants using primitive and advanced characteristics to develop a model for macro evolution. Use of the processes of mutation, inbreeding, hybridization, polyploidy, gene flow and natural selection in explanation of micro evolutionary changes. Not open for credit to students who have taken course 107.—III. (III.) Harding

150. Genetics and Plant Conservation: The Biodiversity Crisis (3)
Lecture/discussion—3 hours. Prerequisite: Biological Sciences 1C or the equivalent. Conservation of genic diversity, measurement of diversity, threats to diversity and reasons for protection, the process of extinction, distribution of diversity, determination of what to conserve and means of conservation. Examples drawn largely from forest tree species.—III. (III.) Ledig

160. Restoration Ecology (3)
Lecture—3 hours. Prerequisite: Plant Biology/Evolution and Ecology 117 or Evolution and Ecology 121 or Plant Biology 147 or the equivalent. Conceptual bases of restoration ecology; tools used by restoration ecologists to solve practical problems; scope and success of actual restoration projects.—III. (III.) Young

160L. Restoration Ecology Laboratory (1)
Laboratory/discussion—3 hours. Prerequisite: course 160 (may be taken concurrently). Companion field course to course 160. A series of part-day and all day visits to various field sites, involving site evaluations, guest field presentations by local restorationists, and actual restoration activities. Not open for credit to students who completed course 160 prior to spring 2004.—III. (III.) Young

192. Internship in Environmental Horticulture (1-12)
Internship—3-36 hours. Prerequisite: upper division standing, completion of at least 84 units, two upper division courses in Environmental Horticulture appropriate for the internship, and consent of instructor. Work experience in an area of Environmental Horticulture and Urban Forestry, including flower and nursery production and marketing, landscape management, arboriculture, turf management and landscape restoration. Internships supervised by a member of the faculty. (P/NP grading only.)

197T. Tutoring in Environmental Horticulture (1-5)
Tutorial—1-5 hours. Prerequisite: upper division standing, completion of course being tutored or the equivalent, consent of instructor. Leading small voluntary discussion or lab groups affiliated with one of the department's regular courses. May be repeated for up to 8 units of credit. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: 3 units of upper division work in environmental horticulture; consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: 3 units of upper division work in environmental horticulture; consent of instructor. (P/NP grading only.)

Graduate Courses

229. Analysis of Horticultural Problems (5)
Lecture—1 hour; laboratory—8 hours; discussion—1 hour; project. Prerequisite: equivalent of B.S. degree in Environmental Horticulture and Urban Forestry, Plant Biology, Agricultural Systems and Environment, or related major, or consent of instructor. Methods of analysis of common plant disorders seen in the landscape, greenhouse, and nursery. Diagnosis of plant disorders caused by soil, water, insects, disease, chemical agents, climactic conditions or cultural practices. Approaches to diagnosis that emphasize acquisition and integration of information. Not open for credit to students who have completed course 241.—III. (III.)

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Topics in environmental horticulture, including plant morphogenesis, floriculture, greenhouse production and modeling, landscape plant ecology, arboriculture, turf culture, postharvest, plant propagation and breeding, urban forestry, plant biodiversity and restoration. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: students in a plant science graduate program. Research conference conducted by departmental faculty to discuss design, philosophy, and interpretation of ongoing specific research areas which includes plant morphogenesis, floriculture, greenhouse production, landscape plant ecology, arboriculture, turf culture, post harvest, and plant breeding related to environmental horticulture. (S/U grading only.)—I, II, III. (I, II, III.)

297T. Tutoring in Environmental Horticulture (1-4)
Tutoring—4-8 hours; discussion—1 hour. Prerequisite: graduate student standing; completion of course to be tutored (or the equivalent) and/or consent of instructor. Leading discussion sessions, conducting laboratory exercises, and lecturing in Environmental Horticulture classes under faculty guidance. Weekly conference on subject matter and instructional techniques. May be repeated for credit by tutoring in different courses.

298. Group Study (1-5)
Prerequisite: graduate standing. Group study of advanced topics in Environmental Horticulture. (S/U grading only.)

299. Research (1-12)
Prerequisite: graduate standing. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Environmental Horticulture and Urban Forestry

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Environmental Horticulture.

The Major Program

Students majoring in Environmental Horticulture and Urban Forestry learn how plants improve the environment and the quality of our lives. The major focuses on the biological and physical concepts and horticultural principles of plant production, management of plants and plant ecosystems in landscape settings and sociological aspects of plant/people interactions in the urban environment. Plants are used to revegetate and restore disturbed landscapes, control erosion and reduce energy and water consumption. The ornamental use of plants to improve the aesthetic quality of urban and rural landscapes, recreational areas, interiorscapes and commercial sites is an important aspect of this major. Students may select one of the following four areas of specialization: Urban Forestry, Floriculture/Nursery, Landscape Management/Turf, or Plant Biodiversity/Restoration.

Internships and Career Opportunities. Students are encouraged to develop internships on or off campus to augment their activities in the classroom and laboratory. Internships are available with the department's greenhouse facility, the UC Davis Arboretum, landscape designers, government agencies or regional nurseries. Career opportunities in this field include growing and/or managing plants in a variety of settings, consulting as an urban, landscape, or restoration horticulturist; business ownership; working for public agencies or private landscape firms/corporations; park management and landscape contracting.

B.S. Major Requirements

UNITS

English Composition Requirement..... 0-8
See College requirement

Preparatory Subject Matter 64–70
Environmental Horticulture 1 and 6..... 7
Landscape Architecture 30..... 4
Biological Sciences 1A, 1B, 1C..... 15
Environmental Science and Policy 1 or 10... 4
Chemistry 2A-2B 10
Physics 1A-1B 6
Agricultural Management and Rangeland Resources 21 and either Mathematics 16A or Statistics 13 6-7
Select two lower division resource science courses and two lower division social science/humanities courses in consultation with adviser 12-17

Breadth/General Education 6-24

Depth Subject Matter..... 32-37
Environmental Horticulture 102 4
Soil Science 100..... 5
Plant Biology 171..... 4
Environmental Horticulture 105 or Plant Biology 102 or 108 4-5
Environmental Horticulture 192 (minimum of 3 units)..... 3
Select two upper division resource science courses and two upper division social science/humanities courses in consultation with adviser 12-16

Areas of Specialization (choose one)
No course may be used to satisfy more than one requirement.

Urban Forestry Option 29
Environmental Horticulture 100, 130, 133 12
Entomology 110..... 5
Evolution and Ecology 121 or Plant Biology 147 4
Geography 155 4
Plant Pathology 120..... 4

Floriculture/Nursery Option..... 27
Environmental Horticulture 120, 125 8
Applied Biological Systems Technology 165 2
Entomology 110, 135..... 9
Plant Biology 142..... 4
Plant Pathology 120..... 4

Landscape Management/Turf Option 27
Environmental Horticulture 129, 130, 133 12
Applied Biological Systems Technology 165 2
Entomology 110..... 5
Evolution and Ecology 117..... 4
Plant Pathology 120..... 4

Plant Biodiversity/Restoration Option..... 20-32
Select two courses from Agricultural Management and Rangeland Resources 130, 150, Environmental Horticulture 160, Environmental Science and Policy 125C, 155L, Landscape Architecture 180F, Soil Science 112 5-8
Select three courses from Environmental and Resource Sciences 173, Environmental Horticulture 144, Environmental Science and Policy 155, Evolution and Ecology 117, 121, Plant Biology 102, 108, 119, 147, Wildlife, Fish, and Conservation Biology 156, 157 9-14
Environmental Horticulture 149 or 150, or Evolution and Ecology 100, or Plant Biology 116 ..... 3- 5
Entomology 103 or 107 or 110, or Plant Pathology 120, or Soil Science 112 .. 3-5

Total Units for the Major 116-139

Major Adviser. D.W. Burger

Environmental Policy Analysis and Planning

(College of Agricultural and Environmental Sciences)

The Major Program

The major in environmental policy analysis and planning develops an understanding of governmental policy-making and skills for analyzing policy in fields related to environmental quality.

Any student in good standing is eligible to transfer to the major; to do so, please see the major adviser, Paul Sabatier (2144 Wickson Hall) or staff adviser (2134 Wickson Hall).

The Program. This major provides students with a general background in the natural sciences relevant to environmental policy. It also provides sufficient training in mathematics, statistics, and research methodology to quantitatively analyze environmental problems and policy options. A strong background in policy analysis, including the evaluation of policy alternatives and the study of factors affecting policy formulation and implementation is included. In addition, students are encouraged to develop substantive knowledge in a specific field of environmental policy, such as urban and regional planning, water pollution control, or energy.

Career Alternatives. Environmental policy analysis and planning graduates are prepared for employment in public agencies, consulting firms, and businesses concerned with environmental affairs. The major is also excellent preparation for students who want to go on to graduate work in law, planning, public policy, or management.

B.S. Major Requirements:

UNITS

English Composition Requirement.....10-11
See College requirement..... 0-8
English 102A, 102B, 102C, 102D, 102E, 102F, or 102G concurrently with Environmental Science and Policy 1..... 4
Communication 1 or Dramatic Art 10..... 3-4

Preparatory Subject Matter 50-56
Biological Sciences 1A or 10 4-5
Chemistry 2A, 2B 10
Agricultural Management and Rangeland Resources 21, Engineering 5, Computer Science Engineering 10, 30..... 3-4
Economics 1A, 1B..... 10
Animal Science 1, Biological Sciences 1B, Geology 1, Hydrologic Science 124, Plant Biology 12, Soil Science 100.... 3-5
Environmental Science and Policy 1..... 4
Mathematics 16A-16B or 21A-21B..... 6-8
Physics 1A..... 3
Political Science 1 4
Statistics 13, 32, 102 3-4

Breadth/General Education 6-24
Satisfaction of General Education requirement

Depth Subject Matter.....42-45
(Students must take these units on a letter grade basis, and must attain an overall grade point average of 2.0 or higher in the Depth Subject Matter courses.)
Environmental Science and Policy 110, 160, 164, 168A..... 16
Environmental Science and Policy 166, 172 or Political Science 187..... 4
Environmental Science and Policy 161 or 173 4
Environmental Science and Policy 171 or 179*..... 3-4
Environmental Science and Policy 178 or Community and Regional Development 160 4
Select one from Sociology 106, Statistics 100, 103, 108, Economics 140..... 4
Economics 100 or Agricultural and Resource Economics 100A 4-5
Agricultural and Resource Economics 175 or 176 4

* Students taking Environmental Science and Policy 179 are strongly encouraged to take Environmental Science and Policy 179L concurrently.

Areas of Specialization (choose one).....17-20

Advanced Policy Analysis Option
Political Science 102, 105, 108, or 155..... 4
Political Science 164, 165, or 170..... 4
Environmental Science and Policy 165, Political Science 175..... 4
Environmental Science and Policy 168B.... 4
Civil and Environmental Engineering 153, Agricultural and Resource Economics 106, Agricultural Management and Rangeland Resources 121, or Economics 130..... 4

City and Regional Planning Option
Applied Biological Systems Technology 180, Agricultural Management and Rangeland Resources 132 3-5
Civil and Environmental Engineering 165, Environmental Science and Policy 163 3-4
Soil Science 118 or Environmental Science and Policy 179..... 3-4
Environmental Science and Policy 172..... 4
Political Science 100, 102, Community and Regional Development 152, 156, 157, 171 4
(Enroll for Environmental Science and Policy 173 under Depth Subject Matter above.)

Energy Policy Option
Environmental Science and Policy 126 or Environmental Toxicology 101..... 4
Engineering 160 4
Geology 130..... 3
Environmental Science and Policy 175..... 4
Environmental Science and Policy 163, 167 4

Environmental Science Option
Students choosing the Environmental Science area of specialization must consult with a faculty adviser to identify an emphasis within this specialization and to select suitable courses. Possible areas of emphasis are biological conservation, pollutants in the environment, ecology, planning in the presence of environmental hazards. If you are considering this area of specialization, please contact the major adviser as soon as possible.

Transportation Planning Option
Civil and Environmental Engineering 165 .. 3
Environmental Science and Policy 167, 168B, 172, 175, Agricultural Management and Rangeland Resources 121, 132, Applied Biological Systems Technology 180..... 8-9
Environmental and Resource Sciences 131 3
Environmental Science and Policy 163..... 4

Water Quality Option
Environmental Science and Policy 172..... 4
Environmental and Resource Science 121, Geology 135..... 3
Hydrologic Science 141, 143, Geology 134, Soil Science 118..... 3-4
Environmental Science and Policy 151, 155, Environmental and Resource Sciences 100, Hydrologic Sciences 122, Wildlife, Fish, and Conservation Biology 120 ...3-4
Environmental Science and Policy 168B, 175, Applied Biological Systems Technology 180, Agricultural Management and Rangeland Resources 121, 132.....4-5

Unrestricted Electives.....24-55

Total Units for the Degree..... 180

Major Adviser. P. Sabatier *(Environmental Science and Policy).*

Minor Program Requirements

The faculty for environmental policy analysis and planning offers the following minor.. The Environmental Policy Analysis minor is for natural and social science students desiring basic training in policy analysis theory and methods.

UNITS

Environmental Policy Analysis.....23-24
Preparation: Economics 1A; basic course in political science.
Environmental Science and Policy 1..... 4
Environmental Science and Policy 160, 161, 168A..... 13
Environmental Science and Policy 163, 170, 171, 172, 179 6-8

Minor Adviser. P. Sabatier *(Environmental Science and Policy).*

Environmental and Resource Sciences

(College of Agricultural and Environmental Sciences)

Faculty. See under departments of Agricultural and Resource Economics, Agronomy and Range Science, and Land, Air and Water Resources.

The Major Program

The environmental and resource sciences major is a program for study of the biological, chemical, and physical features of environmental resources, and the economical and social considerations associated with their use, conservation, protection, and management and restoration. Students who choose this major include those with an interest in careers associated with environmental resource utilization and management, as well as those pursuing postbaccalaureate, academic, or professional training.

The Program. The curriculum for the major provides flexibility in meeting individual needs, interests, and objectives. At the same time, certain courses are required in the basic physical and biological sciences areas. Upper division general environmental resource sciences courses, a resource economics course, and a specified number of units of environmental and resource-oriented courses are required for all students in the major. Students select environmental and resource-oriented courses in consultation with and approval of the student's adviser. Considerable care should be taken to ensure effective utilization of the flexibility of the major, and to meet individual academic and career objectives. Students may specialize their study by selecting one of the options within the major or, in consultation with their adviser, pursuing other specializations.

Internships and Career Alternatives. Positions now held by graduates in environmental and resource sciences are quite varied, but many are employed as resource analysts and planners as well as technical and environmental specialists with government agencies, municipalities, and private firms. A significant proportion of graduates undertake further studies leading to advanced degrees in resources, the environment, and related fields.

B.S. Major Requirements:

UNITS

Written/Oral Expression.....0-8
See College requirement

Preparatory Subject Matter 53-69
Biological Sciences 1A-1B-1C 15
Chemistry 2A-2B 10
Economics 1A 5
Environmental Toxicology 10..... 3
Geology 1 or 50..... 3-4
Environmental and Resource Sciences 60 .. 3
Mathematics 16A-16B or 21A-21B..... 6-8
Agricultural Management and Rangeland Resources 21, 121, Engineering 5, Computer Science Engineering 10, 15..... 3-4
Physics 1A-1B or 7A-7B-7C or 9A-9B-9C—see option requirements 6-12
Physics 7A-7B-7C or 9A-9B-9C required for Air option.
Statistics 13 or 100 or 102..... 4

Breadth/General Education 18-24
Satisfaction of General Education requirements; additional units in social sciences and humanities to total 24 units.

Depth Subject Matter.....24-27
Written expression (in addition to college requirement), English 101, 104A, 104B, 104C, 104D, 104E, or 104F..... 4
Agricultural and Resource Economics 147 or 148 3-4
Atmospheric Science 60 or Environmental and Resource Sciences 131 3-4
Soil Science 100..... 4

Environmental and Resource Sciences 100 or 121 3-6
Agricultural Management and Rangeland Resources 101, Environmental Science and Policy 161, 179; Environmental Toxicology 138, Geology 134, Nature and Culture 120, Political Science 107, 171 or Wildlife, Fish, and Conservation Biology 154 3-4
Agricultural Management and Rangeland Resources 130, Entomology 104, Environmental and Resource Sciences 144, Environmental Science and Policy 100, Evolution and Ecology 101, or Plant Biology 117 or 142 3-4
Atmospheric Science 192 3

Areas of Specialization (choose one)

Air Resource Option 26-28
Directed towards a general understanding of the atmosphere as a finite resource and of environmental problems currently faced by humankind. The option provides a broad understanding of the physical and chemical properties of the atmosphere, including the impacts of air pollution and global climate change. Employment opportunities include positions within federal, state, and county agencies concerned with environmental quality and with private companies.

Atmospheric Science 30, 110, 116, 124, 133 16
Environmental Science and Policy 110 4
Choose two from Atmospheric Science 115, 149, 160; Environmental and Resource Sciences 131, 173, 185, 186; or Environmental Science and Policy 116 6-8

Unrestricted electives (to total 180) 25-52

Environmental Resources Option 18-26
For the general study of the physical, chemical and biological features of renewable natural resources, and the economic and social considerations associated with their use, protection and management. For those who plan careers associated with resource utilization and management, and those pursuing postbaccalaureate, academic, or professional training.

Choose at least two from Soil Science 111, 112, 118; Geology 130, 134 6-9
Choose at least two from Atmospheric Science 116, 124, 133, 160; Environmental Toxicology 131, 138 6-7
Choose at least two from Agricultural Management and Rangeland Resources 132; Environmental and Resource Sciences 136, 144, 173, 185, 186; Geology 135; Hydrologic Science 134, 141, 145 .. 6-10

Unrestricted electives (to total 180) 25-60

GIS and Remote Sensing Option 26
Conceptual and practical training in the application of remote sensing technology and geographical information systems to natural resource assessment and to monitoring human impacts on the environment. Appropriate training for those seeking employment as GIS specialists with natural resource management agencies or environmental consulting firms.

Environmental and Resource Sciences 105, 185, 186; Applied Biological Systems Technology 180, 181, 182 26

Unrestricted Electives (to total 180) 25-52

Hydrobiology Option 32-35
Training in the biological aspects of water resources focusing on the understanding and protection of polluted and unpolluted water systems; the structure, function, and principles of aquatic systems. Graduates may seek employment with state and federal agencies such as Water Resources Control Board, Department of Fish and Game, Department of Water Resources, or consulting firms concerned with environmental impacts.

Choose 28-35 units from Entomology 116; Environmental and Resource Sciences 136; Environmental Science and Policy 123, 124, 151, 155; Environmental Toxicology 101; Geology 116, 135, 139; Hydrologic Science 134, 141; Plant Biology 118, 178; Wildlife, Fish, and Conservation Biology 120, 120L, 123, 15328-35

Unrestricted Electives (to total 180) 16-50

Land and Water Management Option 17-29
A broad background in management of soil and water resources in both natural and agricultural ecosystems. Emphasis on analysis of soils and plants for estimating crop nutrient requirements and principles of irrigation and drainage of agricultural land. Appropriate for those seeking employment with state and federal agencies or with agroindustry.

Choose at least two from Soil Science 105, 109, 111, 118, 120 8-13
Choose at least two from Hydrologic Science 110, 124, 134, 141, 143, 144 6-12
Choose at least one from Agricultural Management and Rangeland Resources 132; Environmental and Resource Sciences 144, 173; Geology 134, 135 3-4

Unrestricted Electives (to total 180) 22-61

Plant Environmental Interactions Option . 22-28
Provides background in plant functioning and allows integration of biological and environmental science to provide understanding of natural and managed ecosystems. (Note: Chemistry 8A, 8B prerequisite to Plant Biology 111 and 112.)

Choose 23-28 units from Agricultural Management and Rangeland Resources 130, 131; Atmospheric Science 133; Environmental and Resource Sciences 144, 173; Environmental Science and Policy 123, 155; Hydrologic Science 124; Plant Biology 111, 111D, 111L, 112, 112D, 117, 141, 142, 157, 158; Soil Science 109, 111, 112 23-28

Unrestricted Electives (to total 180) 23-55

Total Units for the Major 180

Major Adviser. W.K. Silk (Plant and Environmental Sciences).

Advising Center for the major is located in 1152 Plant and Environmental Science Building (530-752-1669).

Related Courses. See courses listed under Agricultural and Resource Economics, Agricultural Management and Rangeland Resources, Animal Science, Entomology, Environmental Biology and Management, Environmental Science and Policy, Environmental Toxicology, Evolution and Ecology, Geography, Geology, Hydrologic Science, Plant Biology, Range Science, Soil Science, Wildlife, Fish, and Conservation Biology.

Courses in Environmental and Resource Sciences (ERS)

Questions pertaining to the following courses should be directed to the instructor or to the Resource Sciences Teaching Center, 1152 Plant and Environmental Science Building (530-752-1669).

Lower Division Courses

6. Map Reading and Remote Sensing (3)
Lecture/discussion—3 hours. Basic skills in map reading, map grid systems, projections, aerial photography, photogrammetry, remote sensing sensors and platforms; the role of cartography and remote sensing in environmental analysis.—I.

10. California: The State (3)
Lecture—3 hours. Prerequisite: introductory geology or geography recommended. Introduction to geomorphology, physiography and natural resources of California. Interrelated impacts of terrain, climate and resources upon essential human activities. Analysis of the fundamental concepts and methods of inquiry guiding existing resource management policies. GE credit: SocSci.—I, III. (III.)

10G. California: The State (Discussion) (1)
Discussion—1 hour; brief essays. Prerequisite: course 10 concurrently. Small group discussion of topics assigned for course 10. Preparation and discussion of essays. GE credit with concurrent enrollment in course 10: Wrt.—I, III. (III.)

47. Watershed Processes and Water Quality in the Tahoe Basin (2)
Lecture/laboratory—21 hours; fieldwork—9 hours; discussion—3 hours; term paper. Prerequisite: basic knowledge of environmental, soil, or hydrologic sciences. Course involves 3 days of instruction in Tahoe City. Watershed processes, runoff water quality management, and restoration in the Lake Tahoe Basin. Soils, precipitation-runoff, revegetation and adaptive management related to erosion control, effective solutions, and development of restoration strategies. Students develop and initiate field restoration. (Same course as Hydrologic Science 47.)—Grismer

60. Global Environmental Interactions (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: high school algebra and chemistry or biology. Relationships among climate, hydrology, biogeochemical cycles and vegetation distribution in diverse landscapes and biomes. Emphasis on physical, chemical, and biological processes affecting ecosystems from the poles to the equator. GE credit: SciEng, Wrt.—II. (II.) Southard, Zasoski

92. Resource Sciences Internship (1-12)
Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in resource sciences. Internship supervised by a member of the faculty. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

100. Principles of Hydrologic Science (4)
Lecture—4 hours. Prerequisite: Chemistry 2B, Mathematics 16B, and Physics 7A or 9A. Topics include hydrology (surface and ground water), hydraulic flow through porous media, water in the soil-plant-atmosphere continuum, water quality, flow through open channels, and representative water-resource problems. GE credit: SciEng.—I. (I.) Grismer

100L. Principles of Hydrologic Science Laboratory (2)
Laboratory—3 hours; discussion—1 hour. Prerequisite: course 100 concurrently. Principles governing water transport in pipes, soil, and rainfall runoff. Water quality concerns associated with salinity and contamination. GE credit with concurrent enrollment in course 100: Wrt.—I. (I.) Grismer

105. Principles of Cartography for GIS (4)
Lecture—2 hours; laboratory—6 hours. Properties and components of maps. Compilation and generalization of base-map data; projections; coordinate systems; reference ellipsoids; symbolization and processing of map data; cartographic design; typography; map production; and cartographic and photographic equipment utilized in producing maps.—III. (III.)

121. Water and Society (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Physics 10 or Geology 1. The role of water as an essential natural resource in contemporary society. Aspects of the scientific method, including descriptions of natural phenomena, measurement techniques, and predictive models. Supply and use of water for municipalities, agriculture, industry, wildlife and recreation. GE credit: SciEng, Wrt.—I. (I.) Silk

131. Air as a Resource (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Chemistry 10. Degradation of the atmospheric resource, historical aspects and effects of air pollution examined. Evaluation of primary gaseous and particulate pollutants and discussion of their impact. GE credit: SciEng, Wrt.—II. (II.) Flocchini

136. Chemistry of the Hydrosphere (3)
Lecture—3 hours. Prerequisite: Chemistry 2B and an upper division course in soil science, hydrologic

science, geology, or limnology. Chemical characteristics of water in the hydrologic cycle. Understanding processes and conditions regulating chemical composition of natural waters with particular emphasis on dissolved mineral constituents. Not open for credit to students who have completed Water Science 180 or Hydrologic Science 136. (Former course Hydrologic Science 136.)—III. (III.)

140. Culinary and Medicinal Herbs (3)
Lecture/discussion—3 hours. Prerequisite: Biological Sciences 1C. Growth, identification, cultivation, and use of common culinary and medicinal herbs; herbal plant families; effects of climate and soils on herbs; herbal medicine; ecology and geography of herbs; herb garden design; secondary chemistry of active compounds. (Same course as Plant Biology 140.)—III. Bledsoe

141. Role of Fire in Natural Ecosystems (4)
Lecture—3 hours; term paper. Prerequisite: Biological Sciences 1B and 1C, upper division or graduate standing or consent of instructor; general ecology or environmental science course recommended. Fire regimes and roles in major North American vegetation types, especially in the west. Physics of fire, fire effects on organisms and ecosystem functioning, reconstructing fire histories, fire in resource management, and fire use by indigenous people.—II. (II.) Barbour

144. Trees and Forests (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1C. Biological structure and function of trees as organisms; understanding of forests as communities and as ecosystems; use of forests by humans; tree phenology, photosynthesis, respiration, soil processes, life histories, dormancy, forest biodiversity, and agroforestry. (Same course as Environmental Horticulture 144 and Plant Biology 144.)—I. (I.) Barbour, Berry, Bledsoe

173. Humans and Vegetation Change (4)
Lecture—3 hours; term paper. Prerequisite: course 60, Geography 1, Environmental Science and Policy 30, or Biological Sciences 1C. Role of humans in modifying the earth's vegetation. Emphasis on cultural-historical and ecological approaches to the evolution of wild landscapes, factors of plant distribution, mapping of vegetation, world vegetation patterns, human impact on major regions, and case studies of land-use and vegetation change.—II. (II.)

185. Aerial Photo Interpretation and Remote Sensing (4)
Lecture—2 hours; laboratory—4 hours. Basics of remote sensing and photogrammetry, grids and map projections, aerial photo interpretation, sensors and platforms for aerial and space photography and nonphotographic imaging systems, aerial thermography, microwave sensing, and introduction to remote sensing applications.—I. (I.)

186. Environmental Remote Sensing (3)
Lecture—3 hours. Prerequisite: Mathematics 16B and Physics 7C or 9B; upper division standing. Overview of satellite, airborne, and ground-based remote sensing. Building on properties of EM Radiation, isotropic and non-isotropic scattering and absorption, examines applications in hydrologic processes, weather and climate, ecology and land use, soils, geology, forestry, and agriculture. Not open for credit to students who have taken Hydrologic Science 186. (Former course Hydrologic Science 186.)—II. (II.) Ustin

186L. Environmental Remote Sensing Lab (2)
Laboratory—4 hours. Prerequisite: course 186 with grade of C or better. Computer based analysis and visualization of digital images and image processing techniques. Continuation of course 186 providing theory and direct experience in digital image processing.—III. (III.) Ustin

192. Resource Sciences Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in resource sciences. Internship supervised by a member of the faculty. (P/NP grading only.)

194H. Senior Honor Thesis (2-6)
Independent study. Prerequisite: senior standing, overall GPA of 3.25 or higher and consent of master adviser. Two or three successive quarters of guided research on an environmentally related subject of special interest to the student. (Deferred grading only, pending completion of thesis.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Environmental Science and Policy

(College of Agricultural and Environmental Sciences)

Andrew Sih, Ph.D., Chairperson of the Department

Department Office, 2132 Wickson Hall (530-752-3026)

Faculty

Charles R. Goldman, Ph.D., Professor
Susan L. Handy, Ph.D., Associate Professor
Susan P. Harrison, Ph.D., Professor
Alan M. Hastings, Ph.D., Professor
Marcel Holyoak, Ph.D., Associate Professor
Robert A. Johnston, M.S., Professor
Mark N. Lubell, Ph.D., Assistant Professor
Stephen G. Morgan, Ph.D., Associate Professor
Joan M. Ogden, Ph.D., Associate Professor
Benjamin S. Orlove, Ph.D., Professor
James F. Quinn, Ph.D., Professor
Eliska Rejmankova, Ph.D., Professor
Peter J. Richerson, Ph.D., Professor
Paul A. Sabatier, Ph.D., Professor
Thomas W. Schoener, Ph.D., Professor *(Evolution and Ecology)*
Mark W. Schwartz, Ph.D., Professor
Andrew Sih, Ph.D., Professor
Daniel Sperling, Ph.D., Professor *(Environmental Science and Policy, Civil and Environmental Engineering)*
Susan Williams, Ph.D., Professor

Affiliated Faculty

Edwin D. Grosholz, Ph.D., Associate Specialist, Cooperative Extension

Emeriti Faculty

William J. Hamilton III, Ph.D., Professor Emeritus
Jack D. Ives, Ph.D., Professor Emeritus
Seymour I. Schwartz, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*

The Program of Study

Environmental Science and Policy is a teaching and research department offering courses, workshops, and directed group study classes that focus on the complex problems of human–environment relations. The department offers Bachelor of Science degrees in Environmental Biology and Management and in Environmental Policy Analysis and Planning. Courses in Environmental Science and Policy also supplement major programs in a wide variety of established disciplines, although highly motivated undergraduates who find existing majors unsuited to their educational objectives are encouraged to contact the chairperson and faculty of the department regarding individual majors in the College of Agricultural and Environmental Sciences (see Individual Major).

Current Information. Through its continuing contacts with many other departments and teaching divisions on the campus, the department develops a variety of special courses and workshops each year that cannot be listed here. Check with the department office and with the expanded course description handbook of the College of Agricultural and Environmental Sciences for up-to-date information about courses.

Graduate Study. The faculty of the department offers the M.S. and Ph.D. degree programs of the Graduate Group in Ecology, as well as instruction through the graduate programs of the disciplines with which they are associated, such as agricultural and resource economics, evolution and ecology, sociology, political science, civil engineering, and anthropology. Further information about graduate programs in ecology should be obtained from the chairperson of the Graduate Group in Ecology.

Graduate Adviser. E.P. Caswell-Chen *(Ecology)*.

Courses in Environmental Science and Policy (ESP)

Lower Division Courses

1. Environmental Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: English 1; English 102, Economics 1A, 1B, Biological Sciences 1A, and Political Science 1 recommended. Analysis of the biological, physical, and social interactions which constitute environmental problems, such as food production, energy development and conservation, pollution, and the conservation of natural environments. Emphasis on analysis of problems and the consequences of proposed solutions.—II. (II.) Holyoak

10. Current Issues in the Environment (3)
Lecture—3 hours. Prerequisite: elementary biology recommended. The science behind environmental issues, and policies affecting our ability to solve domestic and international environmental problems. Resources, environmental quality, regulation, environmental perception and conservation. Integrative case studies. Not open for credit to students who have completed course 1. GE credit: SciEng.—I. (I.) Schwartz

10D. Current Issues in the Environment—Discussion (1)
Discussion—1 hour. Prerequisite: course 10 concurrently. Small group discussions and preparation of papers for course 10. GE credit with concurrent enrollment in course 10: Wrt.—I. (I.) Schwartz

30. The Global Ecosystem (3)
Lecture—3 hours; 1 one-day field trip. Prerequisite: Biological Sciences 10 or Geography 1 or Anthropology 2. The interaction of climate and biotic adaptation and the production of ecological systems. The limits and opportunities for human use of different natural environments, and human utilization of the earth's biotic resources. GE credit: SciEng.

30G. The Global Ecosystem: Laboratory/Discussion (2)
Laboratory/discussion—3 hours. Prerequisite: course 30 concurrently. Presents natural history skills in plant and animal identification, soils, and geology. Emphasis on the diverse organisms and habitats of Northern California. GE credit with concurrent enrollment in course 30: Wrt.

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internship supervised by member of the faculty. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

Upper Division Courses

100. General Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisites: Biological Sciences 1A, 1B, 1C, Mathematics 16A, 16B; Statistics 13 recommended. Theoretical and experimental analysis of the distribution, growth and regulation of species populations; predator-prey and competitive interactions; and the organization of natural communities. Application of evolutionary

and ecological principles to selected environmental problems.—I. (I.) Sih

101. Human Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course from course 30, Anthropology 1, 2, Genetics 10, or the equivalent. Critical variables in the processes that relate humans and their environment. Emphasis on the biological, cultural, social, and psychological forces which encourage stability or change in human ecological relationships. (Same course as Anthropology 101.) GE credit: SocSci, Div.—II. (II.) Mulder

102. Cultural Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one lower division course in the social sciences, upper division standing. Comparative survey of the interaction between diverse human cultural systems and the environment. Primary emphasis given to people in rural and relatively undeveloped environments as a basis for interpreting complex environments. Not open for credit to students who have completed course 133. (Former course 133.) (Same course as Anthropology 102.) GE credit: SocSci, Div, Wrt.—III. (III.) Orlove

(a) Environmental Science

110. Principles of Environmental Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 1A or 7A, Mathematics 16B or 21B, and Biological Sciences 1A. Application of physical and chemical principles, ecological concepts, and systems approach to policy analysis of atmospheric environments, freshwater and marine environments, land use, energy supplies and technology, and other resources.—II. (II.) Richerson

116. The Oceans (3)
Lecture—3 hours. Introductory survey of the marine environment; oceanic physical phenomena, chemical constituents, geological history, the sea's biota, and utilization of marine resources. (Same course as Geology 116.) GE credit: SciEng.—II. (II.) Spero, Cowen

116G. The Oceans: Discussion (2)
Discussion—2 hours. Prerequisite: course 116/Geology 116 concurrently. Scientific method applied to the discovery of the processes, biota, and history of the oceans. Group discussion and preparation of papers on related topics. (Same course as Geology 116G). GE credit with concurrent enrollment in course 116: Wrt.—II. (II.) Spero, Cowen

(b) Ecological Analysis

121. Population Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1B, 1C, Mathematics 16A-16B. Development of exponential and logistic growth models for plant and animal populations, analysis of age structure and genetic structure, analysis of competition and predator-prey systems. Emphasis is on developing models and using them to make predictions and solve problems. Offered in alternate years. GE credit: SciEng, Wrt.—II. Hastings

123. Introduction to Field and Laboratory Methods in Ecology (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 100 or the equivalent, Statistics 102 or the equivalent. Introduces students to methods used for collecting ecological data in field and laboratory situations. Methods used by population ecologists and community ecologists; emphasis on experimental design, scientific writing and data analysis.—III. (III.) M. Schwartz

124. Marine and Coastal Field Ecology (10)
Lecture—6 hours; discussion—4 hours; seminar—1 hour; laboratory—18 hours (Summer Session I). Prerequisite: Biological Sciences 1A; Statistics 13; course 100. Full-time study at Bodega Marine Laboratory. Intensive lecture-laboratory-field study of current ecological theory and problems with emphasis on marine populations and communities; techniques and evaluation of quantitative field research.—summer. Chow

125A. Field Ecology (4)
Lecture—15 hours; discussion—10 hours; field work—15 hours (for two-week period). Prerequisite: consent of instructor. Designed to instruct and demonstrate to students the value and approaches of experimental research using the hypothetico-deductive experimental approach. May be taken only as part of the White Mountain Research Supercourse.—Quinn

125B. Physiological Ecology (4)
Lecture—15 hours; discussion—10 hours; laboratory—15 hours (for two-week period). Prerequisite: consent of instructor. An examination of the functional means by which animals and plants cope with their environments, the physiological limits that determine the boundary conditions of various ecological niches. Unifying principles that describe the regulatory features of all animals or plants emphasized. May be taken only as part of the White Mountain Research Supercourse.—Quinn

125C. Applied Conservation Biology (4)
Lecture—10 hours; discussion—10 hours; field work—15 hours (for two-week period). Prerequisite: consent of instructor. Designed to introduce students to the complexities, and realities, of natural resource exploitation and preservation, emphasizing the trade-offs between economic benefits and ecosystem stability and sustainability. May be taken only as part of the White Mountain Research Supercourse.—Quinn

126. Environmental and Occupational Epidemiology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: introductory course in statistics and upper division standing. Methods and contemporary issues in environmental and occupational epidemiology. Effects of carcinogens, reproductive hazards, lifestyle factors, air and water pollution, infectious agents, and other hazards on human populations. Discussion of epidemiologic study designs, biases, and risk assessment.

(d) Aquatic Ecosystems Analysis

150A. Physical and Chemical Oceanography (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Environmental Science and Policy/Geology 116, Physics 9B, Mathematics 22C, Chemistry 1C; or upper division standing in a natural science and consent of instructor. Physical and chemical properties of seawater, fluid dynamics, air-sea interaction, currents, waves, tides, mixing, major oceanic geo-chemical cycles. (Same course as Geology 150A.)—I. (I.) McClain, Spero

150B. Geological Oceanography (3)
Lecture—3 hours. Prerequisite: Geology 50 or 116. Introduction to the origin and geologic evolution of ocean basins. Composition and structure of oceanic crust; marine volcanism; and deposition of marine sediments. Interpretation of geologic history of the ocean floor in terms of sea-floor spreading theory. (Same course as Geology 150B.)—II. (II.) McClain

150C. Biological Oceanography (4)
Lecture—3 hours; discussion—1 hour; fieldwork—one weekend field trip required. Prerequisite: Biological Sciences 1A and a course in general ecology or consent of instructor. Ecology of major marine habitats, including intertidal, shelf benthic, deep-sea and plankton communities. Existing knowledge and contemporary issues in research. Segment devoted to human use. (Same course as Geology 150C.)

151. Limnology (4)
Lecture—3 hours; discussion—1 hour; special project. Prerequisite: Biological Sciences 1A and junior standing. The biology and productivity of inland waters with emphasis on the physical and chemical environment.—III. (III.) C. Goldman

151L. Limnology Laboratory (3)
Laboratory—6 hours; two weekend field trips. Prerequisite: course 151 (may be taken concurrently); junior, senior, or graduate standing. Limnological studies of lakes, streams, and reservoirs with interpretation of aquatic ecology.—III. (III.) C. Goldman

155. Wetland Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Plant Biology 117 required; course 110 or 151 recommended. Introduction to wetland ecology. The structure and function of major wetland types and principles that are common to wetlands and that distinguish them from terrestrial and aquatic ecosystems.—I. (I.) Rejmankova

155L. Wetland Ecology Laboratory (3)
Lecture—1 hour; laboratory—6 hours; field-work—two 1-day weekend field trips. Prerequisite: course 155 required (may be taken concurrently). Modern and classic techniques in wetland field ecology. Emphasis on sampling procedures, vegetation analysis, laboratory analytical procedures, and examples of successful wetland restoration techniques.—I. (I.) Rejmankova

(e) Environmental Policy Analysis

160. Environmental Decision Making (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Political Science 1, Economics 1A, intermediate statistics, course 1 and course 166 or Political Science 182; upper division standing or consent of instructor. Alternative models of environmental policymaking, and application to case studies of decision making in the U.S. and California.—II. (II.) Sabatier

161. Environmental Law (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing and one course in environmental science (course 1, 10, 110, Biological Sciences 1A, Environmental Toxicology 10, or Resource Sciences 100); English 1 and Political Science 1 recommended. Introduction for non-Law School students to some of the principal issues in environmental law and the judicial interpretation of some important environmental statutes, e.g., NEPA. GE credit: SocSci, Wrt.—III. (III.)

163. Energy and Environmental Aspects of Transportation (4)
Lecture—3 hours; extensive writing. Prerequisite: Economics 1A and Civil and Environmental Engineering 162. Engineering, economic, and systems planning concepts. Analysis and evaluation of energy, air quality and selected environmental attributes of transportation technologies. Strategies for reducing pollution and petroleum consumption in light of institutional and political constraints. Evaluation of vehicle emission models. (Same course as Civil and Environmental Engineering 163.) Offered in alternate years. GE credit: Wrt.—(I.) Sperling

164. Ethical Issues in Environmental Policy (3)
Lecture—3 hours. Prerequisite: courses 160, 168A; seniors only in Environmental Policy Analysis and Planning or by consent of instructor. Basic modes of ethical reasoning and criteria of distributive justice applied to selected topics in environmental policymaking.—III. (III.) Sabatier

165. Science, Experts and Public Policy (4)
Lecture—4 hours. Prerequisite: upper division standing in the social or biological sciences; course 160 or Political Science 108 recommended. Analysis of factors affecting the influence of scientists, planners, and other experts in policymaking. Several cases and controversies will be examined.

166. Policy Making in Natural Resource Agencies (4)
Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: Political Science 1. Analysis of factors that shape the behavior and performance of public agencies responsible for natural resource management and environmental protection. Internet resources and field work used to design and execute a research and writing project on a selected agency or inter-agency program. GE Credit: Wrt.

167. Energy Policy (4)
Lecture—4 hours. Prerequisite: Resource Sciences 3 or Engineering 160; course 160 or Political Science 101, 107, or 109. Overview of U.S. energy policy; policy analysis, philosophy and methods; major policy issues, such as renewable vs. nonrenewable; and applied studies of power plants, solar residential, and state policy options. Offered in alternate years.—III. Ogden

168A. Methods of Environmental Policy Evaluation (5)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: Statistics 13; Economics 100 or Agricultural and Resource Economics 100A; Mathematics 16B or 21B; course 1; upper division standing. Evaluation of alternatives for solution of complex environmental problems; impact analysis, benefit-cost analysis, distributional analysis, decision making under uncertainty, and multi-objective evaluation.—I. (I.) Ogden

168B. Methods of Environmental Policy Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 168A. Continuation of course 168A, with emphasis on examination of the literature for applications of research and evaluation techniques to problems of transportation, air and water pollution, land use, and energy policy. Students will apply the methods and concepts by means of a major project

169. Water Policy and Politics (3)
Lecture—3 hours. Prerequisite: Economics 1A or Political Science 1. The governance of water, including issues of water pollution/quality and water supply. The politics of water decision-making and effectiveness of water policy. Broad focus on federal water policy, with case examples from nationally significant U.S. watersheds. GE credit: SocSci.—III. (III.) Lubell

(f) Environmental Planning

170. Conservation Biology Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 and Economics 1A; Economics 100 or Agricultural and Resource Economics 100A recommended. Analysis of policies designed to conserve species and their habitats. Emphasis on how individual incentives affect the success of conservation policies. Valuation of endangered species and biodiversity. Criteria for deciding conservation priorities

171. Environmental Planning (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1; a course in social science and a course in environmental science. Laws, institutions, design and analysis methods, and means of implementation of plans for land use, air and water quality, transportation, and energy are examined. Theoretical and practical readings are used. Political and technical problems common to all planning processes emphasized.—III. (III.) Handy

172. Public Lands Management (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A. Investigation of alternative approaches to public lands management by Federal and state agencies. The role each agency's legislation plays in determining the range of resource allocations. GE credit: SocSci.—I. (I.) Lubell

173. Land Use and Growth Controls (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Political Science 1, Economics 1A, intermediate statistics (Sociology 106 or Statistics 102 or the equivalent), and local government (Applied Behavioral Science 157, 158 or Political Science 100, 102 or 104.) Exposes students to the economic, political, and legal factors affecting land use and growth controls, and helps students critically evaluate written materials in terms of their arguments and supporting data.

175. Natural Resource Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 100B or Economics 100 or the equivalent. Economic concepts and policy issues associated with natural resources, renewable resources (ground water, forests, fisheries, and wildlife populations) and non-renewable resources (minerals and energy resources, soil). (Same course as Agricultural and Resource Economics 175.) GE credit: SocSci.—I. (II.) Farzin

178. Applied Research Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 103 or Sociology 106 or the equivalent. Research methods for analysis of urban and regional land use, transportation, and environmental problems. Survey research and other data collection techniques; demographic analysis; basic forecasting, air quality, and transportation models. Collection, interpretation, and critical evaluation of data.—II. (II.) Handy

179. Environmental Impact Reporting (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: upper division standing; Biological Sciences 1A; one course from the following: course 1, 10, 110, Environmental Toxicology 10, or Environmental and Resource Sciences 100. Methods of analysis used in environmental impact reporting. Emphasis on effective writing; review and management of impact reports in the context of rational democratic planning systems.—I. (I.) Johnston

179L. Environmental Impact Reporting Using Geographic Information (2)
Laboratory/discussion—2 hours; laboratory—4 hours. Prerequisite: course 179 concurrently. Introduction to Geographic Information Systems (GIS) by using ArcView for assessment and environmental planning. Not open for credit to students who have completed Applied Biological Systems Technology 180, 181 or Agricultural Systems and Environment 132.—I. (I.) Johnston

(g) Other Courses

190. Workshops on Environmental Problems (1-8)
Laboratory—2-16 hours. Prerequisite: consent of instructor. Workshops featuring empirical analyses of contemporary environmental problems by multidisciplinary student teams. Guided by faculty and lay professionals, the teams seek to develop an integrated view of a problem and outline a series of alternative solutions. Open to all upper division and graduate students on application. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internships supervised by a member of the faculty. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

212A. Environmental Policy Process (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course in public policy (e.g., Environmental Science and Policy 160); environmental law (e.g., Environmental Science and Policy 161); course in bureaucratic theory (e.g., Political Science 187 or Environmental Science and Policy 166); course in statistics (e.g., Sociology 106 or Agricultural and Resource Economics 106). Introduction to selected topics in the policy process, applications to the field of environmental policy. Develops critical reading skills, understanding of frameworks of the policy process and political behavior, and an ability to apply multiple frameworks to the same phenomena. Offered in alternate years. (Same course as Ecology 212A.)—(III.) Sabatier

212B. Environmental Policy Evaluation (4)
Lecture—1 hour; discussion—1 hour; seminar—2 hours. Prerequisite: intermediate microeconomics (e.g., Economics 100); Statistics 108 or Agricultural and Resource Economics 106; policy analysis (e.g., Environmental Science and Policy 168A or the equivalent); Agricultural and Resource Economics 176. Methods and practices of policy analysis; philosophical and intellectual bases of policy analysis and the political role of policy analysis. (Same course as Ecology 212B.)

220. Tropical Ecology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: advanced introductory ecology course—course 100, Evolution and Ecology 101, 117; Evolution and Ecology 138 recommended. Open to graduate and undergraduate students who meet requirement subject to consent of instructor. An overview of present status of knowledge on structure and processes of major tropical ecosystems. Differences and similaritiees among tropical and temperate systems stressed. Offered in alternate years.—(III.) Rejmankova

228. Advanced Simulation Modeling (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: courses 128-128L; Statistics 108 or Agricultural and Resource Economics 106. Advanced techniques in simulation modeling; optimization and simulation, dynamic parameter estimation, linear models, error propagation, and sensitivity testing. Latter half of course will introduce model evaluation in ecological and social system models.

252. Sustainable Transportation Technology and Policy (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 160 or the equivalent. Role of technical fixes and demand management in creating a sustainable transportation system. Emphasis on technology options, including alternative fuels, electric propulsion, and IVHS. Analysis of market demand and travel behavior, environmental impacts, economics and politics. (Same course as Civil and Environmental Engineering 252.)—(III.) Sperling

275. Economic Analysis of Resource and Environmental Policies (4)
Lecture/discussion—4 hours. Prerequisite: Agricultural and Resource Economics 204/Economics 204. Development of externality theory, market failure concepts, welfare economics, theory of renewable and non-renewable resource use, and political economic models. Applications to policy issues regarding the agricultural/environment interface and managing resources in the public domain. (Same course as Agricultural and Resource Economics 275.)—III. (III.)

278. Research Methods in Environmental Policy (3)
Lecture/discussion—3 hours. Prerequisite: Agricultural and Resource Economics 106 or the equivalent. Introduction to scientific research in environmental policy. Major issues in the philosophy of the social sciences. How to design research that acknowledges theoretical assumptions and that is likely to produce evidence in an intersubjectively reliable fashion with explicit recognition of its uncertainties. Offered in alternate years.—(II.) Sabatier

298. Directed Group Study (1-5)
299. Research (1-12)
Prerequisite: graduate standing. (S/U grading only.)

Environmental Sciences

See Agricultural Management and Rangeland Resources; Atmospheric Science; Environmental and Resource Sciences; Environmental Biology and Management; Environmental Horticulture and Urban Forestry; Environmental Policy Analysis and Planning; Environmental Toxicology; Hydrology; Landscape Architecture; Soil and Water Science; Wildlife, Fish, and Conservation Biology

Environmental Toxicology

(College of Agricultural and Environmental Sciences)
Ronald S. Tjeerdema, Ph.D., Chairperson of the Department
Department Office, 4138 Meyer Hall (530-752-1142)
http://www.envtox.ucdavis.edu

Faculty

M. Judith Charles, Ph.D., Assistant Professor
Gary N. Cherr, Ph.D., Professor *(Nutrition)*
Michael S. Denison, Ph.D., Professor
Fumio Matsumura, Ph.D., Professor *(Entomology)*
Marion G. Miller, Ph.D., Professor
Patricia Oteiza, Ph.D., Associate Professor, *(Nutrition)*
Robert H. Rice, Ph.D., Professor
Takayuki Shibamoto, Ph.D., Professor
Ronald S. Tjeerdema, Ph.D., Professor
Barry W. Wilson, Ph.D., Professor *(Animal Science)*
Dorothy E. Woolley, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*

Emeriti Faculty

Richard G. Burau, Ph.D., Professor Emeritus
Donald G. Crosby, Ph.D., Professor Emeritus
Dennis P. H. Hsieh, Sc.D., Professor Emeritus
Ted Hullar, Ph.D., Professor Emeritus
James N. Seiber, Ph.D., Professor Emeritus
Michael W. Stimmann, Ph.D., Lecturer Emeritus
Wray W. Winterlin, M.S., Lecturer Emeritus

Affiliated Faculty

Susan Anderson, Ph.D., Associate Adjunct Professor
Arthur Craigmill, PhD., Cooperative Extension Specialist
Mari Golub, Ph.D., Assistant Adjunct Professor *(CRPRC)*
Norman Kado, Ph.D., Associate Adjunct Professor
John Knezovich, Ph.D., Adjunct Professor
Kiyoung Lee, Ph.D., Assistant Professor *(Epidemiology and Preventive Medicine)*
Alison Mitchell, Ph.D., Assistant Professor *(Food Science and Technology)*
Ruby Reed, Ph.D., Lecturer
Cecilia Von Beroldgen, Ph.D., Lecturer *(UC Davis Extension Forensics Program and Department of Justice)*

The Major Program

Toxic agents found in the environment include pesticides, food additives, industrial waste, metals and chemicals produced by animals, plants, fungi and bacteria. Students in the Environmental Toxicology major learn about the potential for toxicants to produce adverse effects by understanding both their environmental fate and biological activity. They learn about monitoring concentrations and the distribution and persistence of agents found in water, soil, air and foods. Toxicity testing procedures and exposure assessment are used to help signal potential for harm to humans and other species. By understanding the cellular targets and biochemical mechanisms perturbed by toxicants, toxicologists can better estimate adverse effects. Overall, the program teaches students how knowledge of the origin, fate and action of toxic agents helps toxicologists evaluate the risk of adverse effects and balance risks against the benefits of use.

The Program. Preparatory courses in biology, chemistry, mathematics, and physics are required to provide the chemical and biological principles which underlie toxicology. Students in the major are expected to understand the environmental fate and biological activity of different classes of toxic substances, and the legislative issues which arise from chemical use. Opportunities are available to develop in-depth understanding in areas of emphasis through selection of electives.

Internships and Career Alternatives. Occupations that use environmental toxicology include risk assessment, pharmaceutical or food additive toxicity testing and research, managing regulatory compliance, residue or forensic analysis, pest control, monitoring and field sampling, industrial hygiene, and environmental health and safety. A substantial proportion of graduates elect to pursue advanced training in graduate or professional schools. Others with the B.S. degree have gone on to law, medical or pharmacy school, as well as to degrees in pharmacology, toxicology, agricultural and environmental chemistry, or public health. During undergraduate study, optional internships or research projects are recommended to provide training and work experience to help students set future goals.

B.S. Major Requirements:

	UNITS
English Composition Requirement	**0-8**
See College requirement	
Preparatory Subject Matter	**64-70**
Biological Sciences 1A, 1B, 1C	15
Chemistry 2A-2B-2C or 2AH-2BH-2CH, and 118A-118B-118C or 128A-128B-128C, 129A	27-28
Agricultural Management and Rangeland Resources 21	3
Environmental Toxicology 10 or Environmental Science and Policy 10	3-4
Mathematics 16A-16B or 21A-21B	6-8
Physics 1A-1B or 7A-7B	6-8
Statistics 100	4
Breadth/General Education	**36**
Satisfaction of the General Education requirement to include courses selected with adviser's approval to complement the major (courses in agricultural economics, environmental studies, political science, psychology, and sociology are particularly recommended.)	24
Additional breadth in humanities and social sciences	12
Depth Subject Matter	**34-35**
Biological Sciences 101, 102 or 103	6-7
Environmental Toxicology 101, 102A-102B, 103A-103B, 138 and (128, 131, 135, or 146)	23
Restricted/Other Electives	**24**
Electives selected for area of specialization with adviser's approval. (See department Web page for details)	
Unrestricted Electives	**7-14**
Total Units for the Degree	**180**

Major Adviser. R.H. Rice.

Advising Center for the major is in 4137 Meyer Hall. Contact the Academic Program Adviser, (530) 752-1042.

Minor Program Requirements:

	UNITS
Environmental Toxicology	**18**
Environmental Toxicology 101, 102A, 103A	12
Elective courses 6 units minimum, selected from Environmental Toxicology 10, 128, 131, 135, 138, 146, 190, 198 and 199 (4 units combined maximum of 190, 198 and 199 with adviser approval)	6

Minor Adviser M.S. Denison

Graduate Study. Programs of study leading to M.S. and Ph.D. degrees are available through related Graduate Groups such as Pharmacology and Toxicology, Biochemistry and Molecular Biology, and Agricultural and Environmental Chemistry. For information on graduate study, contact the Advising Office or the appropriate graduate adviser. See also the Graduate Studies chapter of this catalog.

Graduate Advisers. M.G. Miller *(Pharmacology and Toxicology),* T. Shibamoto *(Agricultural and Environmental Chemistry).*

Courses in Environmental Toxicology (ETX)

Lower Division Courses

10. Introduction to Environmental Toxicology (3)
Lecture—3 hours. Hazardous substances, their effects on humans and their actions and movement in the environment. Emphasis on substances of current concern. GE credit: SciEng.—III. (III.) Tjeerdema

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internships supervised by a member of the faculty. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

101. Principles of Environmental Toxicology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 8B, 118B, or 128B and Biological Sciences 1A. Principles of toxicology with a focus on environmental, industrial, and natural chemicals. Topics include fate and effects of chemicals in organisms and the environment, air pollutants, insecticides, aquatic toxicology, endocrine disruptors, biomarkers and bioassays, and risk assessment.—I. (I.) Denison

102A. Environmental Fate of Toxicants (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 8B, 118B, 128B or consent of instructor. Properties of toxic chemicals influencing their distribution and transformations; action of environmental forces affecting toxicant breakdown, movement, and accumulation; sources and occurrence of major classes of environmental toxicants. Not open for credit to students who have completed course 112A.—II. (II.) Tjeerdema

102B. Quantitative Analysis of Environmental Toxicants (5)
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 102A. Sample preparation methods for trace analysis of environmental toxicants. Concept and techniques of advanced analytical instrumentation. Interpretation and use of analytical data. Not open for credit to students who have completed course 112B.—III. (III.) Shibamoto

103A. Biological Effects of Toxicants (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 102; course 101 and Neurobiology, Physiology, and Behavior 101 recommended. Biological effects of toxic substances in living organisms. Metabolism, cellular and tissue targets, mechanisms of action, and pathological effects. Not open for credit to students who have completed course 114A.—II. (II.) Rice

103B. Biological Effects of Toxicants: Experimental Approaches (5)
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 103A. Experimental approaches for assessing the biological effects of toxicants. Not open for credit to students who have completed course 114B.—III. (III.) Miller

110. Toxic Tragedies and Their Impact on Society (2)
Lecture—2 hours. Prerequisite: Biological Sciences 10 or the equivalent or consent of instructor; Chemistry 118A recommended. Examination of toxic tragedies, their origins, consequences, and effects on toxic regulation. Offered in alternate years. GE credit: Wrt.—(II.)

111. Introduction to Mass Spectrometry (3)
Lecture—3 hours. Prerequisite: Chemistry 118C. Introduction to mass spectrometry, including ioniza-

tion techniques, mass analyzers, interpretation of mass spectra, and applications of mass spectrometry. Emphasis on fundamental concepts of mass spectrometry necessary to identify and quantify organic molecules.—II. (II.) Charles

120. Perspectives in Aquatic Toxicology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 8B, 118B or 128B, Biological Sciences 1A, or consent of instructor. Toxic substances, their fate in marine and freshwater systems, and their effects on aquatic organisms, populations, and ecosystems. Emphasis on substances and issues of current concern. Offered in alternate years.—II. Anderson, Cherr, Tjeerdema

127. Environmental Stress and Development in Marine Organisms (10)
Lecture—4 hours; laboratory—12 hours; discussion—2 hours. Prerequisite: course 101 or Biological Sciences 102 or 104 or the equivalent; course 114A or Nutrition 114 recommended. Course taught at Bodega Marine Laboratory. Effects of environmental and nutritional stress, including pollutants, on development and function in embryos and larvae of marine organisms. Emphasis on advanced experimental methods. (Same course as Nutrition 127.) GE credit: SciEng.—summer. Cherr

128. Food Toxicology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 102 and 103. Chemistry and biochemistry of toxins occurring in foods, including plant and animal toxins, intentional and unintentional food additives. The assessment of food safety and toxic hazards. (Same course as Food Science and Technology 128.) GE credit: SciEng.—III. (III.) Shibamoto, Mitchell

131. Environmental Toxicology of Air Pollutants (3)
Lecture—3 hours. Prerequisite: Chemistry 8B (may be taken concurrently) or the equivalent; Biological Sciences 102 recommended. Field trip required. Toxicology of air pollutants in the ambient, indoor, and occupational environments. Health effects, sources, environmental fates, pulmonary responses, sampling and analyses, and air-quality criteria and standards.—I. (I.) Kado

135. Health Risk Assessment of Toxicants (3)
Lecture—3 hours. Prerequisite: course 101; course 114A recommended. Current practices of health risk assessment of environmental chemicals using toxicological principles and their application to regulatory control of these chemicals. GE credit: SciEng.—I. (I.) Reed

138. Legal Aspects of Environmental Toxicology (3)
Lecture—3 hours. Prerequisite: course 10 or 101 recommended. Federal and California legislation concerning air and water pollution, pesticide use, food and feed additives, consumer protection, and occupational exposure to toxic substances; roles of federal regulatory agencies; alternatives to government control.—II. (II.) Stimmann

146. Exposure and Dose Assessment (3)
Lecture—3 hours. Prerequisite: course 112A; course 135 recommended. The exposure component of risk assessment; specifically, the presence and/or formation of toxic substances in environmental media, their movement within and between contaminated media, and the contacts of human populations with those media. GE credit: SciEng.—III. (III.) Lee

190. Seminar (1)
Seminar—1 hour. Prerequisite: consent of instructor. Selected topics presented by students, faculty, or outside speakers covering current research and instructional activities within environmental toxicology. Reports and discussion concerning oral and written presentations, literature sources, and career opportunities. (P/NP grading only.)—I, II, III. (I, II, III.)

190C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Weekly conference of advanced research methods and the interpretation of research results. (P/NP grading only.)—I, II, III. (I, II, III.)

190S. Environmental Toxicology Career Seminar (1)
Seminar—1 hour. Careers in environmental toxicology; discussions with graduates from the Department of Environmental Toxicology and other experts in the field. (P/NP grading only.)—I. (I.)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internships supervised by a member of the faculty. (P/NP grading only.)

194HA-194HB. Honors Research (3-3)
Discussion—1 hour; laboratory—6 hours. Prerequisite: senior standing, minimum GPA of 3.25, consent of instructor. Specific research project conducted under the supervision of a faculty sponsor. Experience to include experimental design, learning new techniques, data analysis and interpretation of findings. (P/NP grading only; deferred grading pending completion of sequence.)

194HC. Honors Research (3)
Laboratory—6-9 hours; discussion—1 hour. Prerequisite: senior standing, minimum GPA of 3.25, and consent of instructor. Continuation of course 194HA-194HB. (P/NP grading only.)

197T. Tutoring in Environmental Toxicology (1-5)
Hours and duties will vary depending upon course being tutored. Prerequisite: advanced standing in Environmental Toxicology, a related major, or the equivalent experience and consent of instructor. Teaching toxicology including conducting discussion groups for regular departmental courses under direct guidance of staff. May be repeated for credit up to a total of 5 units. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

203. Environmental Toxicants (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 128C (or the equivalent), or Chemistry 8B and consent of instructor. Toxic chemicals: selected topics illustrating their occurrence, structure, and the reactions underlying detection, toxicity, fate, and ecological importance. Offered in alternate years.—II.

214. Mechanisms of Toxic Action (3)
Lecture—3 hours. Prerequisite: Biological Sciences 102, 103, and consent of instructor. Chemical, biochemical, and molecular mechanisms underlying the adverse effects of toxic chemicals. Students are required to write a grant proposal and participate in a grant review panel. Offered in alternate years.—(III.) Denison, Hammock

220. Analysis of Toxicants (3)
Lecture—3 hours. Prerequisite: course 101 and consent of instructor; course 203 recommended. Principles of the microanalysis of toxicants. Theoretical considerations regarding separation, detection, and quantitative determination of toxicants using chemical and instrumental techniques.—I. (I.) Charles

220L. Analysis of Toxicants Laboratory (2)
Laboratory—6 hours. Prerequisite: course 220 (may be taken concurrently) and consent of instructor. Laboratory techniques for microanalysis of toxicants. Separation, detection, and quantitative determination of toxicants using chemical and instrumental methods.—I. (I.)

228. Gas Chromatography/Mass Spectrometry of Toxic Chemicals (3)
Lecture—1 hour; discussion—1 hour; laboratory—3 hours. Prerequisite: course 220 and Chemistry 129C; or consent of instructor. Application of GC/MS techniques to investigate toxic chemicals. Mass spectral fragmentations and their application to the structural elucidation. Practical application of GC/MS in current research. Preference given to environmental toxicology graduate students.—II. (II.) Shibamoto

234. Neurophysiological Basis of Neurotoxicology (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology and Behavior 101 or the equivalent; basic understanding of neurophysiology. Mechanisms of action at the cellular and systemic level of a number of different neurotoxins and toxicants. Examples of ways toxins may act on the nervous system and techniques for study of neurotoxicology. (Same course as Physiology 234.)—I. (I.) Woolley

240. Ecotoxicology (3)
Lecture—3 hours. Prerequisite: elementary course in toxicology and ecology or the equivalent, or consent of instructor. Principles of toxicology as applied to chemical action on natural populations, communities, and ecosystems. Physical, chemical, and biological characteristics which influence ecotoxic effects, modelling, and field research. Selected case histories are analyzed and presented in class.—III. (III.) Matsumura

250. Reproductive Toxicology (3)
Lecture—1.5 hours; lecture/discussion—1.5 hours. Prerequisite: Physiology 220 or Pharmacology—Toxicology 203. Application of toxicological principles in reproductive studies. Effects of toxicants on the male, female, and developing embryo/fetus. Critical evaluation of reproductive toxicity studies and development of mechanistic approaches to understanding how chemical exposure can adversely affect reproduction. Offered in alternate years.—(II.) Miller, Golub

278. Molecular Techniques (3)
Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Recombinant DNA technology and its applications. (Same course as Forensic Science 278.) Offered in alternate years.—Denison, Rice

280. Forensic DNA Analysis (3)
Lecture—3 hours. Prerequisite: coursework in genetics and molecular biology. Foundation in theory and practice of forensic DNA analysis; past, present, and emerging technologies; legal and quality assurance issues. DNA extraction, DNA quantitation, multiplex amplification of STR loci, capillary electrophoresis of amplified products, and analysis of STR typing data. (Same course as Forensic Science 280.) Offered in alternate years.—Von Beroldingen

290. Seminar (1)
Seminar—1 hour. Current topics in environmental toxicology. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Advanced Research Conference (1)
Lecture/discussion—1 hour. Prerequisite: consent of instructor. Presentation and critical discussion of advanced research methods and interpretation of research results. Designed primarily for graduate students. (S/U grading only.)—I, II, III. (I, II, III.)

297T. Tutoring in Environmental Toxicology (1-5)
Hours and duties will vary depending upon course being tutored. Prerequisite: graduate standing in Environmental Toxicology, a related major, or the equivalent experience, and consent of instructor. Teaching toxicology including conducting discussion groups for regular departmental courses under direct guidance of staff. May be repeated for credit up to a total of 5 units. (S/U grading only.)

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Epidemiology

See Epidemiology and Preventive Medicine (under Medicine, School of); and Medicine and Epidemiology

Epidemiology (A Graduate Group)

Wesley O. Johnson, Ph.D., Chairperson of the Group

Group Office, 2108 Tupper Hall (Department of Medicine and Epidemiology) (530-752-8340; Fax: 530-752-0414)

http://www.epi.ucdavis.edu

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Walter Boyce, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Ken Brown, M.D., Professor *(Nutrition)*
Tim E. Carpenter, Ph.D., Professor *(Medicine and Epidemiology)*
James Case, D.V.M., Ph.D., Professor of Clinical Diagnostic Medicine *(Medicine and Epidemiology)*
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Robert Shumway, Ph.D., Professor *(Statistics)*
Robert Szabo, M.D., Professor *(Orthopaedic Surgery)*
Jerold Theis, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Mark Thurmond, D.V.M., M.P.V.M., Ph.D., Professor *(Medicine and Epidemiology)*
Jessica Utts, Ph.D., Professor *(Statistics)*

Emeriti Faculty

Nancy East, M.P.V.M., D.V.M., Professor Emeritus
Bruce Eldridge, Ph.D., Professor Emeritus
Alvin Wiggins, Ph.D., Professor Emeritus

Affiliated Faculty

Robert Atwill, D.V.M., Ph.D., Associate Professor Agronomist/Assistant Cooperative Extension Specialist *(Population Health and Reproduction)*
Rahman Azari, Ph.D., Lecturer *(Statistics)*
Nicholas Lerche, Ph.D., Associate Adjunct Professor, *(Population Health and Reproduction)*
Jonna Mazet, M.P.V.M., D.V.M., Ph.D., Assistant Clinical Professor *(Wildlife Health Center)*
Steven Samuels, Ph.D., Assistant Clinical Professor *(Epidemiology and Preventive Medicine)*

Graduate Study. The Graduate Group in Epidemiology offers programs of study and research leading to the M.S. and Ph.D. degrees. Areas of emphasis include environmental/occupational epidemiology; infectious disease epidemiology; epidemiologic methods and biostatistics; health services and economics; zoonotic and vector-borne epidemiology; and nutritional, wildlife epidemiology. For detailed information regarding the program, address the chairperson of the group.

Graduate Advisers. I. Gardner *(Medicine and Epidemiology),* P. Kass *(Population Health and Reproduction),* J. Utts *(Statistics).*

Required Courses for the Program

Prerequisite Courses. Prerequisites may be taken concurrently with required courses below.

Mathematics 16A-16B or 21A-21B

Statistics 102, 106, and 108, or Preventive Veterinary Medicine 402, 403

Required Courses. These courses are required of all students in the program (M.S. and Ph.D. degrees). These requirements cannot be waived and must be met before a student's Qualifying Examination.

Epidemiology 204, 205A, 205B, 206, 207, 208 and 290

Statistics 130A-130B

One course from Population Health and Reproduction 202 or Statistics 144

Related Courses. For additional course work in Epidemiology, please see Medicine and Epidemiology, Preventive Veterinary Medicine, Population Health and Reproduction, Epidemiology and Preventive Medicine, and Statistics.

Courses in Epidemiology (EPI)

Graduate Courses

204. Statistical Models, Methods, and Data Analysis for Scientists (4)
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: Statistics 130B or 131B, or 133; Statistics 108 recommended. Development of broad statistical skills useful for the analysis of scientific data. Special emphasis given to determining factors associated with characteristics like disease and time-to-event. Analysis of data that can be modeled as generalized linear and generalized linear mixed models, parametric and non-parametric survival models, and models for correlated, clustered, longitudinal data.—III. Johnson

205A. Principles of Epidemiology (4)
Lecture—4 hours. Prerequisite: Preventive Veterinary Medicine 402 or consent of instructor. Basic epidemiologic concepts and approaches to epidemiologic research, with examples from veterinary and human medicine, including outbreak investigation, infectious disease epidemiology, properties of tests, and an introduction to epidemiologic study design and surveillance. (Same course as Preventive Veterinary Medicine 405.)—I. (I.)

205B. Integration of Epidemiologic Concepts (2)
Discussion—2 hours. Prerequisite: Preventive Veterinary Medicine 405/course 205A can be taken concurrently. In-depth analysis and integration of basic epidemiologic concepts and approaches to epidemiologic research presented in Preventive Veterinary Medicine 405/course 205A, with more mathematical and theoretical basis and examples from veterinary and human medicine, including outbreak investigation, infectious disease epidemiology, properties of diagnostic tests, study design, and surveillance.—I. (I.)

206. Epidemiologic Study Design (3)
Lecture—1.5 hours; discussion—0.9 hours; laboratory—1.8 hours. Prerequisite: Preventive Veterinary Medicine 405/course 205A, course 205B. Builds on concepts presented in course 205A. Concepts of epidemiologic study design—clinical trials, observational cohort studies, case control studies—introduced in course 205A are covered in more depth, using a problem-based format. Discussion of published epidemiologic studies. (Same course as Preventive Veterinary Medicine 406A.)—II. (II.)

207. Advanced Concepts in Epidemiologic Study Design (4)
Lecture/discussion—4 hours. Prerequisite: course 205B and 206. In-depth integration of advanced concepts in study design, with theory and examples, including confounding, effect modification under additive and multiplicative models, internal and external validity, bias, misclassification, alternate designs, source populations, statistical power and sample size, causation, and genetic epidemiology.—III. Gold, Kass

208. Analysis and Interpretation of Epidemiologic Data (3)
Lecture—16 sessions; laboratory—21 sessions; project. Prerequisite: course 204 (may be taken concurrently) and 207, and either Statistics 144 or Population Health and Reproduction 202 and entry level skill in standard statistical software (e.g., SPSS, BMDP, SAS, Stata, MinTab, S-Plus). Application of theory and concepts of statistics and epidemiology to analysis and interpretation of data typically found in veterinary and human epidemiologic research.—III. Beckett

210A. Analytic Epidemiology I: Case-Control Studies (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Statistics 130B and Preventive Veterinary Medicine 406 (or the equivalent), or consent of instructor. Theory and practice of epidemiologic data analysis. Topics include confounding, stratification, matching, interaction, and logistic regression. (Same course as Population Health and Reproduction 210A.)—II. (II.) Kass

210B. Analytic Epidemiology II: Cohort Studies (3)
Lecture—3 hours. Prerequisite: course 210A. Theory and practice of epidemiologic data analysis. Topics include rates, rate standardization, cohort analysis, Poisson regression, and survival/failure-time methods. (Same course as Population Health and Reproduction 210B.)—III. (III.) Kass

220. Problems in Epidemiologic Study Design (4)
Lecture—3 hours; term paper. Prerequisite: Preventive Veterinary Medicine 405 and 406 or the equivalent; Population Health and Reproduction 207 concurrently; Statistics 102 and 106 or the equivalent. Design and development of research protocols and funding applications for peer review. Application of research methods data collection and management and statistical analysis in research proposals. Methods of evaluating research proposals, mechanisms of funding, specifying human subjects considerations.—III. (III.) Gold

222. Epidemiological Modeling (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Preventive Veterinary Medicine 405. Techniques of model building and simulation of infectious diseases will be explored. Epidemiologic modeling philosophy, construction and validation will be emphasized. Offered in alternate years.—II. Carpenter

223. Spatial Epidemiology (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Preventive Veterinary Medicine 405 or Environmental Studies 126 or Veterinary Medicine 409. Geographic Information Systems (GIS) and spatial statistics. Students are expected to complete a term project based on their graduate research. Offered in alternate years.—II. Carpenter

224. Health and Ecological Risk Analysis (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Preventive Veterinary Medicine 406 or consent of instructor; background in statistics, including multivariable techniques; a course in differential equations. A methodological approach to risk analysis for human and animal-related health and ecological issues. Basic principles of risk analysis, including perception, communication, assessment and management. Emphasis on the assessment of risk.—III. (III.) Carpenter

240. Principles of Injury Epidemiology (3)
Lecture/discussion—3 hours. Overview of the epidemiology of human injury, including general principles, surveillance methods, behavioral factors, environmental factors, treatment issues and engineering and legal interventions related to vehicular injuries, drownings, falls, fires and burns, poisonings, firearm injuries, and other intentional injuries.—I. (I.) Romano

250. Introduction to Clinical Research Design and Epidemiology (1)
Lecture—1 hour. Prerequisite: graduate standing or medical/nursing personnel. For medical personnel who are or will be involved in medical research. Review of basics of clinical study design and analysis of clinical data. (S/U grading only.)—I. (I.) McCurdy, Romano

251. Environmental Epidemiology (3)
Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 405 (may be taken concurrently); upper division undergraduates who have completed Environmental Studies 126; or the equivalent. Examination of the human health effects and the risk of disease from community, occupational, and personal exposure to toxic substances. Offered in alternate years.—I. Gold

260. Epidemiology of Chronic Diseases and Aging (3)
Lecture/discussion—3 hours. Overview of the epidemiology of chronic disease in old age. Topics include biology of aging, epidemiology of cardiovascular disease, neoplasms, osteoporosis and fractures, psychosocial factors and health in old age, dementias, functional status and prevention of disease.—II. (II.)

270. Research Methods in Occupational Epidemiology (3)
Laboratory/discussion—3 hours. Prerequisite: Environmental Studies 126 or Preventive Veterinary Medicine 405; and Statistics 102 or Epidemiology and Preventive Medicine 402. Methods used in epidemiologic research on occupational hazards. Topics include design and analysis of cohort and case-control studies, sample size, measuring dose, choosing a control group, validation of employment and health data, interpreting negative studies, and analysis software. Offered in alternate years.—III. Beaumont

290. Seminars in Epidemiology (1)
Seminar—1 hour. Students will actively participate in presentation and discussion of ongoing or published research projects in epidemiology. (S/U grading only.)—III. (III.)

291. Seminars in Human Health Services Research and Clinical Epidemiology (1)
Seminar—1 hour. Critical review, evaluation, and discussion of research in health services and clinical epidemiology. Presentation of statistical, epidemiologic, and econometric methods. Students present their own research and critique the work of others. May be repeated for credit. (Same course as General Medicine 291.) (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
Seminar—1-5 hours. Group study in selected areas of epidemiology.

299. Research (1-12)
Research in selected areas of epidemiology. (S/U grading only.)

Evolution and Ecology

Michael Turelli, Ph.D., Chairperson of the Section

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http://www.eve.ucdavis.edu

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David J. Begun, Ph.D., Associate Professor
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Timothy Prout, Ph.D., Professor Emeritus
Kenneth E. F. Watt, Ph.D., LL.D, Professor Emeritus
Grady L. Webster, Ph.D., Professor Emeritus

Affiliated Faculty

Susan L. Keen, Ph.D., Lecturer

The Major Program

The major in Evolution and Ecology offers the student a broad background in the theoretical and empirical basis of our understanding of the diversity and distribution of living organisms.

The Program. The program of study for the evolution and ecology major begins with a core of introductory courses in mathematics, physical sciences, and biology. These are followed by survey courses in evolution and ecology and various more specialized courses that allow the student to focus his or her studies. Evolution and Ecology majors may earn either a Bachelor of Science or a Bachelor of Arts degree. The requirements for the B.S. degree program include more science courses, such as biochemistry, whereas those for the A.B. degree program allow room for more electives within the humanities and social sciences. The A.B. degree is especially appropriate for those students who wish to combine arts or languages with evolution and ecology for career preparation in such areas as scientific writing, translating or illustration.

Career Alternatives. A degree in evolution and ecology prepares the student for career opportunities in research, teaching, health professions, veterinary medicine, agriculture, environmental management, and industry. Many students gain some research experience while at UC Davis and choose to continue their training at the graduate level. This track offers careers in academics, government, or business.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 41-43
Biological Sciences 1A-1B-1C 15
Chemistry 2A-2B 10
Chemistry 8A-8B 6
Mathematics 16A-16B or Statistics 100 or 102 4-6
Physics 1A-1B 6

Depth Subject Matter..... 36
Biological Sciences 101 4
One course from Evolution and Ecology 100; Geology 107; Anthropology 151 3-4
One course from Evolution and Ecology 101; Environmental Science and Policy 100; Wildlife, Fish, and Conservation Biology 151 4
Additional upper division course work in biological science to achieve a total of 36 or more units..... 24-25
Include at least one course from each of the areas of study below.

Areas of Study:

1. Biodiversity: Entomology 103; Evolution and Ecology 105, 108, 112 and 112L, 134, 134L and 134F, 140; Microbiology 105; Nematology 110; Plant Biology 116, 118, 147, 148; Wildlife, Fish, and Conservation Biology 110, 111, 120 and 120L.

2. Advanced Evolution and Ecology: Evolution and Ecology 102, 103, 104, 115, 117, 119, 138, 141, 147, 149, 180A and 180B.

Note: A maximum of 4 units of variable-unit courses (numbered 192, 198, 199) may be applied to upper division elective requirements. Evolution and Ecology majors may not substitute course 192 for the upper division laboratory requirement. Courses numbered 197T are not applicable to the upper division elective unit requirement.

Total Units for the Major 77-79

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 57-66
Biological Sciences 1A-1B-1C 15
Chemistry 2A-2B-2C 15
Chemistry 8A-8B or 118A-118B-118C .. 6-12
Mathematics 16A-16B-16C or 21A-21B-21C 9-12
Physics 7A-7B-7C 12

Depth Subject Matter..... 49
Biological Sciences 101, 102, 103, 104... 13
Evolution and Ecology 100, 101..... 8
Statistics 100, 102 or 130A-130B..... 4-8
Additional upper division course work in biological science to achieve a total of 49 or more units including at least 2 units (6 hours per week) of laboratory..... 20-24
Include at least one course from the *Biodiversity* and two courses from the *Advanced Evolution and Ecology* areas of study below.

Areas of Study:

1. Biodiversity: Entomology 103; Evolution and Ecology 105, 108, 112 and

112L, 134, 134L and 134F, 140; Microbiology 105; Nematology 110; Plant Biology 116, 118, 147, 148; Wildlife, Fish, and Conservation Biology 110, 111, 120 and 120L.

2. Advanced Evolution and Ecology: Evolution and Ecology 102, 103, 104, 115, 117, 119, 138, 141, 147, 149, 180A and 180B.

Note: A maximum of 4 units of variable-unit courses (numbered 192, 198, 199) may be applied to upper division elective requirements. Evolution and Ecology majors may not substitute course 192 for the upper division laboratory requirement. Courses numbered 197T are not applicable to the upper division elective unit requirement.

Total Units for the Major 106-115

Biological Sciences Electives

The following courses are acceptable toward the fulfillment of the upper division biological sciences requirement in the A.B. and B.S. major programs and may be selected without adviser approval. Other elective courses are approved on an individual basis by petition through an adviser.

Anatomy, Physiology, and Cell Biology 100

Anthropology 151, 152, 153, 154A, 154B, 155, 156

Biological Sciences, all upper division courses

Chemistry 107A, 107B

Entomology, all upper division courses except 110

Environmental Science and Policy 110, 116, 121, 123, 150C, 151, 151L

Geology 107, 107L, 150C

Microbiology, all upper division courses

Molecular and Cellular Biology, all upper division courses

Nematology 110

Neurobiology, Physiology, and Behavior, all upper division courses

Nutrition 101, 111

Pathology, Microbiology, and Immunology 101, 126, 126L, 128

Philosophy 108

Plant Biology, all upper division courses

Psychology 121, 122, 127, 129

Wildlife, Fish, and Conservation Biology 120, 120L, 121

Major Advisers. Students transferring to Davis from another institution and majoring in evolution and ecology must consult an adviser immediately upon matriculation so that their transfer credits can be applied to the major requirements. All new students in the major should contact the Section of Evolution and Ecology Office for adviser assignment. Substitutions of courses not on the above list for major requirements are arranged through the adviser.

Advising Center for the major is located in 2320 Storer Hall (530-752-8523). Pre-professional students should establish contact with the Health Sciences Advising Office, 111 South Hall, to learn what specific courses are required on their transcripts.

Teaching Credential Subject Representative. Students planning for a teaching career should consult the Department of Education in regard to preparation for certification. See also the section on the Teacher Education Program.

Courses in Evolution and Ecology (EVE)

Lower Division Courses

2. Biodiversity (3)
Lecture—2 hours; lecture/discussion—1 hour. Introduction to nature, scope and geographical distribution of biodiversity (the diversity of life, with emphasis on plants and animals, especially insects). Humans and biodiversity—domestication, aesthetics, ethics and valuation. Species richness and "success." Biodiversity through time; monitoring, evaluation and conservation. Biomes—global, continental and Californian. (Same course as Entomology 2.) GE credit: SciEng, Wrt.—I. (I.) Gullan, Cranston, Shaffer

11. Principles of Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: elementary biology recommended. Ecological principles with emphasis on humans and their interactions with the environment; how humans affect and depend on natural ecosystems; the future of the Earth's biosphere. GE credit: SciEng.—II. (II.) Toft

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the Section of Evolution and Ecology. Internships supervised by a member of the faculty. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)
(P/NP grading only.)

Upper Division Courses

100. Introduction to Evolution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C, 101; Mathematics 16A, 16B, 16C or the equivalent; Statistics 13 or 100 (Statistics 100 recommended). A general survey of the origins of biological diversity and evolutionary mechanisms.—I, II, III. (I, II, III.) Nuzhdin, Begun, Stanton, Kopp

101. Introduction to Ecology (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C; Mathematics 16A, 16B, 16C or the equivalent. A general survey of the principles of ecology.—I, II, III. (I, II, III.) Schoener, Strong, Stachowicz, Chesson, Strauss

102. Population and Quantitative Genetics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 101, and Statistics 100 or 102, and course 100. Evolution as caused by random mating, genetic drift, natural selection, inbreeding, migration, and mutation in theory and actuality. The resemblance between relatives and consequences of selection for quantitative traits. Application of these ideas to topics such as the evolution of sex.—I. (III.) Langley

103. Phylogeny and Macroevolution (4)
Lecture-—3 hours; discussion—1 hour. Prerequisite: course 100. Patterns and processes of evolution above the species level. Homology, homoplasy, and character evolution. Adaptive radiation; modes and rates of diversification. Evolution of complexity, and macroevolution of the genome. Principles of phylogeny reconstruction and their application to macroevolutionary studies.—II. (II.) Sanderson

104. Community Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 101 or Environmental Science and Policy 100. Population growth and density dependence; predation; exploitative, interference and apparent competition; coexistence mechanisms; niches, spatial and temporal variation; stability, diversity, and productivity of food webs; applications to conservation and biological control. Emphasis on quantitative understanding through models, concepts, and empirical evidence.—(II.) Chesson

105. Phylogenetic Analysis of Vertebrate Structure (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B. The structure of the classes and subclasses of vertebrates is described and interpreted in terms of phylogeny.—I. Wainwright

108. Systematics and Evolution of Angiosperms (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B and 1C. Diversity and classification of angiosperms (flowering plants) on a world scale, and current understanding of the origin of angiosperms and evolutionary relationships and trends within them based on morphological and molecular evidence. (Same course as Plant Biology 108.) GE credit: SciEng.—III. (III.) Doyle

112. Biology of Invertebrates (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1B; courses in systematics, ecology, and evolution recommended. Survey of the invertebrate phyla, emphasizing aquatic forms, and focusing on morphology, development, natural history, ecology, and phylogenetic relationships.—II. (II.) Grosberg, Stachowicz

112L. Biology of Invertebrates Laboratory (2)
Laboratory—6 hours. Prerequisite: course 112 concurrently. Field and laboratory experience with representative members of the major invertebrate phyla discussed in course 112. Emphasis on comparative morphology, natural history, ecology, and behavior of living invertebrates. Two field trips required.—II. (II.) Grosberg, Stachowicz

115. Marine Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Environmental Science and Policy 100 or course 101 or consent of instructor. Processes affecting the distribution, abundance, and diversity of plant and animal life in the sea. Introduction to marine habitat diversity and human impacts on marine ecosystems.—(I.) Stachowicz

117. Plant Ecology (4)
Lecture—3 hours; fieldwork—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C; Plant Biology 111 recommended. The study of the interactions between plants, plant populations or vegetation types and their physical and biological environment. Special emphasis on California. Four full-day field trips and brief write-up of class project required. (Same course as Plant Biology 117.)—III. (I.) Rejmanek, Pearcy

119. Population Biology of Weeds (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C; introductory statistics recommended. Origin and evolution of weeds, reproduction and dispersal, seed ecology, modeling of population dynamics, interactions of weeds and crops, biological control. Laboratories emphasize design of competition experiments and identification of weedy species. (Same course as Plant Biology 119.) Not open for credit to students who have completed Plant Biology 121.—(III.) Rejmanek

134. Herpetology (3)
Lecture—2 hours; term paper. Prerequisite: Biological Sciences 1A, 1B; Evolution and Ecology 100 recommended. The world-wide diversity of amphibians and reptiles with emphasis on behavior, ecology, functional morphology, and evolutionary history. Offered in alternate years.—III. Shaffer

134F. Field Herpetology (2)
Fieldwork—5 hours; lecture/discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B, concurrent enrollment in course 134 and 134L. Multi-day field trips to major California habitats focus on identification of, and ecological experiments on, amphibian and reptile species. Students work in teams to plan experiments, collect and analyze data, write up results and give oral presentations to the class. Offered in alternate years.—III. Shaffer

134L. Herpetology Laboratory (2)
Laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B, course 134 concurrently. The diagnostic characteristics and functional attributes of amphibians and reptiles, emphasizing ecological, biogeographic and phylogenetic patterns. Field experience with common species of reptiles and amphibians in the Davis area. Offered in alternate years.—III. Shaffer

138. Ecology of Tropical Latitudes (5)
Lecture—3 hours; discussion—1 hour; extensive writing. Prerequisite: one course in Biological Sciences, Entomology, Wildlife, Fish and Conservation Biology, Geography, or tropical experience, or consent of instructor. Biological, physical, and human-related aspects of the ecology of low latitudes. Distribution, numbers, and relationships of tropical organisms. Problems of development and conservation in the context of ecological and evolutionary theory. Offered in alternate years. GE credit: SciEng, Wrt.—III. Shapiro

140. Paleobotany (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Introduction to plant fossil record, beginning with invasion of land in the Silurian, emphasizing origin and evolution of major groups and adaptations and changing composition and distribution of floras in relation to plate tectonics and climatic change.—I. (I.) Doyle

141. Principles of Systematics (3)
Lecture—2 hours; biweekly research projects. Prerequisite: Biological Sciences 1B or 1C; course 100 recommended. Historical background, philosophical rationale, contemporary approaches, and working rules of biosystematics, including International Code of Zoological Nomenclature. Offered in alternate years. GE credit: SciEng, Wrt.—(III.) Shapiro

147. Biogeography (4)
Lecture—3 hours; term paper. Prerequisite: Biological Sciences 1A, 1B. Movements of terrestrial organisms. The role of geologic, climatic, and biologic changes in the geographic distribution of organisms. Offered in alternate years.—(I.) Shapiro

149. Evolution of Ecological Systems (4)
Lecture—3 hours; term paper. Prerequisite: course 101 or Environmental Studies 100 (or the equivalent), and course 100 (or the equivalent). Evolution as an organizing force in natural communities. Co-adaptation in trophic and competitive relationships. Ecology of polymorphisms, clines, and speciation. Offered in alternate years.—I. Shapiro

175. Computational Genetics (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Biological Sciences 101 and Statistics 100 or 102. The use of computers to solve problems in genetics and evolution. Introduction to a general purpose computer language (Python), computational statistical methods, and applications such as QTL mapping, linkage detection, estimation of rates of evolution, and gene finding.—II. Gillespie

180A-180B. Experimental Ecology and Evolution in the Field (4-4)
Lecture/laboratory—3 hours; fieldwork—3 hours. Prerequisite: course 100; course 101 or Environmental Science and Policy 100. Experimental design in field ecology. Students will critique primary literature, design project, gather and analyze data. Students required to write original research paper based on field experiments. Offered in alternate years. (Deferred grading only pending completion of sequence.)—II-III. Strauss, Stanton

189. Introduction to Biological Research (1)
Discussion—1 hour. Prerequisite: upper division standing in Evolution and Ecology or related biological science; consent of instructor. Introduction to research methods in biology. Presentation and discussion of research by faculty, graduate, and undergraduate students. May be repeated for credit up to a total of 3 units. (P/NP grading only.)—I, II, III. (I, II, III.)

190. Undergraduate Seminar (2)
Seminar—2 hours. Prerequisite: upper division standing in the biological sciences or a related discipline. Student reports on current topics with emphasis on integration of concepts, synthesis, and state-of-the-art research approaches. Reviews of literature and reports of undergraduate research may be included. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.) Shapiro

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the Section of Evolution and Ecology. Internships supervised by a member of the faculty. (P/NP grading only.)

194HA-194HB-194HC. Research Honors
Laboratory—6 hours. Prerequisite: Students who have completed 135 units and qualify for the honors program (as defined by the current catalog). Students pursue intensive research under the guidance of a faculty adviser. Students are expected to complete the full three-quarter sequence culminating in the writing of an honors thesis. (Deferred grading only, pending completion of sequence.)

197T. Tutoring in Biological Sciences 1B (1-2)
Tutorial—3-6 hours. Prerequisite: Biological Sciences 1B with a grade of B or better. Assisting the instructor by tutoring students in Biological Sciences 1B laboratory. Tutoring is voluntary and is supervised by a Laboratory Teaching Assistant and the Laboratory Coordinator. May be repeated three times for credit. (P/NP grading only.)—I, II, III. (I, I, III.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

210. Molecular Phylogenetic Analysis (3)
Lecture—2 hours; laboratory—3 hours. Theory and practice of inferring phylogenetic trees using molecular sequence data. Practical techniques for obtaining sequence data, advantages and disadvantages of common approaches for inferring trees, statistical methods for comparing alternative hypotheses. (Same course as Nematology 210.) Offered in alternate years.—III. Nadler, Sanderson

211. Applied Phylogenetics (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 103 or 210 or Population Biology 200C or the equivalent, graduate standing. Applications of phylogenetic methods to fields outside of systematics. Core lectures/labs in remedial phylogenetics, phylogeography, conservation and comparative morphology. Special topics vary yearly. May be repeated once for credit.—III. (III.) Sanderson, Shaffer, Wainwright

240. Paleobotany and Angiosperm Evolution (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Plant Biology 108, 116, or course 140. Critical analysis of the plant fossil record as a source of evidence on origin, evolution, and phylogeny of the angio-sperms, Cretaceous and Tertiary climates, geographic history of modern taxa, and origin of modern vegetation types. Offered in alternate years.—II. Doyle

290C. Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Presentation and discussion of faculty and graduate student research in biology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Course

390. Methods of Teaching (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Practical experience in the methods and problems of teaching. Includes analyses of texts and supporting material, discussion of teaching techniques and preparing and conducting of laboratory and discussion sections. May be repeated for credit for a maximum of 8 units. (S/U grading only.)—I, II, III. (I, II, III.)

Exercise Science

(College of Letters and Science)
Charles A. Fuller, Ph.D., Chairperson of the Department
Department Office, 264 Hickey Gymnasium (530-752-0511)

Faculty

Sue C. Bodine, Ph.D., Professor
David Hawkins, Ph.D., Professor
Robert G. Holly, Ph.D., Senior Lecturer
Espen E. Spangenburg, Ph.D., Assistant Professor
Keith R. Williams, Ph.D., Associate Professor

Emeriti Faculty

William C. Adams, Ph.D., Professor Emeritus
Edmund M. Bernauer, Ph.D., Professor Emeritus
Willard S. Lotter, Ed.D., Senior Lecturer Emeritus
E. Dean Ryan, Ed.D., Professor Emeritus

Affiliated Faculty

Carol Meredith, Ph.D., Lecturer
Paul B. Salitsky, Ph.D., Lecturer
James D. Shaffrath, M.D., Lecturer

The Exercise Biology Major Program

The Program. The focus is on both the acute and adaptive effects of physical activity (and inactivity). Exercise biology deals with the mechanisms and consequences of activity from the molecular to the organismal (human ecological) level. We examine these mechanisms and consequences during growth, development, aging, disease and in altered environmental conditions. The exercise biology major encompasses the critical aspects of an integrative program in applied human biology. The Bachelor of Arts program provides a greater breadth of knowledge in the humanities and social sciences and is more appropriate for those who wish to apply their knowledge within the human community.

The Bachelor of Science program is appropriate for students who desire a strong preparation in human biology. It requires the same basic science preparation as the other majors in the Division of Biological Sciences.

Career Alternatives. Students with further academic or professional interests in medicine and other health sciences, community service, business, sales, communications, education or coaching might find the Bachelor of Arts program attractive. The Bachelor of Science could lead to further graduate study in any field related to human biology as well as careers in medicine and other health sciences (e.g., physical therapy), biomechanics and biomedical engineering and medical equipment and pharmaceutical development and sales.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**38–41**
Biological Sciences 1A-1B-1C	15
Chemistry 2A, 2B	10
Physics 1A-1B or 7A-7B	6-8
Psychology 1	4
Statistics 13, 32, 100, or 102	3-4
Psychology 41 recommended	
Depth Subject Matter	**40-45**
Biological Sciences 101	4
Neurobiology, Physiology, and Behavior 101	5
Cell Biology and Human Anatomy 101 and 101L	7
Exercise Biology 101, 102, 103, 104L	15
One additional upper division course in Exercise Biology	3-4
Select one additional course from two of the three content areas listed below	6-10
Sociology and Culture Option: African American and African Studies 100;	

Anthropology 101; Communication 161; Community and Regional Development 176; Exercise Biology 120; History 178; History and Philosophy of Science 150; Science and Society 105, 120; Sociology 122, 154, 159, 172

History and Philosophy Option: Dramatic Art 141; History 135A, 135B, 136, 139A, 139B, 185A, History and Philosophy of Science 130A, 130B, 131; Philosophy 108

Psychology and Communication Option: Agricultural and Resource Economics 112, Communication 134, 136; Environmental Science and Policy 126; Exercise Biology 121, 122; Human Development 100C; Psychology 101, 121, 126, 140, 156

No variable unit courses or Exercise Biology 146, 146L, 147L, 148, 148L or 149L may be used to fulfill these requirements. Consult your adviser regularly.

Total Units for the Major 78-86

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 60-74
Biological Sciences 1A-1B-1C 15
Chemistry 2A-2B-2C 15
Chemistry 8A-8B or 118A-118B-118C .. 6-12
Mathematics 16A-16B-16C or 21A-21B-21C 9-12
Physics 7A-7B-7C or 9A-9B-9C-9D..... 12-16
Statistics 13, 32, 100, or 102..... 3-4
Psychology 1 is highly recommended for all students.

Mathematics 21A-21B-21C-21D, 22A-22B, Physics 9A-9B-9C-9D and Engineering 5, 35 are recommended for students interested in the Biomechanics option.

Depth Subject Matter..... 49-50
Biological Sciences 101, 102, 103, 104 ... 13
Neurobiology, Physiology, and Behavior 101 5
Cell Biology and Human Anatomy 101 and 101L 7
Exercise Biology 101, 102, 103, 104L..... 15
Completion of one Option listed below, or with adviser approval, one course from each option, including 2 units of laboratory 9-10

Physiology Option: Exercise Biology 110, 111 6

Select 1 course from Exercise Biology 113, 116; Neurobiology, Physiology, and Behavior 112, 113, 140 3-4

Biomechanics Option: Exercise Biology 115, 126 6

Select 1 course from Exercise Biology 113; Engineering 102; Applied Science Engineering 115; Neurobiology, Physiology, and Behavior 112 3-4

Applied Exercise Biology Option: Exercise Biology 112, 117..... 7

Select 1 course from Exercise Biology 116, 118; Nutrition 111AV, Physical Education 133..... 3

No variable unit courses or Exercise Biology 146, 146L, 147L, 148, 148L or 149L may be used to fulfill these requirements. Consult your adviser regularly.

Total Units for the Major 109-124

Major Advisers. W.C. Adams, S. Bodine, D. Hawkins, R.G. Holly, P.B. Salitsky, E.E. Spangenburg, K.R. Williams.

Minor Program Requirements:

UNITS

Exercise Biology..... 18
At least 18 upper division units in exercise biology from one of three options 18

(a) Biomechanics

1) Exercise Biology 103.

2) Exercise Biology 113, 115, 126.

3) Additional courses to complete a total of 18 upper division units. None of the variable-unit courses or Exercise Biology 146, 146L, 147L, 148, 148L or 149L may be used to fulfill these requirements. Consult your adviser regularly.

(b) Exercise Physiology

1) Exercise Biology 101.

2) Minimum of three courses from Exercise Biology 110, 111, 112, 113, 116, 117, 118.

3) Additional courses to complete a total of 18 upper division units. None of the variable-unit courses or Exercise Biology 146, 146L, 147L, 148, 148L or 149L may be used to fulfill these requirements. Consult your adviser regularly.

(c) Psychological Aspects

1) Exercise Biology 102.

2) Exercise Biology 120, 121, 122.

3) Additional courses to complete a total of 18 upper division units. None of the variable-unit courses or Exercise Biology 146, 146L, 147L, 148, 148L or 149L may be used to fulfill these requirements. Consult your adviser regularly.

Minor Advisers. Same as major advisers.

Honors Program. Those students with an outstanding academic record and an Exercise Biology GPA of 3.50 or higher may enter the Honors Program with the consent of a faculty adviser. An honors project must be completed consisting of 2 quarters of course 199 (at least 3 units per quarter), 2 units of course 194H, and an honors thesis. These units are taken in addition to the major requirements.

Graduate Study. A program of study and research leading to the M.S. degree is available through the Graduate Group in Exercise Science. For detailed information regarding graduate study, write to the Graduate Adviser, Graduate Group in Exercise Science. See also the Graduate Studies chapter of this catalog.

Graduate Adviser. M.P. Kaufman, C.L. Stebbins, K.R. Williams.

Courses in Exercise Biology (EXB)

(Formerly courses in Exercise Science.)

Lower Division Courses

10. Exercise and Fitness: Principles and Practice (3)
Lecture—3 hours. Human movement from physiological, psychological, sociological, and historical perspectives. Biology and psychology of exercise across the human lifespan. Not open for credit to students who have completed an upper division Exercise Biology course. GE credit: SciEng, Div.—II. (II.) Salitsky, Shaffrath

90X. Lower Division Seminar (1-2)
Lecture—1-2 hours. Prerequisite: lower division standing and consent of instructor. Gives freshman or sophomore level students the opportunity to study a special topic in the general area of Exercise Science in a small class setting.

92. Exercise Biology Internship (1-5)
Internship—3-15 hours. Prerequisite: consent of instructor, dependent on availability of intern positions. Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under department faculty supervision. May be repeated once for credit. (P/NP grading only.)

97T. Tutoring in Exercise Biology (1-5)
Tutorial—3-15 hours. Prerequisite: lower division standing and consent of instructor. Assisting the professor by tutoring students in exercise biology course-related projects. May be repeated for credit for 10 units including courses 97TC, 197T and 197TC. No tutorial units will be counted towards the Exercise Biology major. (P/NP grading only.)—I, II, III. (I, II, III.)

97TC. Tutoring Exercise Biology in the Community (1-5)
Tutorial—3-15 hours. Prerequisite: consent of instructor and program chairperson. Tutoring in the community in exercise biology related projects under the guidance of the faculty. May be repeated once for credit. (P/NP grading only.)

98. Directed Group Study
Prerequisite: consent of instructor and Department Chairperson. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

101. Exercise Physiology (4)
Lecture—4 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101. Physiologic responses to acute exercise, and physiologic adaptations to both chronic exercise (training) and selected environmental stresses. Emphasis on the muscular, metabolic, cardiovascular, respiratory and renal responses and adaptations to exercise. Only 1 unit of credit allowed to students who have completed Exercise Science 101. Only 3 units of credit allowed to students who have completed Exercise Science 102. Not open for credit to students who have completed Exercise Science 101 and 102 (Former Exercise Science 101 and 102).—I. (I.) Holly, Shaffrath

102. Introduction to Motor Learning and the Psychology of Sport and Exercise (4)
Lecture—4 hours. Prerequisite: Psychology 1 recommended. Theoretical and practical issues in motor learning, sport psychology, and exercise psychology. Emphasis on how motor skills are acquired and retained, and on the application of social psychology and human motivation studies to human performance. Only 2 units of credit allowed to students who have completed Exercise Science 104. Only 2 units of credit allowed to students who have completed Exercise Science 105. Not open for credit to students who have completed Exercise Science 104 and 105. (Former Exercise Science 104 and 105.) GE credit: SocSci.—I, II. (II.)

103. Analysis and Control of Human Movement (4)
Lecture—4 hours. Prerequisite: Cell Biology and Human Anatomy 101 and 101L, Physics 7A and 7B. Neurobiology, Physiology, and Behavior 101 recommended. Introduction to functional anatomy, neurophysiological basis of motor control, and biomechanics of human movement. Human movement understood in the context of body structures, basic principles of physics, and functional characteristics of nerve and muscle. Only 1 unit of credit allowed to students who have completed Exercise Science 103. Only 3 units of credit allowed to students who have completed Exercise Science 104. Not open for credit to students who have completed Exercise Science 103 and 104. (Former Exercise Science 103 and 104.)—III. (III.) Williams

104L. Exercise Biology Laboratory (3)
Laboratory—3 hours; lecture—1 hour; discussion—1 hour. Prerequisite: course 101, 102, 103 (the last course taken may be concurrently). Principles and analytical procedures for assessing fundamental physiological, biomechanical, motor learning and motor control factors which underlie human movement and performance. Only 1 unit of credit allowed to students who have completed Exercise Science 101L. Only 1 unit of credit allowed to students who

have completed Exercise Science 103. Not open for credit to students who have completed Exercise Science 101L and 103.—I, III. (I, III.) Holly, Shaffrath

110. Exercise Metabolism (3)
Lecture—2 hours; laboratory—five 4-hour sessions. Prerequisite: courses 101, 102; Chemistry 2A. Focus on energy metabolic pathways and fuels used during different modes of exercise. Also, exercise-induced adaptations which affect metabolism and performance will be discussed. Experiments in laboratory will utilize a variety of techniques to characterize the metabolic responses to exercise. GE credit: SciEng, Wrt.

111. Environmental Effects on Physical Performance (3)
Lecture—2 hours; laboratory—3 hours, with discussion—1 hour (alternate weeks). Prerequisite: courses 101 and 102, or consent of instructor. The effects of thermal, barometric and gravitational conditions on physiological function and physical performance of humans. Acute and chronic effects, emphasizing physiological adaptations and limitations, will be studied.—II. (II.)

112. Clinical Exercise Physiology (4)
Lecture—3 hours; laboratory—3 hours to alternate weekly with discussion—1 hour. Prerequisite: courses 101 and 102, or consent of instructor. Physical activity as a therapeutic modality is examined in normal and diseased populations (cardiovascular, pulmonary, diabetic). Assessment (graded exercise testing), exercise prescription and effects of exercise conditioning are examined in detail.—II. (II.) Holly

113. Growth and Development in Human Performance (3)
Lecture—3 hours. Prerequisite: Cell Biology and Human Anatomy 101, and Neurobiology, Physiology and Behavior 101. Development of human performance potential from conception to old age, including influence of exercise, athletic participation, and preventive medicine. Alterations in motor skill patterns, morphology, and body composition, and physiological capacities with aging. GE credit: SciEng.—III. (III.)

115. Biomechanical Bases of Movement (3)
Lecture—2 hours; laboratory—3 hours to alternate weekly with discussion—1 hour. Prerequisite: course 103 or consent of instructor. Biomechanical bases of human movement investigated; topics include musculo-skeletal mechanics, tissue mechanics, electromyography, and measurement and analysis techniques. Application made to sport, clinical, and work environments, including extensive analysis of locomotion. GE credit: SciEng.—I. (I.) K. Williams

116. Nutrition for Physically Active Persons (3)
Lecture—3 hours. Prerequisite: course 101, Neurobiology, Physiology and Behavior 101. The role of nutrition and exercise in modifying metabolism, body composition, performance and health of humans.—III. (III.)

117. Exercise and Aging in Health and Disease (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 101 or 102 (concurrently) or 113 (concurrently). Etiology of and standard therapy for various diseases associated with aging (e.g., cardiovascular, pulmonary and renal diseases, diabetes, obesity, lipemias, etc.). Exercise will then be considered as a protective and/or therapeutic modality. GE credit: SciEng.—III. (III.) Shaffrath, Holly

118. Bionomics of Work: Physical Performance and Standards in the Workplace (3)
Lecture—2 hours; discussion—1 hour. Explores principles and practices of physical performance in the workplace. Established assessment procedures including validation of job standards are presented. Cost of medical benefits are examined with respect to on-site and off-site programs of fitness maintenance and remediation. GE credit: SciEng, Wrt

120. Sports in American Society (4)
Lecture—3 hours; discussion—1 hour. Sociological approaches to the study of sport and contemporary American culture, including sport's interaction with politics, economics, religion, gender, race, media and ethics. Socialization factors involving youth, scholastic, collegiate, and Olympic sport. (Same course as Physical Education 120.) GE credit: SocSci, Div.—I, II, III. Salitsky, Doten

121. Sport Psychology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 105 and Psychology 145. Consideration of major theories, research findings and methods of data collection in sport psychology through a critical examination of relevant experimental, clinical, and field data.—III. (III.) Salitsky

122. Psychological Effects of Physical Activity (3)
Lecture—3 hours. Prerequisite: Psychology 1 or 15, and upper division standing. Physical activity is evaluated in terms of its ability to enhance the quality of life. Topics studied include: individual factors (self concept, type A); special populations (elderly, cardiovascular); and mental health changes (depression, anxiety).—II. (II.) Saltisky

125. Neuromuscular and Behavioral Aspects of Motor Control (3)
Lecture—2 hours; discussion—1 hour to alternate weekly with laboratory—2 hours. Prerequisite: course 104. Factors which affect control of movement from neuropsychological, physiological, behavioral, and mechanical viewpoints. Topics include central vs. peripheral control mechanisms, open and closed loop theories, motor programming, cognitive learning strategies, and the effects of biochemical and biomechanical influences.

126. Tissue Mechanics (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: course 103 or Engineering 45 or consent of instructor. Structural and mechanical properties of biological tissues including bone, cartilage, ligaments, tendons, nerves, and skeletal muscle. (Same course as Biomedical Engineering 126.) GE credit: SciEng.—II. (II.) Hawkins

146. Theory and Practice of Exercise Training (1)
Lecture/discussion—1 hour. Prerequisite: course 2 or 45 or 102. Physiological adaptations, exercise programming and behavioral techniques focusing on young and middle-aged adults. Topics include exercise prescription, nutrition, psychological effects of exercise, stress management techniques, and exercise adherence techniques. (P/NP grading only.)

146L. Shape-Up Testing and Training Laboratory (1)
Laboratory—3 hours. Prerequisite: course 146 (may be taken concurrently). Primary activities involve leading shape-up class, attending workshops, testing sessions, and completing final reports. May be repeated once for credit. (Former Physical Education 146L.) (P/NP grading only.)

147L. Adult Fitness Training Laboratory (1)
Laboratory—3 hours. Prerequisite: courses 146, 146L, and 102 (may be taken concurrently); current CPR. Involves attending and assisting with aerobic training sessions for older adults, and assisting with physiological testing sessions. (P/NP grading only.)

148. Theory and Practice of Exercise Testing (1)
Lecture/discussion—1 hour. Prerequisite: courses 101, 102, 112 (may be taken concurrently), and 146; current CPR. Theory and practice of exercise testing applied to older adult populations. Physiological responses to and limitations of exercise testing. Application of exercise testing and training to healthy and diseased populations. (P/NP grading only.)—I, II, III. (I, II, III.) Holly, Shaffrath

148L. Adult Fitness Testing Laboratory (1)
Laboratory—3 hours. Prerequisite: courses 146, 148 (concurrently); current CPR. Testing symptomatic and asymptomatic older adults for functional aerobic capacity, body composition, blood lipids, pulmonary function, and cardiovascular disease risk. Counseling adults in appropriate exercise programs and lifestyle modifications. Two quarters minimum; third quarter permitted. (Former course Physical Education 148L.) (P/NP grading only.)—I, II, III. (I, II, III.) Holly, Shaffrath

149L. Cardiopulmonary Rehabilitation Laboratory (1)
Laboratory—3 hours. Prerequisite: courses 148 and 148L; current CPR certification. Testing and training of cardiac patients or individuals at high risk of developing heart disease. Present mini-lectures to program participants, maintain patient records, and present patients' cases in rounds. Two quarters minimum; third quarter permitted. (Former course Physical Education 149L.) (P/NP grading only.)

192. Exercise Biology Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor, dependent on availability of intern positions. Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under program faculty supervision. Written report required. May be repeated up to 15 units of credit, including course 92. (P/NP grading only.)

194H. Research Honors (2)
Independent study—6 hours. Prerequisite: senior standing, minimum of 6 units of course 199, 3.50 GPA or greater in major courses, consent of honors thesis adviser. Completion of individual honors research project in Exercise Biology, under the guidance of an Exercise Biology faculty adviser, culminating in written honors thesis. (P/NP grading only.)—I, II, III. (I, II, III.)

197T. Tutoring in Exercise Biology (1-5)
Tutorial—3-15 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor by tutoring students in exercise biology course-related projects. May be repeated up to 10 units of credit including courses 97T, 97TC and 197TC. No tutorial units will be counted towards the Exercise Biology major. (P/NP grading only.)—I, II, III. (I, II, III.)

197TC. Tutoring Exercise Biology in the Community (1-5)
Tutorial—3-15 hours. Prerequisite: consent of instructor and program chairperson. Tutoring in the community in exercise biology related projects under the guidance of the faculty. May be repeated up to 10 units of credit including courses 97T, 97TC, 197T. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor and Department Chairperson. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of Department Chairperson. (P/NP grading only.)

Exercise Science (A Graduate Group)

Dave Hawkins, Ph.D., Chairperson of the Group

Group Office, 310 Life Sciences Addition (530-752-2981)

http://www.dbs.ucdavis.edu/grad/exs_sci_gg/default.html

Faculty

Sue Bodine, Ph.D., Professor *(Exercise Science)*
Richard Carlsen, Ph.D., Professor *(Human Physiology)*
Fadi Fathallah, Ph.D., Associate Professor *(Biological and Agricultural Engineering)*
Charles A. Fuller, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Dave Hawkins, Ph.D., Professor *(Exercise Science)*
James H. Jones, Ph.D., Professor *(Surgical and Radiological Sciences)*
Thomas Jue, Ph.D., Professor *(Biological Chemistry)*
Marc Kaufman, Ph.D., Professor *(Internal Medicine)*
David D. Kilmer, Ph.D., Professor *(Physical Medicine and Rehabilitation)*
Craig M. McDonald, Ph.D., Associate Professor *(Physical Medicine and Rehabilitation)*

Melvin R. Ramey, Ph.D., Professor *(Civil and Environmental Engineering)*
Edward S. Schelegle, Ph.D., Assistant Professor *(Anatomy, Molecular, Cellular, and Integrative Physiology)*
Espen Spangenburg, Ph.D., Assistant Professor *(Exercise Science)*
Charles Stebbins, Ph.D., Professor *(Internal Medicine)*
Susan M. Stover, Ph.D., Professor *(Anatomy, Physiology and Cell Biology)*
Keith R. Williams, Ph.D., Associate Professor *(Exercise Science)*

Affiliated Faculty

George Brooks, Ph.D., Professor *(Integrative Biology—UC Berkeley)*
Gretchen Casazza, Ph.D., Research Director *(Sports Medicine)*
Chao-Yin Chen, Ph.D., Assistant Research Physiologist *(School of Medicine)*
Youngran Chung, Ph.D., Assistant Research Biochemist *(Exercise Science)*
Robert G. Holly, Ph.D., Senior Lecturer *(Exercise Science)*
Ulrike Kreutzer, Ph.D., Assistant Adjunct Professor *(Exercise Science)*
Marta Van Loan, Ph.D., Associate Adjunct Professor *(Nutrition)*
Charles Wade, Ph.D., Adjunct Professor *(Neurobiology, Physiology, and Behavior)*

Graduate Study. The Graduate Group in Exercise Science offers a program of study and research leading to an M.S. degree. Advanced training is provided in two areas of emphasis. The Exercise Physiology Area involves the study of functional, metabolic, nutritional, and regulatory aspects of the cardiovascular, respiratory, and skeletal muscle systems as they relate to movement and exercise. The Biomechanics Area includes the study of skeletal muscle mechanics, motor control, biomechanical analysis of human movement, tissue mechanics, motor control, and clinical biomechanics.

Graduate Advisers. M. Kaufman, C. Stebbins, K. Williams

Courses in Exercise Science (EXS)

Graduate Courses

200. Introduction to Research in Exercise Science (3)
Discussion—2 hours; seminar—1 hour. Prerequisite: graduate standing in Exercise Science or consent of instructor. Principles of scientific research in Exercise Science: scientific method, literature review, experimental design, hypotheses formulation, data collection, analysis, inferences, biases, human subject and animal protocols, ethics.—I. Jue

201. Exercise Cardiorespiratory Physiology (3)
Lecture/discussion—3 hours. Prerequisite: undergraduate course in systemic physiology, exercise physiology, and biochemistry (intermediary metabolism). Advanced course on integrated responses of the cardiovascular and respiratory systems to exercise. Includes hemodynamic, neurohormonal, and autonomic aspects of cardiac and vascular function, principles of myocardial metabolism, and mechanisms underlying changes in pulmonary function and gas transport.—I. Stebbins

206. Exercise Metabolism (3)
Lecture/discussion—3 hour. Prerequisite: undergraduate course in metabolism (Biological Sciences 103, Nutrition 101) or consent of instructor. The integrated metabolic response to exercise. Includes bioenergetics and metabolic regulation of skeletal muscle, and role of cardiovascular, respiratory, hemodynamic, and neurohormonal control.—III. Jue

210. Introduction to Human Performance Testing (2)
Discussion—1 hour; laboratory—3 hours. Introduction to human exercise testing and measurement. Safety procedures and measurement capabilities of the Human Performance Laboratory at UC Davis. Potential areas for graduate research.—I. (I.) Shaffrath

221. Anthropometry in Physical Activity (3)
Lecture—2 hours; laboratory—five 3-hour sessions to alternate weekly with five 1-hour discussion sessions. Prerequisite: Exercise Biology 101 and 102. Consideration of physical constitution, body proportions, and body composition in man as they affect physical performance, and of body structural and compositional changes accompanying prolonged, systematic physical conditioning.

222. Metabolic Functions in Exercise (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Exercise Biology 102, Neurobiology, Physiology and Behavior 101. Review of the current research literature on the metabolic responses to exercise in man; a laboratory survey of respiratory response, metabolic and water balances, blood gas adjustments and acid-base balance with particular reference to the effect of environmental conditions.

224. Exercise Electrocardiography (2)
Lecture—2 hours. Prerequisite: Exercise Biology 112 or consent of instructor. Physiological bases and clinical implications of normal and abnormal exercise electrocardiograms (ECG) are treated in detail. Exercise prescription is considered as is the predictive significance of normal and abnormal ECG.

225. Seminar in Cardiac Rehabilitation (2)
Seminar—2 hours. Prerequisite: Exercise Biology 112 or graduate standing and consent of instructor. Critical examination of literature dealing with the causes, prevention and treatment of cardiovascular disease with particular emphasis on intervention through cardiac rehabilitation. Both the theoretical bases and practical approaches to cardiac rehabilitation will be examined.

227. Research Techniques in Biomechanics (4)
Lecture—2 hours; laboratory—4 hours; term paper/discussion—1 hours. Prerequisite: consent of instructor, Mathematics 22B; Exercise Biology 115 recommended. Experimental techniques for biomechanical analysis of human movement are examined. Techniques evaluated include data acquisition and analysis by computer, force platform analysis, strength assessment, planar and three-dimensional videography, data reduction and smoothing, body segment parameter determination, electromyography, and biomechanical modeling. (Same course as Biomedical Engineering 227/Mechanical and Aeronautical Engineering 227.)—II. (II.) K. Williams

228. Skeletal Muscle Mechanics: Form, Function, Adaptability (4)
Lecture—4 hours. Prerequisite: basic background in biology, physiology, and engineering; Engineering 35 and 45, Mathematics 21D; and Neurobiology, Physiology and Behavior 101 recommended. Basic structure and function of skeletal muscle examined at the microscopic and macroscopic level. Muscle adaptation in response to aging, disease, injury, exercise, and disuse. Analytic models of muscle function. (Same course as Biomedical Engineering 228.)—(I.) Hawkins

290. Seminar in Exercise Science (1)
Seminar—1 hour. Prerequisite: graduate standing; required of all first year students for first two quarters. Presentation and discussion of topics of interest, and the analysis of research in exercise science. Not open for credit to students who have taken Physical Education 290. (S/U grading only.)—(II, III.) Hawkins

290C. Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing. Student presentations of research in Exercise Science and discussions among participating students and faculty. May be repeated for credit. (S/U grading only.)—I, II, III.

298. Group Study (1-5)
Prerequisite: graduate standing; consent of instructor.

299. Research (1-12)
Prerequisite: graduate standing; consent of instructor and Department Chairperson. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Family and Community Medicine

See Medicine, School of

Feminist Theory and Research

Leslie Rabine, Ph.D., Program Director
Program Office, 2222 Hart Hall (530-752-4686)
http://wms.ucdavis.edu/wgssite/index.htm

Graduate Study. The program in Women and Gender Studies offers courses leading to a designated emphasis in Feminist Theory and Research. The courses provide theoretical and interdisciplinary perspectives to students already pre-paring for the Ph.D. in one of 13 participating departments (Anthropology, Comparative Literature, Cultural Studies, Education, English, French and Italian, German, History, Native American Studies Psychology, Spanish and Classics, Sociology and Theatre and Dance). Students complete all requirements for the Ph.D., including the dissertation, in one of the participating departments. The additional requirements leading to the designated emphasis consist of two core courses (Women's Studies 200A and 200B) and two courses on gender, one of which must be in the student's home department. It is expected that an analysis of gender will be a central component of the student's doctoral examination and dissertation.

Graduate Adviser. Consult the Women and Gender Studies office (530-752-4686).

Fermentation Science

(College of Agricultural and Environmental Sciences)

The Major Program

The Fermentation Science major is a program of study of the fundamental and applied sciences related to the use of microorganisms as production and processing agents. A broad, interdisciplinary food-related education is offered with specialization in the study of application of microorganisms for production of beer and other alcoholic beverages, manufacture of foods such as cheese, waste treatments, and the production of microbial cells, drugs, enzymes, hormones, solvents, acids, and vitamins.

The Program. The major in fermentation science leads to a Bachelor of Science degree. Most of the instruction for the major is done in the Department of Food Science and Technology and in the Department of Viticulture and Enology. Students also take courses in chemistry, microbiology, molecular and cellular biology, genetics, and computer science. Electives often include additional courses in sensory science, management and viticulture.

Preparatory Requirements. Before transferring into the Fermentation Science major, students must complete the following courses with a grade of *C*– or

better and with a combined grade point average of at least 2.5 at the University of California (at least 3.0 for similar courses taken at community college) for these and all other preparatory courses. In addition, students' overall GPAs must be 2.25 or higher. All courses must be taken for a letter grade.

Biological Sciences 1A .....5 units
Chemistry 2A, 2B, 2C, 8A .....17 units
Mathematics 16A .....3 units
Physics 7A.....4 units

Recommendations. Completion of UC Davis equivalents of the following preparatory courses for the major are not required for entry but are highly recommended. Failure to complete these will delay entry into required upper division courses and may thus delay graduation. Some courses may be available at UC Davis during Summer Session.

Chemistry 8B.....4 units
Mathematics 16B .....3 units
Physics 7B.....4 units
Biological Sciences 102.....3 units

Career Alternatives. Graduates qualify for supervisory, technical, production, product development, quality control, research, sales, or executive positions in the food, beverage, and allied industries, in the fermentation industries, and in governmental agencies. Students who choose to continue in graduate study have done so in such areas as food science-enology, microbiology, agricultural and environmental chemistry, and biochemistry.

B.S. Major Requirements:

UNITS

English Composition Requirement.....0-8
See College requirement

Preparatory Subject Matter 58-63
Biological Sciences 1A..... 5
Biological Sciences 102, 103..... 6
Chemistry 2A-2B-2C 15
Chemistry 8A-8B or 118A-118B or 128A-128B, 129A..... 6-8
Agricultural Management and Rangeland Resources 21 or the equivalent with adviser approval 3
Mathematics 16A-16B or 21A-21B..... 6-8
Microbiology 102-102L..... 6
Physics 7A and 7B 8
Agricultural Management and Rangeland Resources 120 or Food Science and Technology 117 or Statistics 106 or 100 3-4

Breadth/General Education 0-24
See General Education requirement

Depth Subject Matter.....40
(Courses in depth subject matter may not be taken on the P/NP grading basis. Overall GPA in depth subject matter must be 2.0 or greater.)
Choose from Biological Sciences 101; Chemical Engineering 161B, 161C, 161L, 206; Chemistry 107A, 107B, 108, 130; Food Science and Technology 102A, 102B, 104, 104L, 108, 109, 110A, 110B, 123, 123L, 128, 205, 250, 250L; Microbiology 105, 140, 150, 155L, 250; Viticulture and Enology 3, 123, 123L, 124, 124L, 125, 125L, 126, 126L, 128, 128L, 129, 135, 140, 186, 190X, 200, 219, 224, 225, 235 (no variable-unit 190, 192, 199, 299 courses allowed toward depth requirement)

Restricted Electives 28
Selected according to student's educational goals and upon approval by adviser. Only 6 units of 192 or 6 units of 190, 198, 199, 290, or 298 may be counted; or a total of 8 units of these courses combined. A list of approved courses is available from advisers.

Unrestricted Electives.....17-22
Total Units for the Degree.....180

Major Adviser. C.W. Bamforth *(Food Science and Technology).*

Advising Center for the major is located in 111 Cruess Hall (530-752-1468).

Graduate Study. Refer to the Graduate Studies degree programs in Agricultural and Environmental Chemistry, Biochemistry, Chemical Engineering, Food Science, Genetics, Microbiology, Viticulture and Enology.

Fiber and Polymer Science

(College of Agricultural and Environmental Sciences)

Faculty. See under Textiles and Clothing.

The Major Program

The fiber and polymer science major is concerned with the physical, chemical, and structural properties of fibers and polymers and how these relate to fiber and polymer performance and end-use.

The Program. All students in this major take a common core of course work in chemistry, physics, and mathematics, and depth subject matter in fiber and polymer science, organic and physical chemistry, and technical writing. In the restricted electives, students select courses from areas such as computer science and mathematics, chemistry, marketing and management, material and advanced fiber and polymer science, and textiles.

Career Alternatives. The major prepares the student for a career in a wide range of industries in the areas of research and development, technical marketing and management, production, quality control, and science teaching (on completion of an additional year in the teaching credential program). The companies employing Fiber and Polymer Science graduates are in the fiber, polymer, industrial product, textile and/or chemical business. Graduates are prepared to enter the graduate program in textiles or agricultural and environmental chemistry with a specialization in fiber and polymer chemistry, and fiber and polymer science programs at other universities.

B.S. Major Requirements:

UNITS

English Composition Requirement.....7-12
See College requirement..... 0-8
Communication 1 4
English 104A, 104B, 104C, 104D, 104E, or 104F 3

Preparatory Subject Matter 52-55
Chemistry 2A-2B-2C 15
Computer Science Engineering 15 or 30... 4
Mathematics 16A-16B-16C or 21A-21B-21C 9-12
Physics 7A-7B-7C or 9A-9B-9C 12
Statistics 13 or Agricultural Management and Rangeland Resources 120..... 4
Textiles and Clothing 6 and 8 or Engineering 45 8

Breadth/General Education 6-24
Satisfaction of General Education requirement; See advising office for breadth requirement.

Depth Subject Matter.....37
Textiles and Clothing 163, 163L..... 4
Fiber and Polymer Science 100, 150, 161, 161L, 180A, 180B..... 14
Chemistry 128A, 128B, 128C, 129A, 129B, 110A and 110C or 107A and 107B.... 19

Restricted Electives 30
Select courses from the following:
Computer Science and Mathematics:
Agricultural Management and Rangeland Resources 21; Engineering 5; Applied Science Engineering 115, 116; Food Science and Technology 156; Mathematics 22A, 22B
Chemistry:
Chemistry 108, 111, 115, 120, 121, 124A, 124B, 124C, 130, 131, 140
Marketing/Management:
Agricultural and Resource Economics 100A, 100B, 113, 136, 157, Economics 1A, 1B, Statistics 103
Material and Advanced Fiber/Polymer Science:
Aeronautical Science Engineering 137, Engineering 104A, 104B, Textiles and Clothing 250A-F, 290, 293
Textiles:
Textiles and Clothing 162, 162L, 164, 165, 173, 174

Unrestricted Electives.....23-40
Total Units for the Degree.....180

Major Adviser. Y.-L. Hsieh *(Textiles and Clothing).*

Advising Center for the major is located in 133B Everson Hall (530-752-4417).

Minor Program Requirements:

UNITS

Fiber and Polymer Science.....18
Textiles and Clothing 6 or Engineering 45.. 4
Courses selected from the following:
Fiber and Polymer Science 100, 150, 161, 161L, 180A and 180B; and Textiles and Clothing 163 and 163L

Minor Adviser. Y.-L. Hsieh.

Courses in Fiber and Polymer Science (FPS)

Upper Division Courses

100. Principles of Polymer Materials Science (3)
Lecture—3 hours. Prerequisite: Chemistry 2A-2B; Chemistry 8A-8B or Engineering 45; introductory physics. The basic principles of polymer science are presented including polymer structure and synthesis; polymerization mechanisms, polymer classes, properties, and reactions; polymer morphology, rheology, and characterization; polymer processing. (Same course as Materials Science Engineering 147.)—II. (II.) Pan

110. Plastics in Society and the Environment (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 10 or introductory course in physical sciences. Basic concepts and methodologies in the study of plastics. Formation, classification, structure, properties, processing, and formulation. Their application to societal needs, and their impact on society and the environment. GE credit: SciEng or SocSci, Wrt.

150. Polymer Syntheses and Reactions (3)
Lecture—3 hours. Prerequisite: Chemistry 128B or 8B, and Chemistry 107A. Organic and physical chemistry aspects of polymer syntheses and reactions including polymerization mechanisms, kinetics and thermodynamics for major types of organic high polymers.—III. (III.) Hsieh

161. Structure and Properties of Fibers (3)
Lecture—3 hours. Prerequisite: Textiles and Clothing 6 and Chemistry 8B. The structure, properties and reactions of natural- and man-made fibers; the relations between molecular structure of fibers and their physical properties; interactions of fibers and detergents.—I. (I.) Hsieh

161L. Textile Chemical Analysis Laboratory (1)
Laboratory—3 hours. Prerequisite: course 161 (may be taken concurrently). Laboratory methods and procedures employed in qualitative and quantitative analysis of textile fibers and auxiliaries.—I. (I.) Hsieh

180A-180B. Introduction to Research in Fiber and Polymer Science (2)
Laboratory/discussion—6 hours. Prerequisite: senior standing in major related to Fiber and Polymer Science, and consent of instructor. Senior thesis on independent problems. Research begun in course 180A will be continued and completed in course 180B. (Deferred grading only, pending completion of sequence.)—I, II, III. (I, II, III.)

192. Internship in Fiber and Polymer Science (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience off campus in a fiber and polymer science related area. Supervision by a member of the Textiles and Clothing faculty. (P/NP grading only.)

197T. Tutoring in Fiber and Polymer Science (1-5)
Tutorial—3-15 hours. Prerequisite: upper division fiber and polymer science related major and consent of instructor. Tutoring of students in Fiber and Polymer Science courses. Assistance with discussion groups and laboratory sections under supervision of instructor. May be repeated for credit if tutoring in another Fiber and Polymer Science course. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Courses

250A-F. Special Topics in Polymer and Fiber Science (3)
Lecture—3 hours. Prerequisite: Fiber and Polymer Science 100 or consent of instructor. Selected topics of current interest in polymer and fiber science. Topics will vary each time the course is offered. (Same course as Materials Science and Engineering 250A-F.)—I, III. (I, III.) Hsieh, Pan, Sun

299. Research (1-12)
Independent study—3-36 hours. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Film Studies

(College of Letters and Science)

Sheldon Lu, Ph.D. and Scott Simmon, Ph.D., Program Directors

Program Office, 522 Sproul Hall (530-752-0830)

http://filmstudies.ucdavis.edu

Committee in Charge

Christine Acham, Ph.D. *(African American and African Studies)*
Sergio de la Mora, Ph.D. *(Chicana/Chicano Studies)*
Nicole Fleetwood, Ph.D. *(American Studies)*
Bishnupriya Ghosh, Ph.D. *(English)*
Sheldon Lu, Ph.D. *(Comparative Literature)*
Pablo Ortiz, Ph.D. *(Music)*
Scott Simmon, Ph.D. *(English)*
Eric Smoodin, Ph.D. *(American Studies)*
Georges van den Abbeele, Ph.D. *(French and Italian)*
George Wilson, Ph.D. *(Philosophy)*

Affiliated Faculty

Christine Acham, Ph.D., Assistant Professor *(African American and African Studies)*
Emily Albu, Ph.D., Associate Professor *(Spanish and Classics)*
Sarah Pia Anderson, Professor *(Theatre and Dance)*
JoAnn Cannon, Ph.D., Professor *(French and Italian)*
Chia-ning Chang, Ph.D., Associate Professor *(East Asian Languages and Cultures)*
Xiaomei Chen, Ph.D., Professor *(East Asian Languages and Cultures)*
Elizabeth Constable, Ph.D., Associate Professor *(French and Italian)*
Nicole Fleetwood, Ph.D., Assistant Professor *(American Studies)*
Sergio de la Mora, Ph.D., Assistant Professor *(Chicana/o Studies)*
Gayatri Gopinath, Ph.D., Assistant Professor *(Women and Gender Studies)*
Bishnupriya Ghosh, Ph.D., Assistant Professor *(English)*
Laura Grindstaff, Ph.D., Assistant Professor *(Sociology)*
Darrell Y. Hamamoto, Ph.D., Associate Professor *(Asian American Studies)*
Lynn Hershman, M.A., Professor *(Art Studio)*
Margherita Heyer-Caput, Ph.D., Associate Professor *(French and Italian)*
Kyu Hyun Kim, Ph.D., Assistant Professor *(East Asian Languages and Cultures)*
Anna Kuhn, Ph.D, Professor *(Women and Gender Studies)*
Sheldon Lu, Ph.D., Professor *(Comparative Literature)*
Cristina Martinez-Carazo, Ph.D., Assistant Professor *(Spanish and Classics)*
Winder McConnell, Ph.D., Professor *(German and Russian)*
Jay Mechling, Ph.D., Professor *(American Studies)*
Pablo Ortiz, D.M.A., Professor *(Music)*
Scott Simmon, Ph.D., Professor *(English)*
Blake Stimson, Ph.D., Assistant Professor *(Art History)*
Georges Van Den Abbeele, Ph.D., Professor *(French and Italian)*
David Van Leer, Ph.D., Professor *(English)*
George Wilson, Ph.D., Professor *(Philosophy)*

The Major Program

This interdisciplinary major takes one of the most influential art forms of the twentieth century and today—film—as its object of study. The field of Film Studies addresses the history, theory, and culture of this art form and asks questions about film texts themselves: modes of production (including everything from filmmakers' aesthetic choices to the role of the global economy); historical, national, and cultural contexts; and spectators and audiences. Questions of gender, race, sexuality, and nationality, in all of these areas, have been central to Film Studies almost since its inception and continue to shape much of the work in the field. While the program emphasizes film history, criticism, and theory, students also have opportunities to explore film/video production.

The Program. Students majoring in Film Studies take upper-division courses in film history and film theory, as well as in at least three of five general areas of study. Students also develop a thematic emphasis, in consultation with an advisor, that draws on courses from at least two different departments/programs and that allows them to pursue their particular interests within the field of Film Studies. Students have the option of completing a senior thesis (either a written paper or an original film/video) within this emphasis.

Career Alternatives. The A.B. degree in Film Studies prepares students for a variety of careers in media industries: for example, local and national film and television production companies, local television newsrooms, community television stations, computer graphic companies, advertising and marketing companies, public relations departments, and film distribution companies. Students wishing to pursue graduate work will be prepared to go on in film studies, as well as a variety of other fields that draw on interdisciplinary study: for example, American studies, English, literatures and languages, drama, communication, computer science, cultural studies, women and gender studies, and ethnic studies programs. Many film students also choose to go on to law school, and the analytical skills, writing abilities, and familiarity with theoretical thought developed through the film major prepare them well for the study and practice of law.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 20-40
Film Studies 1 4
A four-course sequence in a single language or equivalent..... 0-20
One course from African American and African Studies 15, 50; American Studies 1A, 21, 30; Art History 5; Art Studio 30; Chicana/o Studies 50, 60; Design 1; French 50; Humanities 60; Italian 50; Japanese 25; Native American Studies 32; Textiles and Clothing 7; Women's Studies 20, 25 4
One course from African American and African Studies 10, 15, 50; Asian American Studies 1, 2; Chicana/o Studies 10, 50, 60; Native American Studies 1, 10, 32, 33; Women's Studies 20, 25, 50, 70, 804
Two courses from Art History 1A, 1B, 1C, 1D; Asian American Studies 2; Chinese 10, 11; Classics 10; Comparative Literature 3, 4, 5, 6, 7; Dramatic Art 1, 20; English 43, 44; German 48; History 4C, 10C, 17B, 72B; Humanities 5, 6; Japanese 10; Music 10, 28; Native American Studies 33; Russian 41, 42..... 8
Note: One of these two courses may be from Design 15, 16 or Dramatic Art 10, 21A, 21B, 24.

Depth Subject Matter..... 36-40
One course from English 161A, 161 B or Film Studies 124 4
One course from English 162; Film Studies 127; Philosophy 127; Women and Gender Studies 162..... 4
One course each from three of the following topic areas: Cinematic Traditions and Movements, Visual and Popular Culture, Gender/Sexuality/Class, Race/Ethnicity/Class, Production and Performance .. 12
A current list of approved classes is available from the program office and from the faculty adviser.
16-20 units in one of the two breadth areas not used to satisfy the breadth requirement, or development of a thematic area in consultation with a faculty adviser 16-20
Qualified students who complete 20 units and have an overall GPA of 3.5 may choose the senior thesis option (194H-196H) for 8 of those 20 units.
No course may be counted for more than one requirement for the major.

Total Units for the Major 56-80

Major Advisers. S. Lu *(Comparative Literature),* S. Simmon *(English)*

Minor Program Requirements:

UNITS

Film Studies 24
Film Studies 1 4
Upper division courses selected from the following list, with no more than two courses from any one category 20
(a) Problems and Themes in Cinema: Anthropology 136,
Classics 102, Dramatic Art 115, English 160, 161A, 161B,
162, Film Studies 124, 125, Women's Studies 162
(b) Cinema, Nation and Nationality: German 119, 142,
Film Studies 176A, 176B, Italian 150, Japanese 106, Russian
129, Spanish 148

(c) Film and Social Identities: African American and

African Studies 170, 171, Film Studies 120, Jewish Studies

120, Women's Studies 160, 164

(d) Film/Video Production: Art Studio 116, 117, 150

(e) Popular and Visual Culture: American Studies 130, 132,

133, 139, Art Studio 150, Communication 140, Political

Science 165, Textiles and Clothing 107, Women's Studies 139

Restrictions: No more than two courses from a single department or program may be offered in satisfaction of the minor requirements.

Note: With a minor advisor's prior approval, up to four units of internship (e.g., American Studies 192, Communication 192, or Women's Studies 192) in television/video/film production may be offered toward satisfying the requirements of the minor. Such courses will be considered part of the "Film/Video Production" category.

Courses in Film Studies (FMS)

Lower Division Courses

1. Introduction to Film Studies (4)
Lecture—2 hours; discussion—1 hour; film viewing—3 hours. Analysis of film form and narrative, including cinematography, editing, and sound. Issues in film studies, including authorship, stardom, race, gender, class, and cultural identity. Includes introduction to selected cinematic movements and national film traditions. Not open for credit to students who have completed Humanities 10. GE credit: ArtHum, Wrt.—I, II, III. (I, II, III.) Acham, Ghosh, Lu

90X. Lower Division Seminar (4)
Seminar—4 hours. Prerequisite: lower division standing and consent of instructor. Study of a special topic in film studies in a small class setting. May be repeated for credit if topic differs. (P/NP grading only.)—I, II, III. (I, II, III.)

92. Internship (1-12)
Internship—3-36 hours. Supervised internship off and on campus in areas of Film Studies. May be repeated for credit. (P/NP grading only.)

98. Directed Group Study (1-5)
(P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

120. Italian-American Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1. Exploration of representations of Italian-American identity in American (U.S.) cinema. Analysis of both Hollywood and independently produced films, especially as they represent ethnicity, gender, and social class of Italian Americans. Not open for credit to students who have completed Humanities 120. GE credit: ArtHum, Div, Wrt.—III. (III.) Heyer-Caput

124. Topics in U.S. Film History (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 1. Study of an aspect of American film history (such as the silent era; the studio system; U.S. avant-garde cinema), including the influences of technological, economic, regulatory, cultural, and artistic forces. Not open for credit to students who have completed Humanities 124 unless topic differs. May be repeated twice for credit if topic differs. GE credit: ArtHum, Wrt.—III. (III.) Simmon

125. Topics in Film Genres (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 1. A study of one or more of the film genres (such as the documentary, the musical, film noir, screwball comedy, or the western), including genre theory and the relationship of the genre(s) to culture, history, and film industry practices. Not open for credit to students who have completed Humanities 125 unless topic differs. May be repeated twice for credit if topic differs. GE credit: ArtHum, Wrt.—II. (II.) McConnell, Simmon

127. Film Theory (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1 or consent of instructor. Survey of the conceptual frameworks used to study film (including semiotics, psychoanalysis, spectatorship, auteur, genre and narrative theories). Historical survey of major film theorists. (Same course as Philosophy 127.) GE credit: ArtHum, Wrt.—III. (III.) Wilson

176A. Classic Weimar Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1. A study of classic Weimar cinema (ca. 1919-33, including films by Murnau, Pabst, and Lang), and its representations of German national myths, modern urban culture, and the nation's uncertain social and political order. Not open for credit to students who have completed Humanities 176. Offered in alternate years. GE credit: ArtHum, Wrt.—I. Menges

176B. Postwar German Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1. Exploration of German cinema from 1945 to 1980, when the Nazi past was a central theme. Includes study of postwar "rubble films," escapist "homeland films," and New German Cinema of the 1970s (including films by Fassbinder, Kluge, Syberberg, and Herzog). Not open for credit to students who have completed Humanities 177. Offered in alternate years. GE credit: ArtHum, Wrt.—II. Menges

189. Special Topics in Film Studies (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1, upper division standing, or consent of instructor. Group study of a special topic in film, focusing on a national tradition, a major filmmaker, or a specific era. May be repeated three times for credit. GE credit: Wrt.—I, III. (I, III.) Lu

190X. Upper Division Seminar (4)
Seminar—4 hours. Prerequisite: upper division standing or consent of instructor. Study of a special topic in film studies in a small class setting. May be repeated for credit if topic differs. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship (1-12)
Supervised internship off and on campus in areas of Film Studies. May be repeated for credit. (P/NP grading only.)

194H. Special Study for Honors Students (1-5)
Independent study—3-15 hours. Prerequisite: senior standing, GPA of at least 3.5, consent of instructor. Guided research on a topic in Film Studies in preparation for the writing of an honors thesis in course 195H or the creation of an honors project in course 196H. May be repeated twice for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

195H. Honors Thesis (1-5)
Independent study—3-15 hours. Prerequisite: course 194H and consent of instructor. Writing of an honors thesis on a topic in Film Studies under the direction of a faculty member. May be repeated twice for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

196H. Honors Project (1-5)
Project—3-15 hours. Prerequisite: course 194H and consent of instructor. Creation of an honors film, video, or mixed-media project under the direction of a faculty member. May be repeated twice for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

197T. Tutoring in Film Studies (1-5)
Tutorial—3-15 hours. Prerequisite: consent of program director. Leading of small voluntary discussion groups affiliated with one of the Program's regular courses. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit (S/U grading only.)

Fisheries

See Animal Science; Biological and Agricultural Engineering; and Wildlife, Fish, and Conservation Biology

Food Biochemistry

(College of Agricultural and Environmental Sciences)

The Major Program

The major in food biochemistry stresses the principles of chemistry and biochemistry as related to constituents of foods and the changes which occur in the constituents before and during processing and during storage. Particular emphasis is placed on the role of and changes in the carbohydrates, lipids, proteins, enzymes, and nucleic acids and their effect on the quality attributes of foods.

The Program. The food biochemistry curriculum stresses a strong background in chemistry, physics, mathematics, and biology at the lower division level. At the upper division level, students take specialized courses in food science and technology and advanced biochemistry and nutrition. Through the appropriate choice of electives, students may emphasize certain research areas such as nutrition, food processing, or toxicology.

Career Alternatives. The main employment options for a food biochemistry graduate are in research and development at large food industry units; in laboratory-related employment in quality assurance, new food technology, and food analysis; or in any position requiring knowledge of biochemical techniques, such as in clinical laboratories. The major offers excellent preparation for graduate study in areas such as food science, nutrition, biochemistry, and environmental toxicology. Food biochemistry has also been chosen as a pre-professional major by students interested in medical, veterinary, optometry, pharmacy, or dental school.

B.S. Major Requirements:

UNITS

English Composition Requirement..... 0-8
See College English requirement

Preparatory Subject Matter 77-79
Biological Sciences 102, 103..... 6
Biological Sciences 1A-1B-1C..... 15
Chemistry 2A-2B-2C or 2AH-2BH-2CH; 118A-118B-118C or 128A-128B-128C, 129A; 107A-107B or 110A-110B... 32-33
Mathematics 16A-16B-16C or 21A-21B-21C 9
Physics 7A-7B-7C or 9A-9B-9C 12
One course from Computer Science Engineering 10, 30, Engineering 5, Mathematics 22A, 22B, 22C, Statistics 13, Agricultural Management and Rangeland Resources 120 3-4

Breadth/General Education 24
Satisfaction of General Education requirement.

Depth Subject Matter..... 30
Food Science and Technology courses to include Food Science and Technology 103, 104, 104L, 110A..... 25
Food Science and Technology 123, 123L.. 5

Restricted Electives 24
At least one additional upper division bio-

chemistry course, other than Molecular and Cellular Biology 120L. One upper division microbiology course. One nutrition course other than Nutrition 10. Remaining courses can be selected from biochemistry, physiology, environmental toxicology, genetics, public health, microbiology or other subjects related to food science..... 24

Unrestricted Electives..... 15-25

Total Units for the Degree..... 180

Major Adviser. G.M. Smith *(Food Science and Technology).*

Graduate Study. Refer to the Graduate Studies chapter of this catalog.

Food Science

(College of Agricultural and Environmental Sciences)

The Major Program

Food science applies chemical, physical, biological, engineering, and social sciences to processing, preservation, development, packaging, storage, evaluation, identity and utilization of foods.

The Program. Students majoring in food science spend the first two years of study developing the scientific and general background necessary for upper division study. The science courses include chemistry, biology, physics, and mathematics. General background is provided by courses in the social science/humanities area and by optional courses in introductory food science. At the upper division level, students take courses in nutrition, food microbiology, food chemistry, food analysis, food commodities, food processing, and food engineering, and may choose to specialize in one of five career-oriented options. Students enrolled in the program are eligible for various scholarships, including scholarships from the Institute of Food Technologists.

Career Alternatives. Opportunities for employment include positions in the food and allied industries, local, state, and federal government agencies, and educational and research institutions. Graduate study for the food science student may lead to the M.S. or Ph.D. degree in food science, or in related fields such as agricultural chemistry, biochemistry, engineering, microbiology, and nutrition.

B.S. Major Requirements:

UNITS

English Composition Requirement..... 0-8
See College requirement

Preparatory Subject Matter 52-62
English 102F, 104A or 104E (may be used to satisfy college English requirement) 4
Mathematics 16A-16B-16C 9
Biological Sciences 1A, 1C..... 10
Chemistry 2A-2B-2C 15
Organic chemistry (see option for requirement)
Physics 7A-7B-7C 12
Food Science and Technology 1 and/or 2; both recommended, but not required 3-6
Food Science and Technology 50..... 5
Nutrition 10 (or approved substitute) 3

Breadth/General Education 24
Satisfaction of General Education requirement plus social science and humanities electives to total 24 units

Depth Subject Matter..... 48
Biological Sciences 102, 103..... 6
Agricultural Management and Rangeland Resources 120 4
Food Science and Technology 100A, 100B, 101A, 103, 104, 104L, 160, 190..... 26
Food Science and Technology 110A-110B, Applied Biological Systems Technology 110L 8
Food Science and Technology 127 or 107 .. 4

Select one of the following five options:

Food Technology Option
The Food Technology option provides a broad exposure to food chemistry, food microbiology, food engineering and food processing. Students find positions in quality assurance, product development, and food processing in the food industry.

Specific course requirements 12
Chemistry 8A-8B 6
Food Science and Technology 108, 109.... 6

Selected additional courses..... 15
Select courses from a master list available from the department Advising Center.

Food Business and Management Option
The Food Business and Management option allows students to integrate study of the science and technology of food with that of business and economics in a unique program. Students prepare for positions of management in small food companies, and research-and-development oriented marketing or technical sales opportunities in corporate food industries.

Specific course requirements 25
Chemistry 8A-8B 6
Economics 1A 5
Agricultural and Resource Economics 112, 113 8
Management 100 3
Food Science and Technology 109..... 3

Selected additional courses..... 10
Select courses from a master list available from the department Advising Center.

Consumer Food Science Option
The Consumer Food Science option prepares students for jobs in food product formulation, research-and-development oriented marketing and sensory analysis, quality assurance, extension service, creative writing, and community service. Students who fulfill the requirements for the teaching credential teach elementary or secondary school home economics.

Specific course requirements 21
Chemistry 8A-8B 6
Food Science and Technology 47, 101B, 127 (107 is also required), 109, 159 12
Consumer Science 100..... 3

Selected additional courses..... 10
Select courses from a master list available from the department Advising Center.

Brewing Science Option
The Brewing Science option prepares students for careers in production or quality assurance within the brewing industry or other food fermentation industries (e.g., other alcoholic beverages, vinegar and cheese). The option also prepares students for graduate study in food science. The option exposes the students to a diversity of coursework, including chemistry, biochemistry, microbiology and engineering as they pertain to the malting and brewing processes. Issues of quality assurance, plant sanitation and packaging are also key. Of course, there is a thorough grounding in malting and brewing.

Specific course requirements 26-29
Chemistry 8A, 8B 6
Food Science and Technology 3 (recommended but not required)..... 3
Food Science and Technology 102A, 102B, 108, 109, 123, 131 20

Selected additional courses..... 9
Select courses from a master list available from the department Advising Center

Food Biology/Microbiology Option
The Food Biology/Microbiology option is for students interested in research and development careers with food companies or government laboratories, in teaching and research at academic institutions, or in professional (medical, veterinary, pharmacy, optometry or dental) school. This option prepares students for graduate study and research in several areas, including food science, biochemistry, biotechnology, microbiology, and post-harvest biology.

Specific course requirements 17-23
Biological Sciences 1B..... 5
Chemistry 8A-8B or 118A-118B-118C .. 6-12
Microbiology 102, 102L..... 6

Selected additional courses..... 10
Select courses from a master list available from the department Advising Center.

Food Biochemistry Option
The Food Biochemistry option prepares students for graduate study and research in food science, biochemistry, biotechnology, microbiology, pharmacology, post-harvest biology, and commodity emphasis. The program is designed for students interested in graduate or professional school, leading to careers in research in universities, food companies or government laboratories or in teaching at academic institutions. The option can also serve to prepare students for professional schools such as pharmacy, optometry, dentistry, public health or medicine.

Specific course requirements 31
Biological Sciences 1B..... 5
Biological Sciences 104..... 3
Chemistry 118A-118B-118C 12
Chemistry 107A, 107B 6
Food Science and Technology 123, 123L.. 5

Selected additional courses..... 9
Select courses from a master list available from the department Advising Center

Food Chemistry Option
The Food Chemistry option prepares students for graduate study and research in such areas as flavor chemistry, food additive chemistry, biotechnology, biochemistry and toxicology. This option is for students interested in research and development careers with food companies or government laboratories, in teaching and research at academic institutions, or in professional (medical, veterinary, or dental) school.

Specific course requirements 20-21
Chemistry 118A-118B-118C or 128A-128B-128C, 129A 11-12
Chemistry 107A-107B, 124A..... 9

Selected additional courses..... 10
Select courses from a master list available from the department Advising Center.

Unrestricted Electives..... varies by option

Total Units for the Degree..... 180

Major Adviser. E. Bandman *(Food Science and Technology).*

Advising Center for the major is located in 111 Cruess Hall (530-752-1468).

Graduate Study. A program of study and research leading to the M.S. and Ph.D. degrees in Food Science is available (see below). For further information on graduate study, contact the graduate adviser.

Food Science (A Graduate Group)

David M. Ogrydziak, Ph.D., Chairperson of the Group

Group Office, 111 Cruess Hall (530-752-1466; Fax: 530-752-4759)

http://www-foodsci.ucdavis.edu

Faculty. Includes members from twelve departments in the Colleges of Agricultural and Environmental Sciences and Engineering, and the Schools of Medicine and Veterinary Medicine.

Graduate Study. The interdepartmental Graduate Group in Food Science offers programs of study leading to the M.S. degree and to the Ph.D. degree. Graduate studies stress the application of the bio-

logical, chemical, physical, and behavioral sciences to the processing, preservation, quality evaluation, public health aspects, and utilization of foods. For the M.S. degree, there are five areas of specialization: chemistry-biochemistry, microbiology, engineering-technology, sensory science, and enology. Individually designed programs are also acceptable. For the Ph.D., there are four areas of emphasis: biochemistry, chemistry, microbiology/fermentation, and sensory science. Detailed information regarding graduate study is available through the Group Chairperson or the Group Office.

Graduate Advisers. Contact the Food Science Graduate Group Office at kjhunter@ucdavis.edu.

Food Science and Technology

(College of Agricultural and Environmental Sciences)

Charles F. Shoemaker, Ph.D., Chairperson of the Department

Department Office, 126 Cruess Hall (530-752-1465)

http://foodscience.ucdavis.edu

Faculty

Charles W. Bamforth, Ph.D., Professor
Everett Bandman, Ph.D., Professor
Stephanie R. Dungan, Ph.D., Professor *(Food Science and Technology, Chemical Engineering)*
J. Bruce German, Ph.D., Professor
Jean-Xavier Guinard, Ph.D., Professor
John M. Krochta, Ph.D., Professor *(Food Science and Technology, Biological and Agricultural Engineering)*
Kathryn L. McCarthy, Ph.D., Professor *(Food Science and Technology, Biological and Agricultural Engineering)*
Michael J. McCarthy, Ph.D., Professor *(Food Science and Technology, Biological and Agricultural Engineering)*
Alyson Mitchell, Ph.D., Assistant Professor
David M. Ogrydziak, Ph.D., Professor
Michael A. O'Mahony, Ph.D., Professor
Chester W. Price, Ph.D., Professor
David S. Reid, Ph.D., Professor
Moshe Rosenberg, Ph.D., Professor and Specialist in Cooperative Extension
Gerald F. Russell, Ph.D., Senior Lecturer
Barbara O. Schneeman, Ph.D., Professor *(Food Science and Technology, Internal Medicine, Nutrition)*
Charles F. Shoemaker, Ph.D., Professor
R. Paul Singh, Ph.D., Professor *(Food Science and Technology, Biological and Agricultural Engineering)*
Gary M. Smith, Ph.D., Professor
Glenn M. Young, Ph.D., Assistant Professor

Emeriti Faculty

Ericka L. Barrett, Ph.D., Professor Emerita
Richard A. Bernhard, Ph.D., Professor Emeritus
Walter L. Dunkley, Ph.D., Professor Emeritus
Robert E. Feeney, Ph.D., Professor Emeritus
Dieter W. Gruenwedel, Ph.D., Professor Emeritus
Norman F. Haard, Ph.D., Professor Emeritus
Jerald M. Henderson, D.Engr., Professor Emeritus
Walter G. Jennings, Ph.D., Professor Emeritus
Michael J. Lewis, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
R. Larry Merson, Ph.D., Professor Emeritus
Martin W. Miller, Ph.D., Professor Emeritus
Thomas Richardson, Ph.D., Professor Emeritus
Howard G. Schutz, Ph.D., Professor Emeritus
Lloyd M. Smith, Ph.D., Professor Emeritus
Aloys L. Tappel, Ph.D., Professor Emeritus
John R. Whitaker, Ph.D., Professor Emeritus

Affiliated Faculty

Diane M. Barrett, Ph.D., Specialist in Cooperative Extension
Christine M. Bruhn, Ph.D., Specialist in Cooperative Extension
John C. Bruhn, Ph.D., Specialist in Cooperative Extension
Edwin N. Frankel, Ph.D., Adjunct Professor
Linda J. Harris, Ph.D., Specialist in Cooperative Extension
Carl K. Winter, Ph.D., Specialist in Cooperative Extension

Major Program and Graduate Study. See the major in Food Science; and for graduate study, refer to the Graduate Studies chapter of this catalog.

Related Courses. See courses in Consumer Science, Engineering, Molecular and Cellular Biology, Nutrition, and Viticulture and Enology; Environmental Toxicology 101, Population Health and Reproduction 150, Plant Biology 172 and 172L.

Courses in Food Science and Technology (FST)

Lower Division Courses

1. Principles of Food Science (3)
Lecture—2 hours; discussion—1 hour. Food science fundamentals. Fresh and processed food technologies; world food problems; food composition; food microbiological and toxicological safety; food laws; evaluation of acceptability and nutritional value. Not open for credit to students who have completed any Food Science and Technology course except course 10.—II. (II.) Bandman

3. Introduction to Brewing and Beer (3)
Lecture—3 hours. Basic description of brewing and associated processes, from raw materials to final product; history of brewing and brewing science; types of beer worldwide; world beer markets; basics of beer quality, including wholesomeness; role of scientist in brewing. GE credit: SciEng.—I. (I.) Bamforth

10. Food Science, Folklore and Health (3)
Lecture—3 hours. Ancient and modern food folklore in relation to health and well-being. Food safety, organic food, herbalism, food preservation, and nutritional enhancement. Not open for credit to students who have completed course 2. GE credit: SciEng or SocSci.—I, III. (I, III.) Russell

47. Food Product Development Field Study (1)
Discussion—6 hours; fieldwork—2 days (course given between winter and spring quarters). Prerequisite: advance enrollment required in winter quarter with instructor; background knowledge in foods from such courses as Food Science and Technology 1. Commercial aspects of the large-scale development, distribution, and evaluation of food products intended for human consumption. (Former course Consumer Science 47.) (P/NP grading only.)—III. (III.) Shoemaker

50. Introduction to Food Preservation (3)
Lecture—3 hours. Prerequisite: Chemistry 2A, Biological Sciences 1A. Introduction to fruit, vegetable, cereal, dairy, seafood and meat commodity groups. Overview of food preservation principles, including heat processing, refrigeration and freezing, dehydration, fermentation, high pressure processing, irradiation and packaging.—III. Krochta

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

100A. Food Chemistry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 8B; Biological Sciences 1A recommended. Chemical aspects of food composition. Emphasis on the functional properties and chemical reactions of the major components of foods: carbohydrates, lipids, proteins, and water.—I. (I.) Dungan

100B. Food Properties (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A or consent of instructor. Sensory quality, chemical and microbial safety, and nutritional properties of foods. Effects of food processing and preparation on these properties. Selected properties of food commodities.—II. (II.) Guinard

101A. Food Chemistry Laboratory (2)
Lecture/laboratory—1 hour/3 hours. Prerequisite: course 100A (may be taken concurrently). Chemical aspects of food composition described in course 100A.—I. (I.) Reid

101B. Food Properties Laboratory (2)
Lecture/laboratory—1 hour/3 hours. Prerequisite: course 100B (may be taken concurrently). Study of properties of food described in course 100B.—II. (II.) Russell

102A. Malting and Brewing Science (4)
Lecture—4 hours. Prerequisite: Biological Sciences 102, 103; senior standing recommended. The technology of the malting, brewing and fermentation processes is integrated with the chemistry, biochemistry and microbiology that determine industrial practices and product quality. Not open for credit to students who have taken course 102.—II. (II.) Bamforth

102B. Practical Malting and Brewing (4)
Lecture/discussion—2 hours; laboratory—6 hours. Prerequisite: course 102A and analytical experience beyond Chemistry 2C, such as Viticulture and Enology 123, Food Science and Technology 103, 123L, Molecular and Cellular Biology 120L. Open to seniors only in Fermentation Science or Food Science and Technology. Provides practical working knowledge of analytical methods used in malting and brewing and experience with brewing materials and processes, by analysis of samples that illustrate the range of values experienced in practice and pilot scale brewing.—III. (III.) Bamforth

103. Physical and Chemical Methods for Food Analysis (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hour. Prerequisite: Chemistry 2C, 8B, Biological Sciences or Animal Biology 102 (may be taken concurrently), courses 100A, 101A (may be taken concurrently). Theory and application of physical and chemical methods for determining the constituents of foods. Modern separation and instrumental analysis techniques are stressed.—I. (I.) Mitchell

104. Food Microbiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 102. Microorganisms in food safety, spoilage, and production. Food-borne disease agents and their control. Growth parameters of food spoilage agents. Destruction of microbes in food. Food fermentations. The development of microbes as a resource for the food industry.—II. (II.) C. Price

104L. Food Microbiology Laboratory (4)
Lecture—1 hour; discussion—1 hour; laboratory—6 hours. Prerequisite: Biological Sciences 1A, course 104. Cultural and morphological characteristics of microorganisms involved in food spoilage, in food-borne disease, and food fermentation. Analysis of microbiological quality of foods.—II, III. (II, III.) Ogrydziak, Young

107. Food Sensory Science (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Agricultural Systems and Environment 120 or course 117 (may be taken concurrently). Critical examination of techniques and theories of sensory measurement of food; measures of consumer perception and acceptance. An introduction to the sensory and cognitive systems associated with the perception of food. Not open for credit to students who have completed course 107A.—I. O'Mahoney

108. Food Processing Plant Sanitation (2)
Lecture—2 hours. Prerequisite: Chemistry 8B, Biological Sciences 1A, course 104 (may be taken concurrently) or consent of instructor. Sanitary control of food processing, including water treatment, chemical and physical sanitizing agents; principles of cleaning and hard surface detergency, metal corrosion, pest control, and waste disposal; role of regulatory agencies.—II. Ogrydziak

109. Principles of Quality Assurance in Food Processing (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Statistics 13 or Agricultural Systems and Environment 120. Quality assurance measurement techniques applied to selected food processed products emphasized. Rationale for establishing valid quality assurance programs including selection of samples at critical points. Statistical problems in quality assurance programs used by the food industry.—III. (III.) K. McCarthy

110A. Physical Principles in Food Processing (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: Physics 5A and 5B or 7A-7B-7C or the equivalent; calculus recommended. Not open for credit to students enrolled in College of Engineering. Applications of the conservation of mass and energy to food processing. Elements of engineering thermodynamics, fluid mechanics, and problem solving.—I. (I.) M. McCarthy

110B. Heat and Mass Transfer in Food Processing (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: course 110A or the equivalent; Applied Biological Systems Technology 110L recommended (may be taken concurrently). Rate processes: conduction, convection, and radiation heat transfer; microwave heating, refrigeration, freezing, psychrometrics; mass transfer during drying and storage.—II. (II.) Singh

117. Design and Analysis for Sensory Food Science (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Statistics 13 or consent of instructor. Methods of design and analysis for sensory food science. Relative merits and limitations of parametric and nonparametric approaches. Use of human judges. Data analysis and computation. Modifications for quality assurance.—I. (I.) O'Mahoney

119. Chemistry and Technology of Milk and Dairy Products (4)
Lecture—4 hours; demonstrations and a field trip. Prerequisite: Biological Sciences 1A and 102, or consent of instructor. Composition, structure and properties of milk and products derived from milk. Relates chemical, microbiological, and technological principles to commercial practices in processing of milk and its products.—III. Rosenberg

120. Principles of Meat Science (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A. Anatomical, physiological, developmental and biochemical aspects of muscle underlying the conversion of muscle to meat. Includes meat processing, preservation, microbiology and public health issues associated with meat products. (Same course as Animal Science 120.) GE credit: SciEng.—III. (III.) Brandman, Lee

120L. Meat Science Laboratory (2)
Discussion—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1A; course 120 (may be taken concurrently). Laboratory exercises and student participation in transformation of live animal to carcass and meat, structural and biochemical changes related to meat quality, chemical and sensory evaluation of meat, and field trips to packing plant and processing plants. (Same course as Animal Science 120L.)—III. (III.) Lee

123. Introduction to Enzymology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103. Principles of physical, chemical and catalytic properties of enzymes and their importance. Purification, characterization, and quantitative evaluation of reaction conditions on activity are stressed. Specificity and mechanism of action illustrated by use of selected enzymes. (Former course Biochemistry and Biophysics 123.)—III. (III.) G. Smith

123L. Enzymology Laboratory (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 103, course 123 (concurrently). Laboratory procedures involved in detection, purification and characterization of enzymes. (Former course Biochemistry and Biophysics 123L.)—III. (III.) G. Smith

127. Sensory Evaluation of Foods (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Agricultural Systems and Environment 120 or course 117. A critical examination of methods of sensory measurement applied to food and beverage systems; descriptive analysis and consumer tests and their application to quality assurance, product development and optimization.—II. (II.) Guinard

128. Food Toxicology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 102, 103. Chemistry and biochemistry of toxins occurring in foods, including plant and animal toxins, intentional and unintentional food additives. The assessment of food safety and toxic hazards. (Same course as Environmental Toxicology 128.) GE credit: SciEng.—III. (III.) Mitchell, Shibamoto

131. Food Packaging (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 8B, Biological Sciences 1A, Physics 7C. Principles of food packaging. Functions of packaging. Properties of metal, glass, paper and plastic materials and packages. Design, fabrication, and applications of food packaging. Packaging of fresh and processed foods, including fruits and vegetables, dairy foods, beer and wine.—I. (I.) Krochta

151. Food Freezing (1)
Discussion—1 hour; online lecture. Prerequisite: course 110A or the equivalent. Mechanisms of ice crystallization, interpretation of freezing diagrams, and modes of heat transfer. Food properties at subfreezing temperatures, refrigeration requirements, and estimation of freezing times. Industrial systems used in freezing foods.—III. (III.) Singh

159. New Food Product Ideas (2)
Lecture/discussion—2 hours. Prerequisite: upper division standing with background course work in food science (course 50 or 100A), biological sciences (Biological Sciences 1A, 1B, 1C), or the physical sciences (Physics 5A, 5B, 5C or Chemistry 2A, 2B, 2C). Course will familiarize students with initial stages of food product development, including definition and articulation of a problem, generation of ideas to solve the problem, screening of ideas, and the formal presentation of a new product concept.—I. Haard

160. Food Product Development (4)
Lecture—1 hour; discussion—1 hour; laboratory—6 hours. Prerequisite: upper division standing with background course work in food science (course 50 or 100A), biological sciences (Biological Sciences 1A, 1B, 1C), or the physical sciences (Physics 5A, 5B, 5C or Chemistry 2A, 2B, 2C). Product implementation stage of food product development including preliminary product description, prototype development, product testing, and formal presentation of a new product development.—II. (II.) Shoemaker

190. Senior Seminar (1)
Seminar—1 hour. Prerequisite: senior standing or consent of instructor. Selected topics presented by students on recent advances in food science and technology. Reports and discussions concerning oral and written presentations, literature sources and career opportunities.—I. (I.) Shoemaker

192. Internship for Advanced Undergraduates (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience on or off campus in the practical application of food science. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

201. Food Chemistry and Biochemistry (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103. Topics on enzymes, proteins, pigments, lipids, and vitamins. Biochemical principles and methods related to food composition, preservation, and processing. Research proposals and group problem solving.—I. (I.) Shoemaker, Frankel

202. Chemical and Physical Changes in Food (4)
Lecture—3 hours; term paper. Prerequisite: Biological Sciences 103; Chemistry 107B. Fundamental principles of chemistry and physics are applied to a study of changes in water binding properties and activity, changes in proteins, nutrients, toxic constituents, and other compounds during storage, heating, freezing, dehydrating, and concentrating of food materials.

203. Food Processing (3)
Lecture—3 hours. Prerequisite: course 110A, Physics 5C or 7C, Chemistry 107B, and one undergraduate food processing course. Principles of food engineering applied to food processing. Relationship of Newtonian and non-Newtonian fluid properties to heat and momentum transfer. Application of mass transfer in controlling kinetics and quality changes of foods.—II. (II.) K. McCarthy, M. McCarthy

204. Advanced Food Microbiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1C, 103, course 104 or a course in microbiology. Principles of and recent developments in food microbiology, including food pathogen virulence and detection, parameters of microbial growth in food, and the microbiology of food and beverage fermentations.—III. (III.) Price, Ogrydziak

205. Industrial Microbiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 102, 103; Microbiology 130A-130B or Biological Sciences 101 recommended. Use of microorganisms for producing substances such as amino acids, peptides, enzymes, antibiotics and organic acids. Emphasis on metabolic regulation of pathways leading to fermentation products, on yeast fermentations, and on genetic manipulations (including recombinant DNA techniques) of industrial microorganisms. Offered in alternate years.—III. Ogrydziak

207. Advanced Sensory-Instrumental Analyses (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 107 and consent of instructor. Basic principles of measurement of color, texture, and flavor of foods by sensory and instrumental methods. Advanced statistical analysis of relation of colorimetry, texturometry, and chemistry of volatile compounds to perception of appearance, texture, flavor. Offered in alternate years.

210. Proteins: Functional Activities and Interactions (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103. The relationships of structure of proteins to their biological functions. Structural proteins, complexing proteins, and catalytic proteins in plant and animal materials and products.—II. (II.) G. Smith

211. Lipids: Chemistry and Nutrition (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103, Chemistry 107B, 128B. Chemistry of lipids as it pertains to research in food and nutrition. Relations between lipid structure and their physical properties in tissues and foods. Regulation of absorption, transport, and metabolism of lipids. Implications of dietary fats and health.—II. (II.) German

217. Advanced Food Sensory Science (2)
Lecture—2 hours. Prerequisite: course 107A (may be taken concurrently). Advanced study of the techniques and theory of the sensory measurement of food as an analytical tool and as a measure of consumer perception and acceptance. Advanced examination of the sensory and cognitive systems associated with the perception of food.—I. (I.) O'Mahoney

227. Food Perception and the Chemical Senses (2)
Lecture—2 hours. Prerequisite: course 107B (may be taken concurrently), or consent of instructor. Examination of the anatomy and physiology of the chemical senses (taste, smell, and the trigeminal senses) and how they are involved in the perception of food and food intake.—II. (II.) Guinard

290. Seminar (1)
Seminar—1 hour. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Ogrydziak, Shoemaker

290C. Advanced Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Critical presentation and evaluation of original research by graduate students. Planning of research programs and proposals. Discussion led by individual major instructors for their research group. (S/U grading only.)—I, II, III. (I, II, III.)

291. Advanced Food Science Seminar (1)
Seminar—1 hour. Prerequisite: completion of at least one quarter of course 290. Oral presentation of student's original research, discussion, and critical evaluation. (S/U grading only.)—III. (III.)

298. Group Study (1-5)
299. Research (1-12)
Prerequisite: graduate standing. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Food Service Management

(College of Agricultural and Environmental Sciences)

Faculty. See under the Department of Nutrition.

The Major Program and Graduate Study. Food Service Management is incorporated within the major of Clinical Nutrition. If you are interested in preparing for a career in commercial organizations such as hotels, restaurants, industrial cafeterias, or contract food services, as well as in public or private institutions such as hospitals, correctional institutions, schools, or colleges, consult the Department of Nutrition.

Related Courses. See Food Science and Technology, and Nutrition.

Courses in Food Service Management (FSM)

Questions pertaining to the following courses should be directed to the instructor or to the Nutrition Department Advising Office, 1202E Meyer Hall (530-752-2512).

Upper Division Courses

120. Principles of Quantity Food Production (3)
Lecture—3 hours. Prerequisite: Food Science and Technology 100B and 101B. Fundamental principles of food service management including quantity food preparation, institutional equipment, receiving and storage, service, menu planning, merchandising, and safety.—III. (III.)

120L. Quantity Food Production Laboratory (2)
Laboratory—6 hours. Prerequisite: course 120. Laboratory experience in quantity food production and service.—I. (I.)

122. Food Service Systems Management (3)
Lecture—3 hours. Prerequisite: Agricultural and Resource Economics 112, courses 120, 120L, 121. Principles of quantity food production management: production schedules, portion control, financial management, layout and equipment planning, evaluation of alternative systems, and computer applications.—II. (II.)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: one upper division course in Food Service Management and consent of instructor. Work experience on or off campus in practical aspects of food service management, supervised by a faculty member. (P/NP grading only.)—Steinberg

197T. Tutoring in Food Service Management (1-2)
Discussion/laboratory—3 or 6 hours. Prerequisite: Dietetics or related major; completion of the Food Service Management course in which tutoring is done. Tutoring of students in food service management, assistance with discussion groups or laboratory sections; weekly conference with instructor in charge of course; written evaluations. May be repeated if tutoring a different course. (P/NP grading only.)—Steinberg

198. Directed Group Study (1-5)
(P/NP grading only.)—Steinberg

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)—Steinberg

Forensic Science

Courses in Forensic Science (FOR)

200. Fundamental Concepts in Forensic Science (3)
Lecture—2 hours; fieldwork—0.25 hours; lecture/laboratory—0.25 hours; seminar—0.5 hours. Overview of forensic science. Problem definition, strategies for problem solving, analytical tools, and professional and ethical considerations.—Sensabaugh

205. Microscopy and Microanalytical Methods in Forensic Science (4)
Lecture—2.5 hours; seminar—1.5 hours. Examination of optics, interferometry and spectroscopy as they effect microscopy and microanalysis as utilized in forensic science. May be repeated for credit when topic differs. Offered in alternate years.—Howitt

210. Personal Identification and Analytic Methods in Forensic Science (4)
Lecture—4 hours. Crime scene examination and management. Laboratory analyses. Reconstruction and photography; latent print techniques; bloodstain pattern interpretation; arson accelerant detection and firearms trajectory interpretation; microscopy; radiography, infrared spectroscopy and gas chromatography mass spectrometry; statistics in trace analysis. Offered in alternate years.—Howitt

240. Homicide Crime Scene Investigation (3)
Lecture—2 hours; laboratory—3 hours. Processing and evaluating complex homicide scenes. Functions and activities of police agencies. Recognition, documentation, identification, and collection of evidence. Event sequence reconstruction. Evidence collection, preservation, report writing. Courtroom presentation.—II. (II.) Howitt

278. Molecular Techniques (3)
Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Recombinant DNA technology and its applications. (Same course as Environmental Toxicology 278.) Offered in alternate years.—Denison, Rice

280. Forensic DNA Analysis (3)
Lecture—3 hours. Prerequisite: coursework in genetics and molecular biology. Foundation in theory and practice of forensic DNA analysis; past, present, and emerging technologies; legal and quality assurance issues. DNA extraction, DNA quantitation, multiplex amplification of STR loci, capillary electrophoresis of amplified products, and analysis of STR typing data. (Same course as Environmental Toxicology 280.) Offered in alternate years.—Von Beroldingen

289. Survey in Forensic Science (3)
Lecture—3 hours. Analytical methods in contemporary forensic science. Clandestine laboratories in California, crime scene management, examination and analysis of human hair, forensic ballistics/trajectory reconstruction, shoe/tire print impressions, serial number restoration, forensic aspects of alcohol impairment, bloodstain pattern interpretation, microscopy of building materials, biological aspect of forensic science. May be repeated for credit when topic differs.—I, II, III. Howitt

290C. Graduate Research Conference in Forensic Science (1)
Independent study—1 hour. Individual and/or group conference on problems, progress and techniques in forensic science and research. May be repeated for credit when topic differs. (S/U grading only.)—I, II, III. Howitt

298. Group Study in Forensic Science (1-5)
(S/U grading only.)

299. Research in Forensic Science (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

French

(College of Letters and Science)

Julia Simon, Ph.D., Chairperson of the Department

Department Office, 522 Sproul Hall (530-752-1219)

http://french.ucdavis.edu

Faculty

Bruce Anderson, Ph.D., Assistant Professor
Marc E. Blanchard, Agrégé de Lettres, Professor *(French, Comparative Literature)*
Elizabeth Constable, Ph.D., Associate Professor
Noah Guynn, Ph.D., Assistant Professor
Maria I. Manoliu, Ph.D., Professor
Michèle Praeger, Ph.D., Professor
Leslie Rabine, Ph.D., Professor *(Women and Gender Studies, French)*
Julia Simon, Ph.D., Professor
Georges Van Den Abbeele, Ph.D., Professor

Emeriti Faculty

Claude Abraham, Ph.D., Professor Emeritus
Max Bach, Ph.D., Professor Emeritus
Edward M. Bloomberg, Ph.D., Professor Emeritus
Ruby Cohn, Ph.D., Professor Emerita
Gerald Herman, Ph.D., Senior Lecturer Emeritus
Margo R. Kaufman, M.A., Senior Lecturer Emerita
Manfred Kusch, Ph.D., Senior Lecturer Emeritus *(French, Comparative Literature)*
Marshall Lindsay, Ph.D., Professor Emeritus
Ruth B. York, Ph.D., Senior Lecturer Emerita

Affiliated Faculty

Simone Clay, Ph.D., Lecturer

The Major Program

The major program assures proficiency in all four of the language skills—speaking, understanding, reading, and writing—and acquaints students with the intellectual and cultural contributions of the French-speaking world through the study of its literature, traditions, and institutions.

The Program. The department encourages its students to work closely with the academic adviser in designing a major tailored to their needs and interests within the broad requirements prescribed by the program and to avail themselves of the guidance of an excellent teaching faculty. The department sponsors an active French Club and a chapter of Pi Delta Phi, the National French Honor Society. Each year, a substantial number of students with good preparation in French participate in the university's very popular Education Abroad Program, which maintains centers at seven French universities.

Career Alternatives. Foreign language teachers, a cardiologist, a veterinarian, a naval commander at the Pentagon, a professor of Political Science, lawyers, sales representatives, journalists, an anesthesiologist, a law professor, translators, a senior applications programmer, travel agents, independent business owners, a senior museum preparator, nurses, financial managers, stock brokers, and an industrial attaché for a French Trade Commission, all graduated with an A.B. in French from UC Davis

and represent only a small fraction of the career choices documented in a recent survey of department graduates.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**4-34**
French 1, 2, 3 (or the equivalent)	0-15
French 21, 22, 23	0-15
Linguistics 1 or 4	4
Depth Subject Matter	**44**
French 100, 101, 102, 103,104	20
Two additional upper division French literature courses	8
Elective courses in French literature, language, or civilization to be chosen in consultation with undergraduate adviser	16
Total Units for the Major	**48-78**

Recommended
French 101, 102, 103, 104, 107, and 160 plus other upper division courses for a total of 45 units for students interested in obtaining a "single subject" teaching credential in California.

Major Adviser. N. Guynn.

Minor Program Requirements:

	UNITS
French	**24**
French 100	4
Two courses from French 101, 102 or 103	8
Three elective courses in French language, literature, or civilization one of which must be either French 107 or 108	12

Honors Program. Candidates for high or highest honors in French must write a senior thesis under the direction of a faculty member. For this purpose, honors candidates must enroll in French 194H (3 units) and French 195H (3 units). Normally, a student will undertake the honors project during the first two quarters of the senior year; other arrangements must be authorized by the department chair. Only students who, at the end of the junior year (135 units), have attained a cumulative grade-point average of 3.5 in courses required for the major will be eligible for the honors program. The requirements for earning high and highest honors in French are in addition to the regular requirements for the major in French.

Teaching Credential Subject Representative. S. Clay. See also under the Teacher Education Program.

Graduate Study. The Department offers programs of study and research leading to the Ph.D. degree in French. Candidates for the Ph.D. have the option of enriching their degree program by preparing a designated emphasis in Critical Theory, Feminist Theory and Research, Classics, or African American and African Studies. Detailed information may be obtained from the graduate advisers or the department chairperson.

Graduate Advisers. M.I. Manoliu (Ph.D. degree—French Linguistics); E.L. Constable (Ph.D. degree—French Literature).

Prerequisite Credit. Credit will not normally be given for a course if it is the prerequisite of a course already successfully completed. Exceptions can be made by the department chairperson only.

Courses in French (FRE)

Students offering high school language preparation as a prerequisite must take a placement test.

Course Placement. Students with two years of high school French normally take French 2, those with three years take French 3 and those with four years take French 21.

Lower Division Courses

1. Elementary French (5)
Discussion—5 hours; laboratory—1 hour. Students who have successfully completed French 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.—I, II, III. (I, II, III.)

2. Elementary French (5)
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 1. Continuation of course 1.—I, II, III. (I, II, III.)

3. Elementary French (5)
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 2. Continuation of course 2.—I, II, III. (I, II, III.)

21. Intermediate French (5)
Lecture/discussion—5 hours. Prerequisite: course 3. Grammar, oral practice, composition. Initiation to French institutions; reading and discussion of short literary texts.—I, II, III. (I, II, III.)

22. Intermediate French (5)
Lecture/discussion—5 hours. Prerequisite: course 21. Continuation of course 21. Grammar, oral practice, composition. Contemporary French culture; reading and discussion of a play.—I, II, III. (I, II, III.)

23. Intermediate French (5)
Lecture/discussion—5 hours. Prerequisite: course 22. Continuation of course 22. Grammar, oral practice, composition. Current topics in French politics and culture; reading and discussion of a novel.—I, II, III. (I, II, III.)

50. French Film (4)
Lecture—1 hour; discussion—2 hours; term paper. Introduction to the tradition of French cinema from its invention by Méliès and the Lumière brothers through New Wave (especially the works of Truffaut and Godard) and more recent developments in French and Francophone film. Taught in English. Offered in alternate years. GE credit: ArtHum, Wrt.—(I, II, III.) Constable, Van Den Abbeele

51. Major Works of French Literature in Translation (4)
Lecture—2 hours; discussion—1 hour; term paper. Readings in English translation of key works of French and Francophone literature from the Middle Ages to the present. Particular attention is given to the long-standing interest of French writers in issues of social, regional, gender, sexual, and ethnic identity. GE credit: ArtHum, Div, Wrt.—II. (II.) Guynn, Praeger, Van Den Abbeele

52. France and the French-Speaking World (4)
Lecture—2 hours; discussion—1 hour; term paper. Taught in English. A survey of the history and culture of France and the French-speaking world, especially Canada, the Caribbean and Africa. Study of social, historical and cultural issues that occupy the French-speaking world, with particular attention to mass media. GE credit: ArtHum, Div, Wrt.—III. (III.) Praeger, Van Den Abbeele

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Composition in French (4)
Lecture—3 hours; term paper. Prerequisite: course 23. Instruction and practice in expository writing in French, with emphasis on organization, correct syntax, and vocabulary building.—I, II, III. (I, II, III.) Clay

101. Introduction to French Poetry (4)
Lecture—3 hours; short papers. Prerequisite: course 100 or consent of instructor. Analysis and evaluation of works representing the main types of French poetry. Study of French poetic conventions and versification. GE credit: ArtHum.—II. (I.) Constable

102. Introduction to French Drama (4)
Lecture—3 hours; short papers. Prerequisite: course 100 or consent of instructor. Analysis and evaluation of plays representing the main types of French drama, with emphasis on dramatic structure and techniques. GE credit: ArtHum.—I. (II.) Guynn

103. Introduction to French Prose (4)
Lecture—3 hours; short papers. Prerequisite: course 100 or consent of instructor. Analysis and evaluation of works representing main types of French prose, with emphasis on narrative structure and techniques. GE credit: ArtHum.—III. (III.) Praeger, Simon

104. Translation (4)
Lecture—3 hours; extensive writing. Prerequisite: course 100 or the equivalent. Practice in English-to-French and French-to-English translation using a variety of non-literary materials, illustrating different problems and styles.—III. (III.) Clay

106. French in Business and the Professions (4)
Lecture—1 hour; discussion—2 hours; frequent written assignments. Prerequisite: course 100 or consent of instructor. The French language as used in the commercial sphere. Emphasis on proper style and form in letter-writing, and in non-literary composition. Technical terminology in such diverse fields as government and world business.—I. (I.) Clay

107. The Making of Modern France (4)
Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Introduction to French culture through a historical approach to topics such as the citizen and the state (politics, justice, social security), the nation and centralization, the rise of public education, colonization, class and social relationships. Offered in alternate years. GE credit: ArtHum.—(I.) Anderson, Constable, Simon

108. Topics in Contemporary French Culture (4)
Lecture—3 hours; extensive writing. Prerequisite: course 100 or consent of instructor. Contemporary French culture through specific topics such as women and French culture, decolonization and modernization, the politics of education, immigration in France, Francophone cultures. May be repeated once for credit when topic differs. Offered in alternate years. GE Credit: ArtHum.—(II.) Clay, Constable, Praeger

110. Stylistics and Creative Composition (4)
Lecture—3 hours; frequent papers. Prerequisite: course 100 or consent of instructor. Intensive course in creative composition using a variety of techniques and literary styles, patterned on Queneau's Exercices de style. Practice in such stylistic modifications as inversion, antithesis, changes in tense, mood, tonality, etc. The writing of poetry.—II. (II.) Anderson

115. Medieval French Literature and Society (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. The social and cultural life of medieval France as studied through its representation in such literary works as La Chanson de Roland, courtly love lyric, the Arthurian romances of Chrétien de Troyes, Aucassin et Nicolette, selected fabliaux and farces. Offered in alternate years. GE credit: ArtHum.—I. Guynn

116. The French Renaissance (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Overview of major works and writers with particular attention to the historical context of the turbulent 16th century. Writers to be read may include Rabelais, Marot, Ronsard, Du Bellay, Labé, Marguerite de Navarre, Montaigne, and D'Aubigné. May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum.—(III.) Van Den Abbeele

117A. Baroque and Preclassicism (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. The literature and intellectual culture of the period between the Renaissance and French classicism. Offered in alternate years. GE credit: ArtHum.—(II.) Van Den Abbeele

117B. The Classical Moment (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Literature, culture, and

politics in the "Age of Louis XIV." May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum.—(III.) Simon, Van Den Abbeele

118A. The Age of Reason and Revolution (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Literature and philosophy of the French Enlightenment. Readings from such authors as Bayle, Fontenelle, Montesquieu, Voltaire, Rousseau and Diderot. Offered in alternate years. GE credit: ArtHum.—(II.) Simon

118B. Private Lives and Public Secrets: The Early French Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 103. History of the French roman from the Middle Ages to the Revolution with particular emphasis on the novels of the 18th century. Offered in alternate years. GE credit: ArtHum.—II. Simon

119A. The Romantic Imaginary (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Major concepts and themes of French Romanticism, such as dream and the supernatural, impossible love, exoticism, revolution, individualism, nature, the mal du siècle, Romantic irony, the creative imagination, the cult of ruin. Offered in alternate years. GE credit: ArtHum.—II. Constable

119B. Realism, History and the Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Investigation of the narrative and historical codes of French realist fiction, with emphasis on the representation of history in the realist novel, its depiction of social "realities" such as class and gender, and its relation to the historical situation of post-revolutionary society. Offered in alternate years. GE credit: ArtHum.—(III.) Constable

119C. From Baudelaire to Surrealism (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101. Study of the main poets and poetic movements from the mid-19th to the early 20th century, including Baudelaire, the Symbolists, and the Surrealists. Offered in alternate years. GE credit: ArtHum.—(I.) Constable

120. Modern French Thought (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Overview of post-Second World War French intellectual currents from existentialism to structuralism and deconstructionism. Readings will include Sartre and de Beauvoir, Camus, Lévi-Strauss, Lacan, Barthes, Foucault, Derrida, Kristeva, Sollers, Cixous, and Irigaray. Offered in alternate years. GE credit: ArtHum.—(I.) Praeger

121. Twentieth Century French Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 103. Novels and theories of the novel, from Proust to the Nouveau Roman and beyond. Readings from among Gide, Sartre, de Beauvoir, Camus, Breton, Beckett, Robbe-Grillet, Sarraute, Simon, Barthes, Duras, Tournier, Perec, Modiano, Guibert, Toussaint. Offered in alternate years. GE credit: ArtHum.—(II.) Praeger

124. Post-Colonialist and Francophone Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Introduction to Post-Independence Black African and/or Caribbean and/or North African literatures written in French. Selected topics include: identity and subjectivity, the role of the intellectual, women's voices, languages and oral literatures, cultural syncretism, theories of post-colonialism. May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum, Div.—(III.) Adejunmobi, Praeger

125. French Literature and Other Arts (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. The relationship between French literature and other arts—painting, music, cinema, architecture, opera—from different periods. May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum.—II. Guynn

127. Paris: Modernity and Metropolitan Culture (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Study of the representation of Paris in 19th and 20th century texts and its importance in defining the experience and art of modernity. Offered in alternate years. GE credit: ArtHum.—(III.) Blanchard, Constable

130. From Page to Stage: Theatre and Theatricality (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 102. French theater as literature and performance. May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum.—I. Guynn

133. Gender and Politics in French Literature and Culture (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Examination of the thematic, theoretical and political tendencies in contemporary French fiction. Barthes, Foucault, Duras, Guibert, considered in terms of their writing on identity and gender. Offered in alternate years. GE credit: ArtHum, Div.—I. Praeger

140. Study of a Major Writer (4)
Lecture—3 hours; term paper. Prerequisite: course 100 and course 101, 102, or 103 as appropriate to selected topic, or consent of instructor. Concentrated study of works of a single author. May be repeated once for credit as author-subject changes.—II. (II.)

141. Selected Topics in French Literature (4)
Lecture—3 hours; term paper or short papers. Prerequisite: courses 100 and 101 or 102 or 103 as appropriate to the selected topic or consent of instructor. Subjects and themes such as satiric and didactic poetry of the Middle Ages, poetry of the Pléiade, theater in the eighteenth century, pre-romantic poetry, etc. May be repeated twice for credit when topic differs.—II. (II.)

160. Topics in French Morphosyntax (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 100 and Linguistics 1. Analysis of controversial grammatical phenomena with emphasis on the semantic content and the pragmatic function of such categories as tense, mood and gender. Offered in alternate years.—III. Manoliu

161. Modern French Syntax (4)
Lecture—3 hours; short papers. Prerequisite: course 160. Presentation of basic concepts of contemporary approaches to French syntax. Consideration of new explanations of so-called "irregular" phenomena in current language models.—III. (III.) Manoliu

162. History of French Language (4)
Lecture—3 hours; term paper. Prerequisite: course 160. Main periods in development of the French language, from Latin to contemporary popular aspects, with emphasis on relationship between socio-cultural patterns and evolution of the language. GE credit: ArtHum.—II. (II.) Manoliu

192. Internship (1-12)
Internship—3-36 hours; term paper. Prerequisite: upper division standing and consent of instructor. Practical application of the French language through work experience in government and/or business, culminating in an analytical term paper on a topic approved by the sponsoring instructor. (P/NP grading only.)

194H. Special Study for Honors Students (4)
Independent study—4 hours. Prerequisite: open only to French majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in French literature, civilization, or language studies. (P/NP grading only.)

195H. Honors Thesis (4)
Independent study—4 hours. Prerequisite: course 194H. Writing of an honors thesis on a topic in French literature, civilization, or language studies under the direction of a faculty member. (P/NP grading only.)—I, II, III. (I, II, III.)

197T. Tutoring in French (1-4)
Seminar—1-2 hours; laboratory—1-2 hours. Prerequisite: upper division standing and consent of Chairperson. Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with departmental courses. May be repeated for credit for a total of 6 units. (P/NP grading only.)

197TC. Tutoring in the Community (2-4)
Seminar—1-2 hours; laboratory—1-2 hours. Prerequisite: upper division standing and consent of Chairperson. Tutoring in public schools under the guidance of a regular teacher and supervision by a departmental faculty member. May be repeated for credit for a total of 6 units. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

200. Literary Analysis (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Basic principles of applied literary theory. Concepts and methods of the critical analysis of literature and literary texts. Basic principles of bibliographic research will be covered at the beginning of the course.—I. (I.)

201. History of French: Phonology and Morphosyntax (4)
Seminar—3 hours; term paper. Prerequisite: courses 159, 160, 250A, or consent of instructor. Presentation of the main changes in the phonematic and grammatical structures of French, from Latin to contemporary spoken aspects.—III. (III.) Manoliu

204. Topics in Medieval Literature (4)
Seminar—3 hours; term paper. Study of Medieval French literature, focusing on a particular period, milieu, literary movement, genre, or theoretical approach. May be repeated for credit when topic differs.—I. (I.) Guynn

205A. Sixteenth-Century Literature: The Humanists (4)
Seminar—3 hours. French humanism in its most varied forms. Although at different times Rabelais and Montaigne will be primarily studied, other leading intellectuals and religious writers will also receive attention. May be repeated for credit when different topic is studied.—I. (I.) Van Den Abbeele

206A. Seventeenth-Century Literature: Theater (4)
Seminar—3 hours. Works of Corneille, Racine, Molière, and minor dramatists. One or more authors may be covered. May be repeated for credit with consent of instructor when different topics are studied.—II. (II.) Van Den Abbeele

206B. Seventeenth-Century Literature: Prose (4)
Seminar—3 hours; term paper and/or exposé. Works of authors such as Pascal, Descartes, Mme de Lafayette. One or more authors may be covered. May be repeated for credit with consent of instructor as different topics are studied from quarter to quarter.—I. (I.) Van Den Abbeele

206C. Seventeenth-Century Literature: Poetry (4)
Seminar—3 hours; term paper and/or exposé. Studies of the works of one or more poets of the period. May be repeated for credit with consent of instructor.—III. (III.) Van Den Abbeele

207A. Eighteenth-Century Literature: Philosophies (4)
Seminar—3 hours; term paper and/or exposé. Not a course in philosophy, but an examination of the role of philosophy in the design and context of literary works. Study of one or more authors. May be repeated for credit.—II. (II.) Simon

207B. Eighteenth-Century Literature: Novel (4)
Seminar—3 hours. Rise of the novel. Study of narrative experiments in the context of the philosophical climate and new literary values. Course may treat

one or more novelists of the period. May be repeated for credit when different topics are studied.—III. (III.) Simon

208A. Nineteenth-Century Literature: Fiction (4)
Seminar—3 hours. Study of the works of one or several novelists and/or short-story writers of the period. May be repeated for credit with consent of instructor when different topics are studied.—I. (I.) Constable

208B. Nineteenth-Century Literature: Poetry (4)
Seminar—3 hours. Study of the works of one or several poets of the period. May be repeated for credit with consent of instructor when different topics are studied.—III. (III.) Constable

209A. Twentieth-Century: Prose (4)
Seminar—3 hours; term paper and/or exposé. Study of the works of one or several writers of the period.—II. (II.) Praeger

209B. Twentieth-Century: Theater (4)
Seminar—3 hours; term paper and/or exposé. Study of the works of one or several dramatists of the period. May be repeated for credit with consent of instructor.—II. (II.)

209C. Twentieth-Century: Poetry (4)
Seminar—3 hours; term paper and/or exposé. Study of the works of one or several poets of the period. May be repeated for credit with consent of instructor.—III. (III.) Blanchard

210. Studies in Narrative Fiction (4)
Seminar—3 hours. May be repeated for credit with consent of instructor when different topic is studied.—I. (I.) Praeger

211. Studies in Criticism (4)
Seminar—3 hours. May be repeated for credit with consent of instructor when different topic is studied.—II. (II.) Blanchard

212. Studies in the Theater (4)
Seminar—3 hours. May be repeated for credit with consent of instructor when different topic is studied.—I. (I.)

213. Studies in Poetry (4)
Seminar—3 hours. May be repeated for credit with consent of instructor when different topic is studied.—II. (II.)

214. Study of a Literary Movement (4)
Seminar—3 hours. May be repeated for credit with consent of instructor when different topic is studied.—III. (III.)

224. Francophone Literatures (4)
Seminar—3 hours; term paper. Study of cultural productions (literature, film, visual arts) by Francophone peoples such as found in North Africa, West Africa, the Caribbean, South-East Asia, the Americas, and Metropolitan France. May be repeated for credit when topic differs and with consent of instructor.—Praeger, Constable, Rabine, Van Den Abbeele, Adejunmobi

250A. French Linguistics: Morphematics (4)
Seminar—4 hours. Prerequisite: courses 159, 160, or consent of instructor. Theoretical approach to French grammar, with emphasis on morphematics, i.e., a semantic analysis of grammatical categories, as well as of their paradigmatic and syntactic relations.—I. (I.) Manoliu

250B. French Linguistics: Transformational Syntax (4)
Seminar—4 hours. Prerequisite: course 250A or consent of instructor. Presentation of French syntax exemplified by a core of transformational rules (such as subjectivization, passivization, relativization) focusing on the most recent developments in the field (i.e., case grammars, generative semantics, trace theory).—I. (I.) Manoliu

251. Trends in French Contemporary Linguistics (4)
Seminar—3 hours; term paper. Prerequisite: course 250A or 250B or consent of instructor. Issues in contemporary French linguistic thought and their relationship to the development of theoretical linguistics. Topics such as pragmatics, semantics, symbolic logic, speech acts, etc. Intended for students in French linguistics or those interested in applying linguistic models to literature. May be repeated once for credit with consent of instructor when topic differs.—I. (I.) Manoliu

261. Current Issues in Modern French Syntax (4)
Seminar—3 hours; term paper. Prerequisite: course 161. Presentation of contemporary approaches to French syntax. Explanations of various less regular phenomena, with reference to on-going changes in modern spoken French. May be repeated for credit with consent of instructor when topic differs. Offered in alternate years.—II. Manoliu

297. Individual Study (1-5)
(S/U grading only.)

298. Group Study (1-5)
Seminar—1-5 hours. May be repeated for credit with consent of instructor.

299. Research (1-12)
(S/U grading only.)

299D. Dissertation Research (1-12)
(S/U grading only.)

Professional Courses

300. Teaching of a Modern Foreign Language (3)
Lecture/discussion—3 hours. Prerequisite: senior or graduate standing; a major or minor in a modern foreign language.—III. (III.)

390A. The Teaching of French in College (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing or consent of instructor. Course designed for graduate teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university. May be repeated for credit with consent of instructor. (S/U grading only.)—I. (I.) Anderson

390B. The Teaching of French in College (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing or consent of instructor. Course designed for graduate teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university. (S/U grading only.)—II. (II.) Anderson

390C. The Teaching of French in College (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing or consent of instructor. Course designed for graduate teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university. (S/U grading only.)—II. (II.) Anderson

390D. Teaching Intermediate French (2)
Lecture/discussion—2 hours. Prerequisite: course 390A, 390B, 390C. Focus on how to teach intermediate French grammar, literature, and composition. (S/U grading only.)—I. (I.) Clay

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Freshman Seminar Program

Ellen Sutter, Program Director

Program Office, 17 Wellman (Teaching Resources Center) (530-752-3249)

http://trc.ucdavis.edu/TRC

Committee in Charge

John Boe, Ph.D. *(College of Letters and Science)*
Connie Bowe, M.D. *(School of Medicine)*
Annie King, Ph.D. *(College of Agricultural and Environmental Sciences)*
Ellen Sutter, Ph.D. *(Teaching Resources Center)*
Patricia Turner, Ph.D. *(Vice Provost for Undergraduate Studies)*

Courses in Freshman Seminar (FRS)

(Questions pertaining to the following course should be directed to the instructor or to the Teaching Resources Center.)

Lower Division Course

1A-ZZ. Freshman Seminar (1)
Seminar—1-1.5 hours. Prerequisite: open only to students who have completed fewer than 45 quarter units. Investigation of a special topic (A-ZZ) through shared readings, discussions, written assignments, term papers, and special activities (such as field-work site visits, laboratory work, etc.). Emphasis on student participation in learning.—I, II, III.

2A-ZZ. Freshman Seminar (2)
Seminar—2-2.5 hours. Prerequisite: open only to students who have completed fewer than 45 quarter units. Investigation of a special topic (A-ZZ) through shared readings, discussions, written assignments, term papers, and special activities (such as field-work site visits, laboratory work, etc.). Emphasis on student participation in learning.—I, II, III.

Fungal Biology and Ecology

(College of Agricultural and Environmental Sciences)

The minor in Fungal Biology and Ecology is open to all students interested in a concentrated exposure to and knowledge of the fungi and allied organisms.

The minor is sponsored by the Plant Pathology Department.

Minor Program Requirements

	UNITS
Fungal Biology and Ecology	**18-20**
Plant Pathology 130, 148, 150	11
Select 7-9 units from Food Science and Technology 104, Medical Microbiology and Immunology 130, Plant Biology 146, Plant Pathology 40, 135, 151, Science and Society 30, Soil Science 111, 112; Plant Pathology 224 (available to advanced students with consent of instructor)	7-9

Minor Adviser. J. D. MacDonald.

Genetics

See Molecular and Cellular Biology; and Genetics (A Graduate Group)

Genetics (A Graduate Group)

James Murray, Ph.D., Chairperson of the Group

Group Office, 310 Life Sciences Addition (530-752-4863)

http://biosci.ucdavis.edu/ggc/ggg

Faculty

Steffen Abel, Ph.D., Associate Professor *(Vegetable Crops)*
Diane Beckles, Ph.D., Assistant Professor *(Vegetable Crops)*
David Begun, Ph.D., Associate Professor *(Evolution and Ecology)*
Craig Benham, Ph.D., Professor *(Genome Center)*
Alan B. Bennett, Ph.D., Professor *(Vegetable Crops)*

Linda F. Bisson, Ph.D., Professor *(Viticulture and Enology)*
John Bowman, Ph.D., Associate Professor *(Plant Biology)*
Anne Bagg Britt, Ph.D., Associate Professor *(Plant Biology)*
Sean Burgess, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Kenneth C. Burtis, Ph.D., Professor *(Molecular and Cellular Biology)*
Judy Callis, Ph.D., Professor *(Molecular and Cellular Biology)*
Frederic Chedin, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Hongwu Chen, Ph.D., Assistant Professor *(Cancer Center)*
Roger Chetelat, Ph.D., Associate Agronomist *(Vegetable Crops)*
Douglas Cook, Ph.D., Professor *(Plant Pathology)*
Gino A. Cortopassi, Ph.D., Professor *(Molecular Biosciences)*
Michael E. Dahmus, Ph.D., Professor *(Molecular and Cellular Biology)*
Abhaya Dandekar, Ph.D., Professor *(Pomology)*
Mary Delany, Ph.D., Associate Professor *(Animal Science)*
Jorge Dubcovsky, Ph.D., Professor *(Agronomy and Range Science)*
Jan Dvorak, Ph.D., Professor *(Agronomy and Range Science)*
JoAnne Engebrecht, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Holly Ernest, Ph.D., Assistant Research Geneticist *(Population Health and Reproduction)*
Bryce W. Falk, Ph.D., Professor *(Plant Pathology)*
Thomas R. Famula, Ph.D., Professor *(Animal Science)*
Charles S. Gasser, Ph.D., Professor *(Molecular and Cellular Biology)*
Paul Gepts, Ph.D., Professor *(Agronomy and Range Science)*
Robert L. Gilbertson, Ph.D., Professor *(Plant Pathology)*
David G. Gilchrist, Ph.D., Professor *(CEPRAP)*
Thomas Gradziel, Ph.D., Professor *(Pomology)*
Paul H. Gumerlock, Ph.D., Assistant Professor *(Hematology and Oncology)*
Nobuko Hagiwara, Ph.D., Assistant Professor *(Cardiovascular Medicine)*
John H. Harada, Ph.D., Professor *(Plant Biology)*
James A. Harding, Ph.D., Professor *(Environmental Horticulture)*
Stacey Harmer, Ph.D., Assistant Professor *(Plant Biology)*
Wolf-Dietrich Heyer, Ph.D., Professor *(Microbiology)*
Michael J. Holland, Ph.D., Professor *(Biological Chemistry)*
Liping Huang, Ph.D., Assistant Adjunct Professor *(Nutrition)*
Neil Hunter, Ph.D., Assistant Professor *(Microbiology)*
Marie Jasieniuk, Ph.D., Assistant Professor *(Vegetable Crops)*
Clarence I. Kado, Ph.D., Professor *(Plant Pathology)*
Sree Kanthaswamy, Ph.D., Assistant Research Geneticist *(Veterinary Genetics , Forensics)*
Ken Kaplan, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Daniel Kliebenstein, Ph.D., Assistant Professor *(Vegetable Crops)*
Artyom Kopp, Ph.D., Assistant Professor *(Evolution and Ecology)*
Stephen C. Kowalczykowski, Ph.D., Professor *(Microbiology)*
Dietmar Kueltz, Ph.D., Assistant Professor *(Animal Science)*
Hsing-Jien Kung, Ph.D., Professor *(Biological Chemistry)*
Kit Lam, Ph.D., Professor *(Cancer Center)*
Charles Langley, Ph.D., Professor *(Center for Population Biology)*
Janine LaSalle, Ph.D., Assistant Professor *(Microbiology and Immunology)*
Tom Ledig, Ph.D., Adjunct Professor *(Environmental Horticulture)*
Hongzhe Li, Ph.D., Assistant Professor *(Biological Chemistry)*
Su-Ju Lin, Ph.D., Assistant Professor *(Microbiology)*
William Lucas, Ph.D., Professor *(Plant Biology)*
Leslie A. Lyons, Ph.D., Assistant Professor *(Population Health and Reproduction)*
Julin Maloof, Ph.D., Assistant Professor *(Plant Biology)*
Marta Marthas, Ph.D., Associate Adjunct Professor *(Primate Center)*
Bernie May, Ph.D., Professor *(Animal Science)*
Juan F. Medrano, Ph.D., Professor *(Animal Science)*
Carole Meredith, Ph.D., Professor *(Viticulture and Enology)*
Danika Metallinos-Bannasch, Ph.D., Assistant Professor *(Population Health and Reproduction)*
Frederick J. Meyers, Ph.D., Professor *(Hematology and Oncology)*
Richard Michelmore, Ph.D., Professor *(Vegetable Crops)*
Maria Mudryj, Ph.D., Associate Professor *(Microbiology and Immunology)*
James D. Murray, Ph.D., Professor *(Animal Science)*
Jeanette E. Natzle, Ph.D., Associate Professor *(Molecular and Cellular Biology)*
David Neale, Ph.D., Adjunct Professor *(Environmental Horticulture)*
Sergey Nuzhdin, Ph.D., Associate Professor *(Evolution and Ecology)*
Anita M. Oberbauer, Ph.D., Professor *(Animal Science)*
Dan E. Parfitt, Ph.D., Pomologist *(Pomology)*
Martin L. Privalsky, Ph.D., Professor *(Microbiology)*
Carlos F. Quiros, Ph.D., Professor *(Vegetable Crops)*
Kathryn L. Radke, Ph.D., Associate Professor *(Animal Science)*
Pamela C. Ronald, Ph.D., Associate Professor *(Plant Pathology)*
Lesilee Rose, Ph.D., Associate Professor *(Molecular and Cellular Biology)*
John Roth, Ph.D., Professor, *(Microbiology)*
Earl Sawai, Ph.D., Associate Adjunct Professor *(Pathology)*
Carl W. Schmid, Ph.D., Professor *(Molecular and Cellular Biology)*
Michael F. Seldin, Ph.D., Professor *(Biological Chemistry)*
Douglas Shaw, Ph.D., Professor *(Pomology)*
Mitchell Singer, Ph.D., Associate Professor *(Microbiology)*
Neelima Sinha, Ph.D., Professor *(Plant Biology)*
David G. Smith, Ph.D., Professor *(Anthropology)*
Dina St. Clair, Ph.D., Associate Professor *(Vegetable Crops)*
Daniel Starr, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Venkatesan Sundaresan, Ph.D., Professor *(Plant Biology)*
Michael Syvanen, Ph.D., Professor *(Microbiology and Immunology)*
Thomas Tai, Ph.D., Associate in AES *(Agronomy and Range Science)*
Larry R. Teuber, Ph.D., Professor *(Agronomy and Range Science)*
Alison Van Eenennaam, Ph.D., Cooperative Extension Specialist *(Animal Science)*
M. Andrew Walker, Ph.D., Professor *(Viticulture and Enology)*
Craig H. Warden, Ph.D., Associate Professor *(Rowe Program)*
Thea A. Wilkins, Ph.D., Professor *(Agronomy and Range Science)*
Valerie M. Williamson, Ph.D., Professor *(Nematology)*
Reen Wu, Ph.D., Professor *(Pulmonary Medicine)*
John I. Yoder, Ph.D., Professor *(Vegetable Crops)*

Graduate Study. The Graduate Group in Genetics offers programs of study and research leading to the M.S. and Ph.D. degrees. To optimize the breadth available for student training and faculty interaction while still providing the opportunity for focused curricula, Focus Groups (FGs) were recently created within the graduate group. These focus groups consist of clusters of labs with similar research interests; faculty members belong to one or more focus groups (all faculty belong to the General Genetics section of graduate group). In addition, there are FGs in Animal Genomics, Chromosome Biology, Human Genetics, and Model Plants (FGs in Plant Breeding and Bioinformatics are expected soon). Each of these groups provide broad training in genetics, combined with an emphasis specific to its area. Students choose their focus group affiliation based on their research interests and the membership of their major professor. For additional information regarding the program, contact the group administrative assistant at 530-752-4863.

Graduate Adviser. Consult Genetics Graduate Group Office.

Courses in Genetics (GGG)

Graduate Courses

201A. Advanced Genetic Analysis (5)
Lecture/discussion—5 hours. Prerequisite: Biological Sciences 101, Statistics 100 or the equivalent, graduate standing. Fundamentals of genetic analysis and chromosome structure using model organisms including mutation, transmission, complementation, suppression, and enhancement as well as epigenetic phenomena at the whole organism and molecular levels.—III.

201B. Genomics (5)
Lecture—3 hours; discussion—2 hours. Prerequisite: course 201A, 201C or the equivalent. Prokaryotic and eukaryotic genomes. Experimental strategies and analytical challenges of modern genomics research and the theory and mechanics of data analysis. Structural, functional, and comparative genomics. Related issues in bioinformatics.—III. (III.) Cook, Michelmore

201C. Molecular Biology (4)
Lecture—4 hours. Prerequisite: Molecular and Cellular Biology 221A or the equivalent. Pass 1 restricted to graduate students in biochemistry and molecular biology, microbiology, or genetics. Structure and organization of DNA and chromatin; DNA replication, repair and recombination; transcription and RNA processing; protein biosynthesis and turnover; transcriptional and post-transcriptional control mechanisms; examples from eukaryotic and eubacterial cells, and virsuses. (Same course as Molecular and Cellular Biology 221C.)—III. (III.)

201D. Quantitative and Population Genetics (5)
Lecture—5 hours. Prerequisite: course 201A or consent of instructor. Basic concepts of quantitative and population genetics including gene and genotypic frequencies, multiple factor hypothesis, phenotypic and genotypic values, heritability, selection, genetic variation, the detection of quantitative trait loci and evolution in populations. Experimental and analytical methods.—II. (II.) Famula, Neale, Shaw

205. Molecular Genetics Laboratory (5)
Laboratory—15 hours. Prerequisite: Biological Sciences 101 (may be taken concurrently) or the equivalent, enrolled in Genetics Graduate Group. Students will conduct experiments in molecular genetics laboratories. Individual research problems will emphasize experimental design, experience with methodologies, and data interpretation. May be repeated up to three times for credit. (S/U grading only.)—I, II, III. (I, II, III.)

207L. Research Methods in Plant Genetics Laboratory (2-5)
Laboratory—6-15 hours. Prerequisite: course 207 (may be taken concurrently). Working knowledge of contemporary methodologies in plant genetics is obtained by participating in research programs of the various Plant Genetics Affinity Group members. (S/U grading only.)—I, II, III. (I, II, III.)

210. Horizontal Gene Transfer (3)
Lecture/discussion—3 hours. Prerequisite: background in basic microbiology and genetics required; introductory course in molecular biology, biotechnology and microbial and animal/plant genetics recommended. Transfer of genes between unrelated organisms in nature. Dissemination of foreign DNA from genetically engineered organisms, including plants and animals. Mechanisms by which genes are

transferred horizontally, and between kingdoms.—I. (I.) Kado

211. Concepts in Human Genetics and Genomics (3)
Lecture/discussion—3 hours. Prerequisite: course 201A or the equivalent; course 201B, 201C or the equivalent recommended. Human genomic organization; genetic structure of populations; positional cloning, application of linkage, association, and haplotypes; quantitative trait loci analyses; integrative genetic studies of gene expression; DNA repair mechanisms in genetic disease; mutation analyses; epigenetics; mitochondrial disease; gene manipulation and therapy.—II. (II.)

220. Genomics and Biotechnology of Plant Improvement (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101 or the equivalent. Integration of modern biotechnology and classical plant breeding including the impact of structural, comparative and functional genomics on gene discovery, characterization and exploitation. Also covers molecular markers, plant transformation, hybrid production, disease resistance, and novel output traits. (Same course as Vegetable Crops 220.)—II. Michelmore

291. Seminar in History of Genetics (2)
Seminar—2 hours. Prerequisite: Biological Sciences 101. The development of modern genetic theories beginning with Mendel.—II. (II.)

292A. Seminar in Cytogenetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201A or consent of instructor. Topics related to the deletion, duplication and rearrangement of chromosome regions. Offered in alternate years.—(I.)

292B. Seminar in Quantitative Genetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201A or consent of instructor. Topics of current interest related to the inheritance of continuous characters. Offered in alternate years.—(II.)

292C. Seminar in Developmental Genetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201A or consent of instructor. Topics in the area of cell-specific control of genes in development. Offered in alternate years.—I.

292D. Seminar in Population, Evolutionary and Ecological Genetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201A or consent of instructor. Topics related to the analysis and prediction of genetic changes in populations. Offered in alternate years.—II.

293. Seminar in Animal Genetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201A or consent of instructor. Emphasis on recent advances in the field of animal genetics, ranging from quantitative genetics to molecular biology as it relates to animals.—III. (III.)

295. Seminar in Molecular Genetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201A or consent of instructor. Topics of current interest related to the structure, modification and expression of genes.—I. (I.)

296. Scientific Professionalism and Integrity (2)
Lecture—1 hour; seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Review of basic skills required of contemporary scientists. Topics include scientific conduct, manuscript preparation, grant writing, seminar presentations, and time management. Emphasis on responsibilities of scientists to factually and thoughtfully communicate results. (S/U grading only.)—I. (I.) Yoder

297. Seminar in Plant Genetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201A or consent of instructor. Current topics in plant genetics will be examined in student-conducted seminars and discussion format. The integration of molecular, organismal and population genetics to address questions in plant biology will be emphasized.

298. Group Study (1-5)
Prerequisite: consent of instructor. Group study of selected topics in genetics. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Course

300. Methods in Teaching Genetics (1-3)
Lecture/discussion. Prerequisite: graduate standing and consent of instructor. Practical experience in the methods and problems of teaching genetics. Includes analysis of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion or laboratory sections, formulating examinations under supervision of instructor. May be repeated for credit up to 3 times or 9 units if teaching in different genetics related course. (S/U grading only.)—I, II, III.

Geographic Information Systems

(College of Agricultural and Environmental Sciences)

The Department of Biological and Agricultural Engineering offers a minor in Geographic Information Systems with an emphasis on spatial analysis. This minor is ideal for students interested in information processing of spatial data related to remote sensing, land information systems, marine cartography, thematic mapping, surface modeling, environmental modeling resources management, public utility planning, emergency response, geomarketing, geotechnics, archaeology, military exercises, and computer-aided design. Prerequisites include Mathematics 16A-16B, Statistics 13 or Agricultural Systems and Environment 120 or Civil and Environmental Engineering 114, and Agricultural Systems and Environment 21 or Computer Science Engineering 15.

Minor Program Requirements:

	UNITS
Geographic Information Systems	**18**
Applied Biological Systems Technology 180, 185, Environmental and Resource Sciences 186, 186L	13
Select 8 or more units from Agricultural Management and Rangeland Resources Systems and Environment 121, Applied Biological Systems Technology 175, Applied Biological Systems Technology/ Hydrologic Science 182, Environmental Science and Policy 179, 179L	5

Minor Advisers: R.E. Plant

Geographic Studies

(College of Agricultural and Environmental Sciences)

The interdepartmental minor in Geographic Studies is defined by its concern with place. Geographers strive to answer spatial questions regarding the earth's surface; to describe and explain the character of regions; to ascertain the ways in which historical and contemporary humans have used and shaped the earth's surface; and to understand the interactions of physical, biotic, and human systems within our global environment. The minor is compatible with a variety of environmental majors in the college and also with graduate programs in geography.

The minor is sponsored by the Department of Environmental Design.

Minor Program Requirements:

	UNITS
Geographic Studies	**20**
Geography 10	3
Select at least one course from three of the following areas	17
(a) Human geography: Human and Community Development 141, 142; International Agricultural Development 104; Environmental and Resource Sciences 173; or other courses approved by the adviser.	
(b) Methods in geography: Environmental and Resource Sciences 105, 185, 186; or other courses approved by the adviser.	
(c) Regional ecosystems: Landscape Architecture 168; Wildlife, Fish, and Conservation Biology 156, 157; Environmental and Resource Sciences 144; Evolution and Ecology 121; Geography 123, 131; or other courses approved by the adviser.	
(d) Individual study: Select a maximum of 4 units of 192 (Internship) or 199 (Research) in any appropriate department.	

Minor Adviser. D.J. Dingemans.

Geography

Courses in Geography (GEO)

Lower Division Courses

1. Physical Geography (4)
Lecture—3 hours; laboratory—2 hours. Basic physical elements of the human habitat, especially climate, landforms, soils, and natural vegetation.—III. Dingemans

2. Introduction to Cultural Geography (3)
Lecture—3 hours. Traditional systems of habitat use: their characteristics, origin, occurrence, ecology. Development of contemporary cultural patterns and patterns in man-land relationships. Emphasis on the nonindustrial world. GE credit: SocSci.—III. (III.) Allan

2G. Introduction to Cultural Geography: Discussion (1)
Discussion—1 hour; short papers. Prerequisite: course 2 concurrently. Small group discussion of topics and readings assigned for course 2. Preparation and discussion of short papers. GE credit with concurrent enrollment in course 2: Wrt.—III. (III.) Allan

10. The World's Regions (3)
Lecture—3 hours. The major geographic regions of the world; their origins, physical environments, cultures and economies; their interactions and global roles. Designed for non-majors.—I, II, III. (I, II, III.) Dingemans, Allan

98. Directed Group Study (1-5)
Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.)

99. Independent Study (1-5)
Prerequisite: consent of instructor, primarily for lower division students. (P/NP grading only.)

Upper Division Courses

121. North America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1 and 2 or consent of instructor. Landscapes and lifeways in the United States and Canada, and the ways in which physical and human forces have contributed to their variety. Regional stresses within and between the two countries.

123. Western Europe (3)
Lecture—3 hours. Prerequisite: courses 1 and 2 or consent of instructor. Geographic conditions and their relation to the economic, social, and political problems of the countries of Western Europe.—III. Dingemans

126. Southern Asia (3)
Lecture—3 hours. Prerequisite: courses 1 and 2, or consent of instructor. Physical, cultural, and historical geography of Southern Asia.—III. (III.) Allan

131. California (4)
Lecture—3 hours; discussion—1 hour. The regional nature and variety of California: landforms, climates,

vegetation, and soils; water, agriculture, and the cities. Ecological problems caused by increasing population and technological pressures on these environments.—Dingemans

143. Political Geography (4)
Lecture—3 hours; term paper. Areal differentiation of major natural and cultural phenomena affecting the world's political organization.—II. Dingemans

151. History of Geographic Thought (4)
Lecture—3 hours; term paper. Prerequisite: three upper division courses in geography. The literature of geography: objectives, subdivisions, and development of the subject.

155. Urban Geography (4)
Lecture—3 hours; term paper. Prerequisite: course 5 or consent of instructor. Geography of land use within cities. The processes of change, and theories of economic and social organization of urban space. The urban landscape as a product of history, planning policy, transportation systems, and residential structure.—Dingemans

161. Conservation of Resources and Environment (4)
Lecture—4 hours. Principles of natural-resource and environmental-quality conservation. Land use conflicts between forestry, agricultural, mining, municipal, and recreational interests. Roles of industry, government, and society in creating and resolving resource and environmental problems.

170. Cultural Ecology (4)
Lecture—3 hours; term paper. Prerequisite: course 2 or Anthropology 2. Geographic theories of environment-man relations. Ecologic relations of gatherers, fishermen, hunters, cultivators, and urbanites; their environmental impacts; their domestic plants and animals.

171. Cultural Geography (4)
Lecture—3 hours; term paper. Prerequisite: course 2 or consent of instructor. Consideration of principal concepts and approaches in cultural geography in modern times, and links with, and parallels in, other disciplines.

192. Student Internship in Geography (2-4)
Internship—5-15 hours at employing agency; term paper. Prerequisite: consent of undergraduate Geography major adviser and consent of instructor. Supervised program of student internships with public agencies dealing with geographical problems. The application and evaluation of theoretical concepts through work experience with a variety of assignments and work schedules. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates. (1-5)
(P/NP grading only.)

Geography (A Graduate Group)

Deborah L. Elliott-Fisk, Ph.D., Chairperson of the Group

Group Office, 152 Walker Hall (530-752-4119; geography@ucdavis.edu)

Faculty

Nigel Allan, Ph.D., Professor *(Geography)*
Michael Barbour, Ph.D., Professor *(Environmental Horticulture)*
David Boyd, Ph.D., Associate Professor *(Anthropology)*
Cynthia Brantley, Ph.D., Professor *(History)*
Stephen Brush, Ph.D., Professor *(Human and Community Development)*
Dennis Dingemans, Ph.D., Associate Professor *(Geography)*
Deborah L. Elliott-Fisk, Ph.D., Professor *(Wildlife, Fish, and Conservation Biology)*
Mark Francis, M.L.A., Professor *(Landscape Architecture)*
Charles Goldman, Ph.D., Professor *(Environmental Science and Policy)*
Steven Greco, Ph.D., Assistant Professor *(Landscape Architecture)*
Louis Grivetti, Ph.D., Professor *(Nutrition)*
Lynette Hart, Ph.D., Professor *(Population Health and Reproduction)*
David Hird, D.V.M., Ph.D., Professor *(Veterinary Medicine)*
Frank Hirtz, L.L.D., Ph.D., Associate Professor *(Human and Community Development)*
Lovell (Tu) Jarvis, Ph.D., Professor *(Agricultural and Resource Economics)*
Robert Johnston, M.S., Professor *(Environmental Science and Policy)*
Suad Joseph, Ph.D., Professor *(Anthropology, Women and Gender Studies)*
Carl Keen, Ph.D., Professor *(Nutrition)*
Martin Kenney, Ph.D., Professor *(Human and Community Development)*
Nguyen Kien, Ph.D., Professor *(Anesthesiology)*
F. Thomas Ledig, Ph.D., Adjunct Professor *(Environmental Horticulture)*
Jeff D. Loux, Ph.D., Assistant Adjunct Professor *(Landscape Architecture)*
Jay R. Lund, Ph.D., Professor *(Civil and Environmental Engineering)*
Dean MacCannell, Ph.D., Professor *(Landscape Architecture)*
Roger McDonald, Ph.D., Professor *(Nutrition)*
Jay Mechling, Ph.D., Professor *(American Studies)*
Janet Momsen, Ph.D., Professor *(Human and Community Development)*
Debbie Niemeier, Ph.D., Associate Professor *(Civil and Environmental Engineering)*
Ben Orlove, Ph.D., Professor *(Environmental Science and Policy)*
Patsy Eubanks Owens, M.L.A., Professor *(Landscape Architecture)*
Richard Plant, Ph.D., Professor *(Agronomy and Range Science)*
James Quinn, Ph.D., Professor *(Environmental Science and Policy)*
David Robertson, Ph.D., Professor *(English)*
Lynn Roller, Ph.D., Professor *(Classics, Art History)*
Scott Rozelle, Ph.D., Professor *(Agricultural and Resource Economics)*
Margaret Rucker, Ph.D., Professor *(Textiles and Clothing)*
Heath Schenker, M.A., Professor *(Landscape Architecture)*
Art Shapiro, Ph.D., Professor *(Evolution and Ecology)*
Michael P. Smith, Ph.D., Professor *(Human and Community Development)*
Margaret Swain, Ph.D., Associate Adjunct Professor *(Anthropology)*
Susan Ustin, Ph.D., Professor *(Land, Air and Water Resources)*
Stefano Varese, Ph.D., Professor *(Native American Studies)*
Charles Walker, Ph.D., Associate Professor *(History)*
Wesley W. Wallender, Ph.D., Professor *(Land, Air and Water Resources)*
Miriam J. Wells, Ph.D., Professor *(Human and Community Development)*
Diane Wolf, Ph.D., Professor *(Sociology)*
Truman Young, Ph.D., Professor *(Environmental Horticulture)*
Minghua, Zhang, Ph.D., Associate Adjunct Professor *(Land Air and Water Resources)*

Emeriti Faculty

Thomas Cahill, Ph.D., Professor Emeritus
Jack Ives, Ph.D., Professor Emeritus
Stephen Jett, Ph.D., Professor Emeritus
Robert L. Thayer, Jr., M.A., Professor Emeritus
Geoffrey Wandesforde-Smith, Ph.D., Associate Professor Emeritus

Affiliated Faculty

James Grieshop, Ph.D., Specialist, Cooperative Extension *(Human and Community Development)*
Eric Larsen, Ph.D., Assistant Research Scientist, *(Landscape Architecture)*
Greg McPherson, Ph.D., Researcher/Lecturer *(Western Center for Urban Forest Research and Education)*
Charlene Sailor, Ph.D., Associate Research Scientist
Sheri Zidenberg-Cherr, Ph.D., Specialist *(Cooperative Extension Specialist in Nutrition)*

Graduate study. The Graduate Group in Geography offers programs of study and research leading to the M.A. and Ph.D. degrees. Faculty and students share a common interest in spatial interaction between humans and the biophysical environment. Areas of thematic emphasis include biogeography, cultural-human geography, medical-nutritional geography, tourism, and environmental geography. Current research project locales include the Caribbean, eastern Europe, southeast Asia, Africa, and the United States (especially California).

Preparation. Most students considered for admission will have an undergraduate major in geography or in a closely related field. Generally, a student with an undergraduate degree in a closely-allied field will be required to complete the equivalent of a minor in geography, consisting of one course each in human geography, physical geography and geographic methods, plus an additional 9 units of geographic coursework. The student's guidance committee must certify definition of this requirement.

Faculty interests are diverse, and attract a correspondingly diverse set of students in such areas as biophysical geography and related natural science and engineering fields, as well as human geography and related social science fields. A number of faculty members use and teach geographic information systems, remote sensing, and related geographic techniques, and the faculty have a strong field orientation as well (a tradition in geography). This range of academic interests is typical of strong graduate programs in geography at other universities in the United States. However, the strengths of the Davis campus and its faculty enable the program to focus on several areas of emphasis in geography where faculty expertise and student interest is the greatest: biogeography, environmental and natural resource geography, gender and geography, tourism, and landscape architecture.

Graduate adviser. S. Brush *(Human and Community Development),* D. MacCannell *(Landscape Architecture).*

Courses in Geography (GEO)

Graduate Courses

200A. Research Trends in Geography (1)
Seminar—1 hour. Major current research themes and trends in geography. (S/U grading only.)

200B. Geographical Concepts (4)
Lecture—3 hours; term paper. Prerequisite: undergraduate course work in geography or consent of instructor; graduate standing. Survey of key concepts and thematic content of the discipline of geography, including the role of science and humanism, the classical context of the discipline, and process, structure and scale.—I. (I.) Dingemans

200C. Theory and Practice of Geography (4)
Lecture—3 hours; term paper. Prerequisite: graduate standing. Development of geographical theory; key concepts and theories; their chronology, and application to the practice of geography. Analytical background to geographical theory; application of theory to geographical practice and research projects.—II. (II.) Momsen

200D. Research Methods in Geography (4)
Lecture—3 hours; term paper. Prerequisite: graduate standing, courses 200B and 200C, or consent of instructor. Survey of research methods in geography, including the use of logic, theory and paradigms, research design, and analytical techniques, including statistics and modeling.—III. (III.)

201. Sources and General Literature of Geography (4)
Discussion—4 hours. Prerequisite: graduate standing in geography; consent of instructor. Designed for students preparing for higher degrees in geography. May be repeated for credit in one or more of the following subfields: physical, cultural, economic, urban, historical, political, conservation, and regional geography.—I, II, III. (I, II, III.)

290. Seminar: Selected Regions (4)
Seminar—3 hours. Region to be announced annually.—I, II, III. (I, II, III.)

291. Seminar in Cultural Geography (4)
Seminar—3 hours.—I, II, III. (I, II, III.)

292. Seminar in Plant Geography (4)
Seminar—3 hours; seminar paper. Prerequisite: graduate standing. Examination of that aspect of cultural plant geography dealing with human impacts and vegetation change in the earth's major biomes. Particular emphasis on the New World's savannas, deserts, and grasslands. Offered in alternate years.—I.

293. Graduate Internship (1-12)
Prerequisite: consent of instructor. Individually designed, supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

295. Seminar in Urban Geography (4)
Seminar—3 hours.—II. (II.)

297. Graduate Group in Geography Seminar (2)
Lecture/discussion—1 hour; term paper. Prerequisite: graduate standing. Seminars by UC Davis faculty and prominent national and international scholars; research presentations by Graduate Group in Geography Ph.D. candidates. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

299D. Individual Study (1-12)
Prerequisite: graduate student status in Geography and consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Geology

(College of Letters and Science)

Louise H. Kellogg, Ph.D., Chairperson of the Department

Department Office, 174 Physics/Geology Building (530-752-0350)

http://www-geology.ucdavis.edu

Faculty

Magali I. Billen, Ph.D., Assistant Professor
Sandra J. Carlson, Ph.D., Professor
William H. Casey, Ph.D., Professor *(Land, Air and Water Resources)*
Howard W. Day, Ph.D., Professor
John F. Dewey, Ph.D., Professor
James A. Doyle, Ph.D., Professor *(Evolution and Ecology)*
Graham E. Fogg, Ph.D., Professor *(Land, Air, and Water Resources)*
Louise H. Kellogg, Ph.D., Professor
Charles E. Lesher, Ph.D., Professor
James S. McClain, Ph.D., Associate Professor, *Academic Senate Distinguished Teaching Award*
Isabel P. Montañez, Ph.D., Professor
Jeffrey F. Mount, Ph.D., Professor
Alexandra Navrotsky, Ph.D., Professor *(Thermochemistry Facility, Chemistry)*
John B. Rundle, Ph.D., Professor *(Computational Science and Engineering)*
James R. Rustad, Ph.D., Associate Professor
Peter Schiffman, Ph.D., Professor
Howard J. Spero. Ph.D., Professor
Dawn Y. Sumner, Ph.D., Associate Professor
Donald L. Turcotte, Ph.D., Professor
Geerat J. Vermeij, Ph.D., Professor
Kenneth L. Verosub, Ph.D., Professor, Academic Senate Distinguished Teaching Award
Robert A. Zierenberg, Ph.D., Professor

Emeriti Faculty

Richard Cowen, Ph.D., Senior Lecturer Emeritus, *Academic Senate Distinguished Teaching Award*
Charles G. Higgins, Ph.D., Professor Emeritus
Robert A. Matthews, Ph.D., Senior Lecturer Emeritus
Eldridge M. Moores, Ph.D., Professor Emeritus
Robert J. Twiss, Ph.D., Professor Emeritus

Affiliated Faculty

David A. Osleger, Ph.D., Adjunct Associate Professor

The Major Programs

"Civilization exists by geological consent—subject to change without notice."—Will Durant

Geology is the study of the Earth, and in particular the history, the structure, the evolution of life, and the processes that have molded the Earth and its inhabitants. The coming of the space age has also extended the field to include the solid planets of the solar system. Although often attracted to the study of geology by an aesthetic appreciation and enjoyment of the earth, geologists commonly approach their studies from an interest either in the academic or the applied aspects of the science.

The academic aspects include the study of the history of life, the Earth, and the planets, and of the processes that drive the historical evolution. The study of historical evolution through "deep time" is what fundamentally distinguishes geology from most of the other physical sciences. The study of the processes that drive this evolution can involve the application of any of the physical or life sciences to understanding the Earth. In this sense, geology is truly an interdisciplinary science.

The applied aspects of the science generally involve the interaction between humans and the earth. Applied studies include the study of mineral resources including oil and water; identification and mitigation of Earth hazards such as earthquakes, landslides, and volcanic eruptions; identification and mitigation of polluted ground water; and land use planning.

The Program. Students interested in becoming professional geologists or continuing their geological studies at the graduate level should elect the Bachelor of Science degree program. The Bachelor of Arts program is for students interested in an interdisciplinary program of study, or who plan to go into pre-college teaching. Both programs allow students to emphasize an aspect of the field of particular interest to them. The upper division electives are not restricted to geology courses but must be chosen to provide a relevant, coherent, and in-depth program of study. Transfer students should have completed as much as possible of the preparatory subject matter listed below. High school preparation for either program should include high school chemistry and four years of mathematics or the equivalent.

Internships and Career Alternatives. The largest employer of geologists has traditionally been the oil industry, although recently more opportunities have been available in environmental geology with consulting firms and government agencies. Government organizations and research laboratories also employ geologists in a variety of other capacities. There is a growing need for earth science teachers at all pre-college levels, and colleges and universities provide opportunities in teaching and research. Entry level positions are available with a Bachelor's degree. A Master's degree is the usual professional level degree, and a Ph.D. is generally required for research and academic positions. Internships during undergraduate training are a means of exploring potential career opportunities and can lead to positions after graduation. UC Davis students have interned at the California Division of Mines and Geology, the State Department of Water Resources, and various consulting firms.

Education Abroad Options. The department strongly encourages interested students to pursue a portion of their studies abroad. Within the constraints of the campus and College residence requirements, it is possible for students to complete significant portions of the Geology major at an international institution provided that the student consults with one of the undergraduate advisers and carefully plans a course of study abroad that will complement their coursework at Davis. In recent years, UC Davis Geology majors have spent their junior or senior years completing upper division coursework at EAP partner institutions including the University of Leeds, the University of Edinburgh, and the University of Otago.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**40-43**
Geology 3, 3L, 50, 50L, 60	13
Mathematics 16A-16B or 21A-21B	6-8
Chemistry 2A-2B	10
Physics 7A-7B	8
Statistics 13 or 13AT or 32 or 102	3-4
Depth Subject Matter	**36**
Geology 100, 100L, 101, 101L, 103, 107, 107L, 108, 109, 109L	24
Additional upper division electives chosen from upper division courses in geology. Upper division courses in related fields may satisfy this requirement if approved in advance by the major adviser	12
Total Units for the Major	**76-79**

Recommended
Chemistry 2C or Hydrologic Science 134, Physics 7C.

B.S. Major Requirements:

	UNITS
Preparatory Subject Matter	**57-59**
Geology 3, 3L, 50, 50L, 60, 62	15
Mathematics 21A-21B-21C	12
Chemistry 2A-2B	10
Select one of the following three options:	
General Geology option:	
Hydrologic Science 134 or Chemistry 2C	5-6
Statistics 32 or 102	3-4
Physics 7A-7B-7C or 9A-9B-9C	12
Geochemistry/Petrology option:	
Hydrologic Science 134 or Chemistry 2C	5-6
Statistics 32 or 102	3-4
Mathematics 21D	4
Physics 9A-9B	8
Quantitative/Geophysics option:	
Mathematics 21D and 22A	7
Physics 9A-9B-9C	12
Depth Subject Matter	**52**
Geology 100, 100L, 101, 101L, 103, 105, 106, 107, 107L, 108, 109, 109L, 110	40
Additional upper division electives chosen from Geology 130–190 courses, Hydrologic Science 144, 146 and related fields approved in advance by major adviser. No more than 3 units upper division elective credit for Geology 115–129 courses. Maximum of 6 units upper division elective credit for Geology 192 or 194A-194B or 194HA-194HB.	12
Total Units for the Major	**109-111**

English Composition Requirement
It is recommended that all majors complete the English composition requirement (English 101 or 102 or 104 or the equivalent) before or concurrently with the following courses: Geology 100, 101, 105N, 106, 108, 109L, 110.

Recommended
For those who are intending to pursue a career in geology or who are planning to apply to graduate programs in the earth sciences, one or more of the following courses are recommended for any of the options or specifically to supplement the options as listed. Note that Mathematics 22A is not a necessary prerequisite to Physics 9C:

General Geology option: Mathematics 21D, 22A, 22B, Physics 9A-9B-9C instead of 7A-7B-7C, Statistics 104, 106, 108.

Geochemistry/Petrology option: Mathematics 22A, Physics 9C, Hydrology 134 and Chemistry 2C, Chemistry 110A.

Quantitative/Geophysics option: Mathematics 22B, Statistics 32 or 102, Hydrology 134 or Chemistry 2C.

Major Advisers. A.B. degree: R.A. Zierenberg; B.S. degree: I.P. Montañez, R.A. Zierenberg, P. Schiffman.

Minor Program Requirements:

Students in other disciplines may elect to complete a minor in Geology by choosing a geological subject emphasis listed below. On transcripts the minor will appear as a minor in Geology.

UNITS

Geology 19-24
Select one of the five emphases below.

General Geology emphasis 19-20
Geology 50 (or 1) and 50L 5-6
Geology 100, 101, 109 and either 107 or 108 11
Geology 116 or 134 3
Minor Adviser. R.A. Zierenberg.

Engineering Geology emphasis 19-22
Geology 50 and 50L 5
Civil Engineering 171, 171L 5
Three courses chosen from Geology 134, 161, 162, Hydrologic Science 103, 144, 146, Soil Science 118, 120 9-12
Minor Adviser. R.A. Zierenberg.

Geochemistry emphasis 19-22
Geology 60 and either 146 or 148 7
Chemistry 110A and 110B, or Materials Science and Engineering 130 and 134 ..... 6 (Chemistry majors may substitute one of the elective courses for Chemistry 110B.)
Two elective courses chosen from Chemistry 110C, Geology 108, 146, 148, Hydrologic Science 134, Soil Science 102 .....6-9 (Chemistry 110C and Materials Science and Engineering 134 cannot both be counted toward the minor.)
Minor Adviser. R.A. Zierenberg.

Oceanography emphasis 21-24
Geology 108, 116, 150A, 150B, 150C 16
Two courses chosen from Environmental Science and Policy 100, 151, Geology 109, 152 5-8
Minor Adviser. H.J. Spero.

Paleobiology emphasis 20-21
Geology 107 and 107L, 108 8
Geology 152 4
At least eight additional units from the following: Anthropology 151 or 152, Evolution and Ecology 100, 101, 102, 105, 112-112L, 140, 149, Geology 109, 150C . 8-9
Minor Adviser. H.J. Spero.

Science Teaching Credential. Students wishing to prepare for a science credential with a concentration in Earth and Planetary Science may do so by satisfying the requirements for the B.S. degree in Natural Science or the A.B. degree in Geology (77-79 units) and 36 additional units of science as outlined below. Students may also prepare for the science credential by taking the B.S. degree in Geology (108-111 units) and an additional 24 units as indicated by the asterisks below.

Biological Sciences 1A-1B-1C* 15
Chemistry 2C 5
Physics 7C 4
Mathematics 16C 3
Geology 36* 4
Geology 116-116G* 5

Teaching Credential Subject Representative. H.W. Day. See also under Education—Teacher Education.

Graduate Study. The Department of Geology offers a program of study and research leading to the M.S. and Ph.D. degrees. For information regarding graduate study in geology, address the Graduate Adviser, Department of Geology.

Graduate Advisers. C.E. Lesher, J.S. McClain, S.J. Carlson.

Courses in Geology (GEL)

Lower Division Courses

1. The Earth (4)
Lecture—3 hours; discussion—1 hour. Introduction to the study of the Earth. Earth's physical and chemical structure; internal and surface processes that mold the Earth; geological hazards and resources. Not open for credit to students who have completed course 50. Only 2 units of credit to students who have completed course 2. GE credit: SciEng.—I, II, III. (I, II, III.) Osleger, Verosub

2. The Blue Planet: Introduction to Earth Science (3)
Lecture—3 hours. Study of the solid and fluid earth and its place in the solar system. Holistic examination of how the solid earth interacts with the atmosphere, hydrosphere, biosphere, and extraterrestrial environment. Not open for credit to students who have completed course 50. Only 2 units of credit to students who have completed course 1. GE credit: SciEng.—III. (III.) McClain

2G. The Blue Planet: Introduction to Earth Science Discussion (1)
Discussion—1 hour. Prerequisite: course 2 concurrently. Small group discussion and preparation of short papers for course 2. GE credit with concurrent enrollment in course 2: Wrt.—III. (III.) McClain

3. History of Life (3)
Lecture—3 hours. Prerequisite: course 1 recommended. The history of life during the three and one-half billion years from its origin to the present day. Origin of life and processes of evolution; how to visualize and understand living organisms from their fossil remains. GE credit: SciEng.—II. (II.)

3G. History of Life: Discussion (1)
Discussion—1 hour. Prerequisite: course 3 concurrently. Small group discussion and preparation of short papers for course 3. GE credit with concurrent enrollment in course 3: Wrt.—II. (II.)

3L. History of Life Laboratory (1)
Laboratory—3 hours. Prerequisite: course 3 concurrently. Exercises in understanding fossils as the clues to interpreting ancient life, including their functional morphology, paleoecology, and evolution.—II. (II.)

4. Evolution: Science and World View (3)
Lecture—2 hours; discussion—1 hour. Introduction to biological evolution. Emphasis on historical development, major lines of evidence and causes of evolution; relationships between evolution and Earth history; the impact of evolutionary thought on other disciplines. GE credit: SciEng.—I. (I.) Vermeij

10. Modern and Ancient Global Environmental Change (3)
Lecture—3 hours. Fundamental scientific concepts underlying issues such as global warming, pollution, and the future of nonsustainable resources presented in the context of anthropogenic processes as well as natural forcing of paleoenvironmental change throughout Earth's history. GE credit: SciEng.—III. (III.) Montanez

12. Evolution and Paleobiology of Dinosaurs (2)
Lecture—2 hours. Introduction to evolutionary biology, paleobiology, ecology and paleoecology, using dinosaurs as case studies.—II. (II.) Carlson

17. Earthquakes and Other Earth Hazards (2)
Lecture—2 hours. The impact of earthquakes, volcanoes, landslides and floods on Man, his structures and his environment. Discussion of the causes, effects, and solution of geologic problems in rural and urban settings.—I, III. (I, III.) Dewey

20. Geology of California (2)
Lecture—2 hours. The geologic history of California, the origin of rocks and the environments in which they were formed, the structure of the rocks and the interpretation of their structural history, mineral resources, and appreciation of the California landscape.—III. (II.) Osleger

25. Geology of National Parks (2)
Lecture—2 hours. Appreciation of the geologic framework underlying the inherent beauty of U.S. National Parks. Each park provides a visual focus for understanding a variety of geologic processes such as mountain building, volcanism, stream erosion, and glacial action.—I. (I.) Osleger

32. Volcanoes (3)
Lecture—3 hours. Role of eruptions, and eruptive products of volcanoes in shaping the planet's surface, influencing its environment, and providing essential human resources. GE: SciEng.—II. (II.) Schiffman

35. Rivers (3)
Lecture—3 hours. Introduction to geomorphology, climate and geology of rivers and watersheds, with case examples from California. Assessment of impacts of logging, agriculture, mining, urbanization and water supply on river processes. Optional river field trips. GE credit: SciEng.—III. (III.) Mount

36. The Solar System (4)
Lecture—3 hours; discussion—1 hour. Nature of the sun, moon, and planets as determined by recent manned and unmanned exploration of the solar system. Comparison of terrestrial, lunar, and planetary geological processes. Search for life on other planets. Origin and evolution of the solar system. (Former course 113-113G.) GE credit: SciEng, Wrt.—III. (III.) Osleger

50. Physical Geology (3)
Lecture—3 hours. Prerequisite: high school physics and chemistry. The Earth, its materials, its internal and external processes, its development through time by sea-floor spreading and global plate tectonics. Students with credit for course 1 or the equivalent may receive only 2 units for course 50.—I. (I.) Rustad, McClain

50L. Physical Geology Laboratory (2)
Laboratory—6 hours; one or two one-day field trips. Prerequisite: course 50 (preferably taken concurrently). Introduction to classification and recognition of minerals and rocks and to interpretation of topographic and geologic maps and aerial photographs. Students with credit for course 1L or the equivalent may receive only 1 unit for course 50L.—I. (I.) Rustad, McClain

60. Earth Materials: Introduction (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 2A; Mathematics 16A or 21A; course 1 or 50, 50L. Physical and chemical properties of rocks, minerals and other earth materials; structure and composition of rock-forming minerals; formation of minerals by precipitation from silicate liquids and aqueous fluids and by solid state transformations.—I. (I.) Day

62. Optical Mineralogy (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 60 (may be taken concurrently); high school physics is strongly recommended. Optical properties of inorganic crystals; techniques of mineral identification using the polarizing microscope; strategies for studying rocks in thin section.—I. (I.) Day

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor; lower division standing. (P/NP grading only.)

Upper Division Courses

100. Earth Dynamics I: Extensional and Translational Processes (3)
Lecture—3 hours. Prerequisite: course 50, 50L, Physics 7A or 9A (may be taken concurrently), or consent of instructor. Structural features of, and geophysical constraints on, regions of extensional and translational tectonics. Observation, formation, and tectonic environments of joints, fractures, normal faults, and strike-slip faults. GE credit: SciEng, Wrt.—I. (I.) Cowgill

100L. Earth Dynamics I: Structure/Tectonics Laboratory (1)
Laboratory—3 hours; two one-day field trips required. Prerequisite: course 50L and course 100 (may be taken concurrently); or consent of instructor. Introduction to three-dimensional analysis of geologic structures; introduction to field techniques; interpretation of topographic and geologic maps; tectonic analysis of extensional and strike-slip terranes.—I. (I.) Cowgill

101. Earth Dynamics II: Convergent and Collisional Processes (3)
Lecture—3 hours. Prerequisite: courses 50-50L, 100, Mathematics 21B or 16B (may be taken concurrently), Physics 5A or 7A or 9A (may be taken concurrently); or consent of instructor. Geophysical and structural signatures of convergent tectonics, subduction zones, plate collisions and mountain belts. Topics include ductile deformation, folds, seismic Benioff zones, gravity and isostacy. Examples of collisions and resulting mountain belts. Examples drawn from western North America. GE credit: SciEng, Wrt.—II. (II.) Cowgill

101L. Earth Dynamics II: Structure/Tectonics Laboratory (2)
Laboratory and fieldwork—6 hours; six days of field trips on four separate weekends required. Prerequisite: courses 50L, 100L, and 101 (may be taken concurrently); or consent of instructor. Continuation of Geology 100L. Analysis of three-dimensional geologic structures; introduction to field techniques; field-mapping projects; interpretation of topographic and geologic maps; tectonic analysis of convergent and collisional terranes.—II. (II.) Cowgill

103. Field Geology (3)
Fieldwork and laboratory—9 hours; 7-8 days on weekends during quarter. Prerequisite: course 101L or consent of instructor. Field mapping projects and writing geological reports. Weekly classroom meetings devoted to preparation of maps, cross sections, stratigraphic sections, rock descriptions, and reports.—III. (III.) Lesher

105. Earth Materials: Igneous Rocks (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: courses 60, 62; Mathematics 16A or 21A; Chemistry 2B (may be taken concurrently). Origin and occurrence of igneous rocks. Laboratory exercises emphasize the study of these rocks in hand specimen and thin section. GE credit: SciEng, Wrt.—II. (II.) Lesher

106. Earth Materials: Metamorphic Rocks (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 105, Chemistry 2B, Mathematics 16A or 21A. Physical and chemical properties of metamorphic rocks; interpretation of metamorphic environments. Laboratory exercises emphasize the study of these rocks in hand specimen and thin section. GE credit: SciEng, Wrt.—III. (III.) Day

107. Earth History: Paleobiology (3)
Lecture—3 hours. Prerequisite: courses 3-3L or Biological Sciences 1B. The evolution and ecological structure of the biosphere from the origin of life to the present.—II, III. (II, III.) Carlson

107L. Earth History: Paleobiology Laboratory (2)
Laboratory—6 hours. Prerequisite: courses 3-3L or Biological Sciences 1B; course 107 (may be taken concurrently). Exercises in determining the ecological functions and evolution of individuals, populations, and communities of fossil organisms in field and laboratory.—III. (III.) Carlson

108. Earth History: Paleoclimates (3)
Lecture—3 hours. Prerequisite: course 1 or Geology/Environmental Science and Policy 116; and Chemistry 2A; or consent of instructor. Geological and environmental factors controlling climate change, the greenhouse effect with a detailed analysis of the history of Earth's climate fluctuations over the last 600 million years. Past and present climate records are used to examine potential future climatic scenarios. GE credit: SciEng, Wrt.—I. (I.) Spero

109. Earth History: Sediments and Strata (2)
Lecture—2 hours. Prerequisite: courses 50-50L. Principles of stratigraphic and sedimentologic analysis. Evaluation of historical and modern global changes in sedimentation within terrestrial and marine environments. Examination of the plate tectonic, climatic and oceanographic factors controlling the distribution and exploitation of economic fluids within sedimentary rocks. GE credit with concurrent enrollment in course 109L: SciEng.—II. (II.) Sumner

109L. Earth History: Sediments and Strata Laboratory (2)
Laboratory—6 hours (includes four 1-day field trips). Prerequisite: course 109 (may be taken concurrently). Methods of stratigraphic and sedimentologic analysis of modern and ancient sediments. Identification of major sediment and sedimentary rock types. Outcrop and subsurface analysis of sedimentary basins. GE credit with concurrent enrollment in course 109: Wrt.—II. (II.) Sumner

110. Summer Field Geology (8)
Fieldwork—8 hours/day, 6 days/week for six weeks. Prerequisite: courses 103, 109; course 105 recommended. Advanced application of geologic and geophysical field methods to the study of rocks. Includes development and interpretation of geologic maps and cross sections; gravity, magnetic, electrical resistivity and seismic surveys; and field analysis of plutonic and volcanic rock suites. GE credit: SciEng, Wrt.—summer. McClain

115. Earth Science, History, and People (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing; course 1. Study of interplay between the Earth and its human inhabitants through history, including consideration of acute events such as earthquakes and eruptions as well as the geology of resources, topography, and water. GE credit: SciEng or SocSci, Wrt.—III. (III.) Verosub

116. The Oceans (3)
Lecture—3 hours. Prerequisite: upper division standing or consent of instructor. Introductory survey of the marine environment. Oceanic physical phenomena, chemical constituents, geological history, and the sea's biota; and utilization of marine resources. (Same course as Environmental Science and Policy 116.) GE credit: SciEng.—II. (I, II.)

116G. The Oceans: Discussion (2)
Discussion—2 hours. Prerequisite: course 116/Environmental Science and Policy 116 concurrently. Scientific method applied to discovery of the processes, biota and history of the oceans. Group discussion and preparation of papers. (Same course as Environmental Science and Policy 116G.) GE credit with concurrent enrollment in course 116: Wrt.—II. (I, II.)

129. Sample Preparation and Techniques for Petrology (1)
Laboratory—3 hours. Prerequisite: courses 60-60L. Introduction to petrographic laboratory techniques for petrographers. Topics covered may include thin and polished section preparation, rock crushing/grinding, mineral separation, staining, and photomicroscopy. (P/NP grading only.)—I. Winter

130. Non-Renewable Natural Resources (3)
Lecture—3 hours. Prerequisite: course 1. Origin, occurrence, and distribution of non-renewable resources, including metallic, nonmetallic, and energy-producing materials. Problems of discovery, production, and management. Estimations and limitations of reserves, and their sociological, political, and economic effects.—II. (II.) Zierenberg

134. Environmental Geology and Land Use Planning (3)
Lecture—3 hours. Prerequisite: one course in Geology, preferably course 50 or 1, or consent of instructor. Geologic aspects of land use and development planning. Geologic problems concerning volcanic and earthquake hazards, land stability, floods, erosion, coastal hazards, non-renewable resource extraction, waste disposal, water resources. GE credit: SciEng, Wrt.—I. (I.) Montanez

138. Introductory Volcanology (4)
Lecture—2 hours; fieldwork—6 hours. Prerequisite: upper division standing, course 60 and 109 or the equivalents, or consent of instructor. Principles of physical and chemical volcanology. Taught in a volcanically active setting (e.g., Hawaii) with a strong field component. GE credit: SciEng.—summer (summer) Schiffman

139. Fluvial Geomorphology (5)
Lecture—3 hours; laboratory—3 hours; fieldwork—3 hours. Prerequisite: courses 50, 50L; Mathematics 21B or 16B recommended. Advanced analysis of fluvial processes, including geomorphic evolution of rivers, floodplains and watersheds at various spatial and temporal scales, and in response to changing land use. Laboratory exercises examine methods of geomorphic analysis of rivers. Includes three weekend field trips.—I. (I.) Mount

142. Basin Analysis (5)
Lecture—3 hours; laboratory—6 hours; two required one-day field trips. Prerequisite: course 50 and 50L; course 109 recommended. Integrated analysis of sedimentary basins from initiation to maturity, including geophysics of basin formation, controls on sedimentary fill, subsidence and thermal evolution, fluid flow, rock alteration due to fluid flow, and applications to petroleum exploration and hydrology.—(I.) Sumner

143. Advanced Igneous Petrology (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: course 105, Mathematics 16C or 21C, Chemistry 2C. Physical and chemical properties of magmatic environments and processes of igneous rock formation. Laboratory study of representative igneous rocks. GE credit: SciEng, Wrt.—(II.) Lesher

144. Historical Ecology (3)
Lecture—3 hours. Prerequisite: upper division course in environmental science or ecology, or an introductory course in paleobiology. Ancient ecosystems and the factors that caused them to change. Species, expansion, evolution of new modes of life, geologically induced variations in resource supply, and extinction provide historical perspective on the biosphere of future.—II. Vermeij

145. Advanced Metamorphic Petrology (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: course 106; Hydrologic Science 134 or Chemistry 2C; Mathematics 16C or 21C. Metamorphic processes and the origin of metamorphic rocks. Laboratory study of representative rock suites. Offered in alternate years. GE credit: SciEng, Wrt.

146. Isotope Geochemistry (3)
Lecture—3 hours. Prerequisite: Chemistry 2C or consent of instructor. Principles and applications of nuclear chemistry to geology. Methods of determining geologic ages using K-Ar, Rb-Sr, Nd-Sm, and U-Pb isotopes. The interpretation of apparent ages determined by isotopic methods. The age and origin of the earth. Offered in alternate years.—(II.) Day

147. Geology of Ore Deposits (4)
Lecture—3 hours; laboratory—3 hours; optional one-weekend field trip. Prerequisite: Chemistry 2C or Hydrologic Science 134, courses 60, 62, and 105. Tectonic, lithologic and geochemical setting of major metallic ore deposit types emphasizing ore deposit genesis, water/rock interaction and the environmental effects of mining. Offered in alternate years.—III. Zierenberg

148. Stable Isotopes and Geochemical Tracers (3)
Lecture—3 hours. Prerequisite: Chemistry 2C or Hydrologic Science 134; courses 50, 50L, 60. Use of oxygen and hydrogen isotopes in defining

hydrologic processes; carbon, nitrogen, and sulfur isotopes as indicators of exchange between the lithosphere, hydrosphere, atmosphere and biosphere. Radiogenic, cosmogenic, and noble gas isotope tracers. Offered in alternate years.—(III.) Zierenberg

150A. Physical and Chemical Oceanography (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 116/Environmental Science and Policy 116; Physics 9B; Mathematics 21D; Chemistry 2C; or upper division standing in a natural science and consent of instructor. Physical and chemical properties of seawater, fluid dynamics, air-sea interaction, currents, waves, tides, mixing, major oceanic geochemical cycles. (Same course as Environmental Science and Policy 150A.)—(I.) McClain, Spero

150B. Geological Oceanography (3)
Lecture—3 hours. Prerequisite: course 50 or 116. Introduction to the origin and geologic evolution of ocean basins. Composition and structure of oceanic crust; marine volcanism; and deposition of marine sediments. Interpretation of geologic history of the ocean floor in terms of sea-floor spreading theory. (Same course as Environmental Science and Policy 150B.)—II. (II.) Billen, McClain

150C. Biological Oceanography (4)
Lecture—3 hours; discussion—1 hour; fieldwork—one weekend field trip required. Prerequisite: Biological Sciences 1A and a course in general ecology or consent of instructor. Ecology of major marine habitats, including intertidal, shelf benthic, deep-sea and plankton communities. Existing knowledge and contemporary issues in research. Segment devoted to human use. (Same course as Environmental Science and Policy 150C.)—II. (II.)

152. Paleobiology of Protista (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: courses 107 or Biological Sciences 1A or consent of instructor. Morphology, systematics, evolution, and ecology of single-celled organisms that are preserved in the fossil record. Offered in alternate years.

156. Hydrogeology and Contaminant Transport (5)
Lecture—3 hours; laboratory—3 hours; term paper. Prerequisite: Hydrologic Science 145, Civil and Environmental Engineering 144 or the equivalent. Physical and chemical processes affecting groundwater flow and contaminant transport, with emphasis on realistic hydrogeologic systems. Groundwater geology and chemistry. Fundamentals of groundwater flow and transport analysis. Laboratory includes field pumping test and work with physical and computer models. (Same course as Hydrologic Science 146.)—II. Fogg

160. Geological Data Analysis (3)
Lecture/discussion—3 hours. Prerequisite: Mathematics 21A or the equivalent. Introduction to quantitative methods in analyzing geological data including basic principles of statistics and probability, error analysis, hypothesis testing, inverse theory, time series analysis and directional data analyses. Use of computer in lectures and homework.—III. Billen

161. Exploration Geophysics and Seismology (3)
Lecture—3 hours. Prerequisite: Mathematics 21C, Physics 5C or 7C or 9C; or consent of instructor. Principles of exploration geophysics and seismology. Use of gravity, magnetic, electrical resistivity, electromagnetic, and seismic measurements to determine structure of the Earth's crust. Interpretation of data using computers. Survey of well-logging techniques. Seismology and earthquakes.—I. (I.) Billen

162. Geophysics of the Solid Earth (3)
Lecture—3 hours. Prerequisite: Mathematics 21C, Physics 5C or 7C or 9C; or consent of instructor. Theory and use of physics in the study of the solid earth. Gravity, magnetism, paleomagnetism, and heat flow. Application to the interpretation of the regional and large-scale structure of the earth and to plate tectonics.—(II.) Kellogg

163. Planetary Geology and Geophysics (3)
Lecture—3 hours. Prerequisite: Mathematics 21C, Physics 7C or 9C, and course 50 or 36 or Astronomy 10, or consent of instructor. Principles of planetary science. Planetary dynamics, including orbital mechanics, tidal interactions and ring dynamics. Theory of planetary interiors, gravitational fields, rotational dynamics. Physics of planetary atmospheres. Geological processes, landforms and their modification. Methods of analysis from Earth-based observations and spacecraft.—II. Kellogg

175. Advanced Field Geology (1-6)
Fieldwork—2-12 hours; discussion—1-6 hours. Prerequisite: consent of instructor. Advanced field studies of selected geologic terrains, including making observations, interpreting these observations, and discussing variations in interpretations. May be repeated for up to 6 units of credit if topic differs. (P/NP grading only.)—I, II, III. (I, II, III.)

182. Field Studies in Marine Geochemisty (2-8)
Lecture—3 hours; laboratory—1-3 hours; fieldwork—6-40 hours. Prerequisite: consent of instructor. Marine geochemistry with the opportunity of going to sea or into the field on land. Techniques of seafloor mapping using bottom photography, marine geochemical sampling, and method of data reduction and sample analysis. Analysis of data/samples collected.

190. Seminar in Geology (1)
Discussion—1 hour; seminar—1 hour; written abstracts. Prerequisite: major in Geology. Presentation and discussion of current topics in geology by visiting lecturers, staff, and students. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship in Geology (1-12)
Internship. Prerequisite: upper division standing; project approval prior to internship. Supervised work experience in geology. May be repeated for credit for a total of 10 units. (P/NP grading only.)

194A-194B. Senior Thesis (3-3)
Prerequisite: open to Geology majors who have completed 135 units and who do not qualify for the honors program. Guided independent study of a selected topic, leading to the writing of a senior thesis. (Deferred grading only, pending completion of course sequence.)

194HA-194HB. Senior Honors Project (3-3)
Independent study—9 hours. Prerequisite: open to Geology majors who have completed 135 units and who qualify for the honors program. Guided independent study of a selected topic, leading to the writing of an honors thesis. (Deferred grading only, pending completion of sequence.)

198. Directed Group Study (1-5)
Prerequisite: senior standing in Geology or consent of instructor.

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

205. Advanced Field Stratigraphy (3)
Lecture—1 hour; field work—2 hours. Prerequisite: courses 109 and 110 or consent of instructor; course 206 recommended. Fieldwork over spring break. Application of stratigraphic techniques to research problems. Collection, compilation, and interpretation of field data. Integration of data with models for deposition and interpretations of Earth history. Topics will vary. May be repeated for credit.—(III.) Sumner

206. Stratigraphic Analysis (3)
Lecture—3 hours. Prerequisite: courses 109, 109L or consent of instructor; course 144 recommended. Topics in advanced methods of stratigraphic analysis, regional stratigraphy and sedimentation, and sedimentary basin analysis. Emphasis on techniques used to interpret stratigraphic record and on current issues in stratigraphy and sedimentation. May be repeated for credit when topic differs. Offered in alternate years.—(I.) Montanez

214. Active Tectonics (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing or consent of instructor. Active deformation associated with faults, landslides, and volcanoes. Geodetic measurement techniques such as triangulation, trilateration, leveling, Global Positioning System (GPS), and radar interferometry. GPS data acquisition and analysis. Inversion of geodetic data and mechanical models of crustal deformation. Cowgill

216. Tectonics (3)
Lecture/discussion—3 hours. Prerequisite: course 101 or consent of instructor. Nature and evolution of tectonic features of the Earth. Causes, consequences, and evolution of plate motion, with selected examples from the Earth's deformed belts. Offered in alternate years.—(I.) Dewey

217. Topics in Geophysics (3)
Lecture—1 hour; seminar—2 hours. Prerequisite: consent of instructor. Discussion and evaluation of current research in a given area of geophysics. Topic will change from year to year. May be repeated for credit.—(II.)

218. Analysis of Structures in Deformed Rocks (3)
Seminar—3 hours. Prerequisite: courses 100, 100L, 101, 101L, 170; or consent of instructor. Recent advances in the understanding and analysis of structures in brittlely and ductilely deformed rocks. Detailed investigation of the characteristics of the structures, models for their formation, and applications to inferring the kinematics of larger scale tectonics. Offered in alternate years.—III.

219. Fracture and Flow of Rocks (3)
Lecture—3 hours. Prerequisite: courses 100, 101, Mathematics 21 or 16, Physics 7 or 9, or consent of instructor. Origins of those structures in rocks associated with brittle and ductile deformation. Theoretical analysis, using continuum mechanics, and experimental evidence for the origin of the structures with emphasis on deformational processes in the earth. Offered in alternate years.—(III.) Billen

220. Mechanics of Geologic Structures (3)
Lecture—3 hours. Prerequisite: course 170, Mathematics 21C, Physics 9A or 5A, or consent of instructor; Mathematics 21D and 22A recommended. Development in tensor notation of the balance laws of continuum mechanics, and constitutive theories of elasticity, viscosity, and plasticity and their application to understanding development of geologic structures such as fractures, faults, dikes, folds, foliations, and boudinage. Offered in alternate years.—(III.)

226. Advanced Sedimentary Petrology (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 144 or consent of instructor. Advanced petrography and geochemistry of sediments and sedimentary rocks. Geochemical, textural and mineralogical evolution of sedimentary rocks reflecting depositional or burial processes. Laboratory work emphasizes thin section study of rocks. May be repeated for credit when topic differs.—II. (II.) Sumner

227. Stable Isotope Biogeochemistry (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: graduate standing and consent of instructor. Discussion and application of stable isotope techniques for scientific research problems. Course emphasizes carbon, oxygen, nitrogen, hydrogen and sulfur isotopes. Laboratory will develop basic skills of cryogenic gas extraction and specific techniques for individual research using stable isotopes.—(III.) Spero

228. Topics in Paleoceanography (3)
Lecture—3 hours. Prerequisite: courses 108, 150A or consent of instructor. Critical discussion and review of selected topics in paleoceanography and paleoclimatology relating to the history of the processes controlling and affecting climate change and ocean circulation throughout the geologic record. Topics vary. May be repeated for credit.—III. Spero

235. Surface Processes (3)
Seminar—3 hours. Prerequisite: courses 50, 50L, 139; Mathematics 21B or 16B recommended. Recent advances in the analysis of landforms and their evolution. Detailed investigation of the tools used to document surface processes. Evaluation of concepts and processes that govern landscape

evolution. May be repeated for credit when topic differs.—II. Mount

236. Inverse Theory in Geology and Geophysics (3)
Lecture—3 hours. Prerequisite: consent of instructor. Inversion of data for model parameters. Evaluation of parameter uncertainties. Linear and nonlinear problems for discrete and continuous models. Bakus-Gilbert inversion. Offered in alternate years.—(III.) McClain

238. Theoretical Seismology (3)
Lecture—3 hours. Prerequisite: consent of instructor. Elastodynamic wave equation. Greens functions and source representations. Ray theory. Plane and spherical waves and boundary conditions. Elastic wave propagation in stratified media. Offered in alternate years. (P/NP grading only.)—III. McClain

240. Geophysics of the Earth (3)
Lecture—3 hours. Prerequisite: Earth Sciences and Resources 201, Physics 9B, Mathematics 22B. Physics of the earth's crust, mantle, and core. Laplace's equation and spherical harmonic expression of gravity and magnetic fields. Elastic wave equation in geologic media. Body and surface seismic waves. Equations of state, thermal structure of the earth. Offered in alternate years.—II. Turcotte

241. Geomagnetism (3)
Lecture—3 hours. Prerequisite: graduate standing. Nature and origin of the Earth's magnetic field. Present field and recent secular variation. Spherical harmonic analysis. Paleosecular variation. Polarity transitions and geomagnetic excursions. Statistics of polarity intervals. Dynamo theory. Planetary magnetism. Offered in alternate years.

242. Paleomagnetism (3)
Lecture—3 hours. Prerequisite: graduate standing. Principles and applications of paleomagnetism. Physical basis of rock and mineral magnetism. Field and laboratory techniques. Instrumentation. Analysis of paleomagnetic data. Statistical methods. Rock magnetic properties. Geological and geophysical applications. Offered in alternate years.—I. Verosub

246. Physical Chemistry of Metamorphic Processes (3)
Lecture—3 hours. Prerequisite: course 145, Chemistry 110A, or consent of instructor. Physiochemical principles of metamorphic mineral assemblages and methods of interpreting the paragenesis of metamorphic rocks. Offered in alternate years.

247. Metamorphic Petrology Seminar (3)
Seminar—3 hours. Prerequisite: course 145 or consent of instructor; course 246 recommended. Selected topics in metamorphic petrology (e.g., mass transport processes, tectonic settings, geothermometry, thermal structure of metamorphic belts, regional studies). May be repeated for credit when topic differs. Offered in alternate years. (S/U grading only.)—II. Day

250. Advanced Geochemistry Seminar (3)
Seminar—3 hours. Prerequisite: course 146 or consent of instructor. Critical review of selected topics in geochemistry including: ore genesis, hydrothermal and geothermal fluids, recent and ancient sediments, isotope geology, origin and chemistry of the oceans. Subject varies yearly depending on student interest. May be repeated for credit. Offered in alternate years.—I. Zierenberg

253. Current Topics in Igneous Petrology (3)
Seminar—3 hours. Prerequisite: graduate standing in Geology; course 143 or consent of instructor. Topical seminar designed to help graduate students develop and maintain familiarity with current and past literature related to igneous rock petrogenesis. May be re-peated for credit when topic differs. (S/U grading only.)—(I.) Lesher

254. Physical Chemistry of Igneous Processes (3)
Lecture—3 hours. Prerequisite: course 143 or consent of instructor; Chemistry 110A required; Chemistry 110B and 110C recommended. Introduction of modern concepts in chemical thermodynamics and kinetics, and fluid dynamics of magmatic systems for graduate students in petrology. Offered in alternate years.—III. Lesher

255. Experimental Petrology (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 143 or consent of instructor. Introduction to techniques and methods of design and executing experiments on Earth-forming minerals and rocks. Problems and examples from igneous and metamorphic petrology will be utilized. Offered in alternate years.—(I.) Lesher

260. Paleontology (3)
Seminar—3 hours. Prerequisite: graduate standing in geology or a biological science. Selected problems in paleontology. Subject to be studied will be decided at an organizational meeting. May be repeated for credit when topic differs.—I, III. (I, III.) Carlson

281. Instrumental Techniques for Earth Scientists (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Mathematics 21A, 21B, 21C, Physics 7A, 7B, 7C or 9A, 9B, 9C or consent of instructor. Laboratory research techniques for new graduate students in Geology. Demonstration of and exposure to appropriate techniques in research.—I. Schiffman

285. Field Studies in Marine Geochemisty (2-8)
Lecture—3 hours; laboratory—1-3 hours; fieldwork—6-40 hours. Prerequisite: consent of instructor. Marine geochemistry with the opportunity of going to sea or into the field on land. Techniques of seafloor mapping using bottom photography, marine geochemical sampling, and method of data reduction and sample analysis. Analysis of data/samples collected.

290. Seminar in Geology (1)
Seminar—1 hour; discussion—1 hour. Presentation and discussion of current topics in geology by visiting lecturers, staff, and students. (S/U grading only.)—I, II, III. (I, II, III.)

291. Geology of the Sierra Nevada (1)
Seminar—one day-long session. Prerequisite: consent of instructor. Short oral presentations by students and faculty concerning results of their past work and plans for future work in the Sierra. A written abstract is required following the format required at professional meetings. (S/U grading only.)—(III.) Day

292. River Forum (1)
Seminar—1 hour; optional field trips to evaluate local rivers. Prerequisite: graduate standing. Review and discussion of latest research and fundamental issues surrounding riverine systems, with emphasis on physical processes. Topics vary. (S/U grading only.)—I, II, III. (I, II, III.) Mount

294. Structure/Tectonics Forum (1)
Seminar—1 hour. Prerequisite: graduate student in geology or consent of instructor. Seminar/discussion group to review and discuss latest research in structural geology and tectonics, and on-going research of participants. Topics will vary each quarter depending on the interests of the group. Occasional field trips to areas of current interest. May be repeated for credit when topic differs. (S/U grading only.)—I, II, III. (I, II, III.)

295. Advanced Problems in Geodynamics (3)
Seminar—3 hours. Prerequisite: courses 100 and 101 or consent of instructor. Seminar dealing with problems in geodynamics. Topics will vary (e.g., ductile deformation mechanisms, brittle fracture, earthquake prediction, driving forces for plate tectonics, mantle convection). Emphasis on recent literature. May be repeated for credit when topic differs. Offered in alternate years. (S/U grading only.)—(III.) Kellogg

296. Advanced Problems in Tectonics (3)
Seminar—3 hours. Prerequisite: course 101 or consent of instructor. Seminar dealing with current problems in tectonics of selected regions. Topics will change from year to year. Emphasis on study of recent literature. May be repeated for credit. Offered in alternate years. (S/U grading only.)—(III.) Dewey

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Professional Courses

390. Methods of Teaching Geology (1)
Discussion—1 hour. Prerequisite: graduate student standing in Geology. Discussion of methods and problems of teaching geology. Topics include departmental facilities, grading efficiency/effectiveness, Teaching Assistant/student interaction, and teaching techniques for lecturing, discussions, and labs. Participation in teaching program required for Ph.D. in Geology. (S/U grading only.)—I. (I.) Carlson

391. Ethical Issues in Earth Sciences (1)
Seminar—1 hour. Prerequisite: graduate standing in Geology or consent of instructor. Reading and discussion of ethical issues arising in the earth sciences. Topics include scientific misconduct, gender equity in science, authorship of scientific papers, establishing priorities in research, and related issues. Offered in alternate years. (S/U grading only.)—(III.) Kellogg

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Geophysics

(College of Letters and Science)

Geophysics is study of the physical properties and processes within and surrounding the Earth. Many problems in the Earth Sciences require geophysical techniques for study. The interdisciplinary minor in geophysics is for students with backgrounds in the physical sciences, engineering and other fields who are interested in pursuing a graduate or professional career in geophysics, or who require a significant knowledge in the field. The curriculum reflects the need for such students to have a firm foundation of geophysics classes, as well as courses from the vast diversity of subdisciplines from many departments that are included in geophysics.

The minor is sponsored by the Department of Geology, 174 Physics/Geology Building.

Minor Program Requirements:

	UNITS
Geophysics	**21-24**
Engineering 5	3
Geology 161, 162	6
Applied Science Engineering 115	3
One course sequence chosen from the following:	9-12
a. Atmospheric Science 120, 121A, 121B;	
b. Geology 100, 100L, 101, 101L;	
c. Mathematics 118A, 118B, 118C;	
d. Physics 104A, 104B, 105C.	

Minor adviser. J.S. McClain, Department of Geology, 392 Physics/Geology, 752-7093.

German

(College of Letters and Science)

Winder McConnell, Ph.D., Chairperson of the Department

Department Office (German and Russian), 622 Sproul Hall (530-752-4999)

http://german.ucdavis.edu

Faculty

Carlee Arnett, Ph.D., Assistant Professor
Clifford A. Bernd, Dr.Phil., Professor
Gail Finney, Ph.D., Professor
Ingeborg Henderson, Ph.D., Senior Lecturer, *Academic Senate Distinguished Teaching Award*
Winder McConnell, Ph.D., Professor

Emeriti Faculty

John F. Fetzer, Ph.D., Professor Emeritus
Karl R. Menges, Dr.Phil., Professor Emeritus
H. Guenther Nerjes, Ph.D., Professor Emeritus
Fritz Sammern-Frankenegg, Dr.Phil., Lecturer Emeritus

The Major Program

The German major explores in depth the literature and language, the culture and commerce of the German-speaking world. Whereas the General Program accommodates specifically those students whose interest lies in literary studies, German Area Studies as well as the Culture and Commerce emphasis are two options that combine advanced language study with courses featuring the contributions of the German-speaking world to fields such as music, art, philosophy, history, and economics.

The Program. Two of the three major emphases reflect the department's primary emphasis on literary figures, movements and themes, and thus they share a common core of upper-division literature electives. The Culture and Commerce emphasis has as its goal functional language competency to enable students to live and work in a German-speaking environment. A key feature of this track is a work/study experience abroad. Regardless of emphasis, students will find maximum practice in spoken and written German as well as in listening comprehension in all upper-division courses offered in German.

Career Alternatives. Completion of the major prepares students for graduate study in German or for career opportunities in international fields ranging from employment in business and government to careers in the fine arts and sciences. Also, it permits admission to professional schools such as law and medicine.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 16-27
German 1-2-3 (or the equivalent)..... 0-15
German 20, 21, 22 12

Depth Subject Matter..... 44

General Program
German 101A, 101B, 103..... 12
German 120 4
Three courses chosen from upper division literature offerings taught in German ... 12
Four additional upper division courses selected from 104–109 and 121–198, upon the explicit advance approval of the undergraduate major adviser..... 16
The above category may be satisfied in part by one or more courses in Comparative Literature, in another national literature, or from German literature-in-translation offerings (111–119, 140–142) upon consultation with, and advance approval of, the undergraduate major adviser.

German Culture and Commerce Emphasis
German 103, 104, 109A, 109B..... 16
German 118E or 120 4
German 143, 192 12
Three elective courses from at least two of the following subjects..... 12
Economics 110B, 116, 160A, 160B, 162, History 144A, 144B, Political Science 123, 137
Recommended: International Relations 1, German 101A, 101B

German Area Studies Emphasis
German 101A, 101B, 103..... 12
German 120 4
Two courses chosen from upper division literature courses that are taught in German 8
History 144A or 144B 4
Four elective courses in accordance with the student's interest chosen from at least two of the following three areas after consultation with and approval of the adviser 16
Humanities:
History 143, Philosophy 170, 175.
Social Sciences:
Geography 123, Political Science 117, 137.
Fine Arts:
Art 176C, 177A, 177B, Music 110A, 110C, 110D, 110E.
Special consideration is also given to such courses in Comparative Literature as the 164 series, where pan-European movements influential upon German literature are at issue.

Total Units for the Major 60-71

Minor Program Requirements:

The Department offers a German Language and Literature minor. In addition, individualized minor programs may be designed upon consultation with the undergraduate adviser.

Students are particularly encouraged to consider a minor that combines a coherent group of courses to emphasize area studies in German (i.e., German philosophy, the arts, history, political science, as well as literature). The purpose of the minor is to provide students with the opportunity to augment their training in other fields by acquiring proficiency in the German language and exposure to German literature and culture.

UNITS

German Language and/or Literature 20-24
Choose courses numbered from German 101A through 109B and literature courses that are taught in German 20-24

Major Adviser. C. Bernd.

Honors and Honors Program. The honors program comprises two quarters of study under course 194HA–194HB, which will include a research paper. See also the University and College requirements.

Teaching Credential Subject Representative. C. Arnett. See also under the Teacher Education Program.

Graduate Study. The Department offers programs of study and research leading to the M.A. degree and to the Ph.D. degree in German Literature. Additional degree options for a designated emphasis are available through departmental affiliations with the programs in Social Theory and Comparative History, Critical Theory, Feminist Theory, and second language acquisition. Detailed information may be obtained by writing to the Department Chairperson or the Graduate Adviser.

Graduate Adviser. W. McConnell.

Prerequisite Credit. Credit normally will not be given on the lower-division level for a course that is the prerequisite of a course already successfully completed.

Courses in German (GER)

Lower Division Courses

Course Placement: Students with two years of high school German normally continue in German 2; those with three years, German 3; those with four years, German 20.

1. Elementary German (5)
Discussion—5 hours; laboratory—two 1/2-hour sessions. Introduction to German grammar and development of all language skills in a cultural context with special emphasis on communication. (Students who have successfully completed German 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.)—I, III. (I, III.)

2. Elementary German (5)
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 1. Continuation of course 1 in areas of grammar and basic language skills.—I, II. (I, II.)

3. Elementary German (5)
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 2. Completion of grammar sequence and continuing practice of all language skills through cultural texts.—II, III. (II, III.)

6. Conversational German (3)
Discussion—3 hours. Prerequisite: course 3. Designed to develop intermediate language skills with special emphasis on communication and grammatical accuracy. Course 6 may be taken concurrently with course 20.—I, II, III. (I, II, III.)

20. Intermediate German (4)
Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: course 3. May be taken concurrently with course 6. Review of grammatical principles by means of written exercises; expanding of vocabulary through readings of modern texts. Not open for credit to students who have completed course 4. (Former course 4.)—I, III. (I, III.)

21. Composition and Conversation (4)
Discussion—3 hours; extensive writing. Prerequisite: course 20 or consent of instructor. Practice in short essay writing. Discussion based on readings from a variety of German texts.—I, II. (I, II.)

22. Composition and Conversation (4)
Discussion—3 hours; extensive writing. Prerequisite: course 21 or consent of instructor. Practice in short essay writing with an aim toward refinement and expansion of vocabulary. Discussion based on readings in a variety of German.—II, III. (II, III.)

47. Erasmus and Christian Humanism (4)
Lecture/discussion—3 hours; term paper. Erasmus is studied as a protagonist of contemporary ideas such as the equality of men and women, individual human dignity, peace and disarmament, pluralistic society and tolerance, in the context of Renaissance Europe, and his influence in the following centuries. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II.

48. Myth and Saga in the Germanic Cultures (4)
Lecture—3 hours; term paper. Knowledge of German not required. Reading in English translation from the Norse Eddas, the Volsung and Sigurd-Siegfried cycles, and the Gudrun lays; literary mythology in German Romanticism culminating in Wagner's "total art-work" concept and The Ring of the Nibelung cycle. May not be counted toward major in German. GE credit: ArtHum, Wrt.—I. (I.)

49. Freshman Colloquium (2)
Seminar—2 hours. Prerequisite: open only to students who have completed 40 or fewer quarter units of transferable college-level work. Readings, discussion and written projects treating topics such as communist–capitalist tension in German literary culture; masculine "versus" feminine authorial consciousness; disintegration and reconstitution of language reflecting cultural transformation; exorcising post-holocaust national guilt and individual frustration—Germany's new European "mission."—II. (II.)

92. Field Work in German (1-12)
Internship—3-36 hours. Prerequisite: lower division standing. Total immersion program in Germany or a German speaking setting in the U.S. to further develop students' proficiency in the German language. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

101A. Survey of German Literature, 800-1800 (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 22. German literature from the Middle Ages to Classicism (800-1800) with an overview of major movements and authors. GE credit: ArtHum—I. (I.) Bernd

101B. Survey of German Literature, 1800-Present (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 22. German literature from the Age of Romanticism (1800) to the present with an overview of major movements and authors. GE credit: ArtHum—III. (III.) Bernd

103. Writing Skills in German (4)
Lecture—3 hours; extensive writing. Prerequisite: course 22. Practice in different kinds of writing, such as abstracts, correspondence, lecture summaries, analysis of or response to short literary texts.

104. Translation (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 22. Exercises in German-to-English, English-to-German translation using texts from the areas of culture and commerce. Not open for credit to students who have completed course 104A. Offered in alternate years.—I. McConnell

105. The Modern German Language (4)
Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: course 20; Linguistics 1 recommended. Introduction to the linguistic analysis of contemporary German, including its phonology, morphology, syntax and semantics, as well as sociolinguistic considerations.—I. (I.) Arnett

109A. Business German (4)
Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: course 22 or consent of instructor. Specialized advanced language course using business-oriented information and publications as the basis for discussions, roleplay, reports, compositions and translations.—III. Henderson

109B. Advanced Business German (4)
Lecture/discussion—3 hours; laboratory/discussion—1 hour. Prerequisite: course 109A or consent of instructor. Specialized advanced language course designed as a sequel to German 109A. Expands on previously introduced materials and features new topics such as the EU, the European Currency System, German company forms and the stock market.—III. (III.)

112. Topics in German Literature (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: upper division standing or consent of instructor. Investigation of significant themes and issues within their European context. Knowledge of German is not required. May be repeated once for credit. Offered in alternate years. GE credit: ArtHum, Wrt.—III. McConnell

113. Goethe's Faust (4)
Discussion—3 hours; term paper. Knowledge of German not required. Intensive study of Goethe's Faust in its entirety. Discussions and readings in English; reading the text in the original is encouraged. Offered in alternate years. GE credit: ArtHum, Wrt.—II. Bernd

115. German Literature Since 1945 (4)
Lecture—3 hours; extensive writing. Knowledge of German not required. Major writers of the post-war generation of Austria, Switzerland and Germany: novelists, such as Böll, Grass, Johnson, Walser, Handke; playwrights such as Frisch, Dürrentmatt and Hochhuth; and poets, such as Celan, Enzensberger, and Aichinger. May be repeated for credit in different topic area. GE credit: ArtHum, Wrt.—I. (I.)

118A. Vienna at the Turn of the Twentieth Century (The End of the Habsburg Empire) (4)
Lecture—1 hour; discussion—2 hours; extensive writing. Knowledge of German not required. Cultural ferment in Vienna, capital of the multinational Habsburg empire, at the turn of the century, with consideration of innovations in literature, music, graphic arts, architecture, philosophy and psychology, heralding European modernism. Offered in alternate years. GE credit: ArtHum, Wrt.—I. Finney

118B. Weimar Culture: Defeat, the Roaring Twenties, the Rise of Nazism (4)
Lecture—1 hour; discussion—2 hours; extensive writing. Knowledge of German not required. Expressionism in graphic arts, literature, film, New Objectivity, Brecht and Bauhaus considered in the context of the failure of the German experiment in democracy, the Weimer Republic of 1919-33. Offered in alternate years. GE credit: ArtHum, Wrt.—III.

118C. Germany Under the Third Reich (4)
Lecture/discussion—3 hours; term paper. Prerequisite: background in modern European history; course 118B recommended. No knowledge of German required. Interdisciplinary study of German society and culture during the Third Reich (1933-45); readings in aesthetics, history, and philosophy; study of Fascist culture in literature, film, architecture, and the graphic arts; focus on everyday life in Hitler's Germany. . GE credit: ArtHum, Wrt.—I. McConnell

118D. Germany Between 1949 and 1989: Division and Restoration (4)
Lecture/discussion—3 hours; term paper. Knowledge of German not required. Survey of German history as a divided country. Associated cultural phenomena such as the so-called Economic Miracle, the Student Movement, the Historians' Debate through a variety of theoretical and aesthetics texts and films. Offered in alternate years. GE credit: ArtHum.—II.

118E. Contemporary German Culture (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: course 50. Thorough introduction into the political, economic, social and cultural scene of Germany today (Austria and Switzerland marginally included). Historical background and comparative perspectives. Readings from a variety of sources, films and videotapes. Knowledge of German not required. Offered in alternate years. GE credit: ArtHum, Wrt.—II.

119. From German Fiction to German Film (4)
Lecture—3 hours; discussion—1 hour; term paper. Examines a number of film adaptations of major German prose works and plays to ascertain the types of changes involved in the shift in medium and the positive and negative effects achieved by such transferences. GE credit: ArtHum, Wrt.—II. (II.)

120. Survey of German Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 22. Major developments in German arts, philosophical thought, social institutions, and political history. GE credit: ArtHum.—III. (III.) Bernd

121. The Medieval Period in German Literature (4)
Discussion—3 hours; extensive writing. Prerequisite: course 22. Literary-philosophical profile of the Mittelhochdeutsche Blütezeit in terms of the significant epics, romances, and lyric poetry. Readings in German. Offered in alternate years. GE credit: ArtHum.—II. McConnell

122A. Humanism and Reformation (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 21. Exemplary literary works of the sixteenth century tracing the principal lines of development and showing the reflection in literature of the social scene. Offered in alternate years. GE credit: ArtHum.—I.

122B. The Literary Baroque (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 21. Exemplary literary works of the seventeenth century tracing the principal lines of development and showing the reflection in literature of the social scene. Offered in alternate years. GE credit: ArtHum.—II.

123. Literature of the Classical Age (4)
Discussion—3 hours; term paper. Prerequisite: course 22. A critical assessment of principal works of Goethe and Schiller within the historical and philosophical context of their times. Offered in alternate years. GE credit: ArtHum.—I. Bernd

124. Major Movements in German Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 22. Significant movements and schools in German literary history (e.g., the medieval troubadours, storm and stress, the romanticists, the George Circle, the expressionists), with emphasis on the broader cultural dynamics and ideologies as these apply to individual literary works. May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum.—II. Finney

125. Short Fiction: 1880-1914 (4)
Lecture—3 hours; term paper. Prerequisite: course 22. Reading of short German fiction from the fin-de-siècle period and representative of various prose styles and cultural currents. Offered in alternate years. GE credit: ArtHum.—III. Finney

126. Modern German Literature (4)
Discussion—3 hours; extensive writing. Prerequisite: course 22. Selections from significant works of major contemporary writers, such as Hesse, Mann, Kafka, Rilke, Brecht, Grass. May be repeated once for credit with consent of adviser. GE credit: ArtHum.—I. (I.) Finney

127. Major Writers in German (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 22. Examination of representative works by a major writer, set in the broader cultural context of the relevant period or movement. May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum.—I, III.

129. Postwar Women Writers (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 22. Major writers in both Germanies, Austria, and Switzerland since 1945. Topics include the concept of a feminist aesthetics, East vs. West German writers, and the status of minority women writers in Germany (Jewish, Turkish-German, Afro-German). GE credit: ArtHum, Div.—I. (I.) Finney

131. German Lyric Poetry (4)
Lecture—3 hours; term paper. Prerequisite: course 22. Study of the genre of lyric poety from the late Middle Ages through Renaissance, Baroque, Classical, Romantic, and Modern periods in correlation with other literary forms and the social climate of each period. Offered in alternate years. GE credit: ArtHum.—I. Bernd

132. The German Novelle (4)
Lecture—3 hours; term paper. Prerequisite: course 22. Inquiry into the art of the "Novelle" through analysis of the materials and formal devices of representative authors from Goethe to Kafka. Offered in alternate years. GE credit: ArtHum.—I. Bernd

133. The German Drama (4)
Lecture—3 hours; term paper. Prerequisite: course 22. Readings in the works of Germany's leading dramatists from the eighteenth century to the present day, such as Lessing, Goethe, Schiller, Kleist, Büchner, Hauptmann, Brecht. Offered in alternate years. GE credit: ArtHum.—(III.) Bernd

134. Topics in German Intellectual History (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 21. Topics in German intellectual history with materials from a number of periods, genres, and disciplines. May be repeated twice for credit when topic differs. Offered in alternate years. GE credit: ArtHum.—(I, III.)

140. German Political Literature from the Middle Ages to the Present (4)
Lecture—3 hours; extensive writing. Prerequisite: English 3 or 4. Knowledge of German not required. Examination of the relationship of art to politics in German literary history from the time of Walther von der Vogelweide in the Middle Ages, through the Reformation, the period of Romanticism, and the Twentieth Century. Offered in alternate years. GE credit: ArtHum, Wrt.—II. McConnell

141. The Holocaust and its Literary Representation (4)
Lecture—2 hours; discussion—1 hour; term paper. Knowledge of German not required. Aesthetic representation and metaphorical transformation of the holocaust in its human and historical perspectives. Offered in alternate years. GE credit: ArtHum, Wrt.—(I.)

142. New German Cinema (4)
Lecture—3 hours; discussion—1 hour. Knowledge of German not required. A survey of representative works of the most influential filmmakers of the New-German cinema: Alexander Kluge, Volker Schlöndorff, Rainer Werner Fassbinder, Werner Herzog, Hans-Jürgen Syberberg, Wim Wenders, Margarethe von Trotta, Helke Sander, Helma Sanders-Brahms and Jutta Brückner.—I.

143. Language Through Media (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 22. Study of contemporary German-language news media (press, video, film, CD-ROM, internet) for insight into political and cultural developments in the German-speaking countries. Offered in alternate years. GE credit: ArtHum.—II. (II.) Arnett

145. The Literature of Deviance: Mann, Hesse, Kafka (4)
Lecture/discussion—3 hours; term paper. Close study of selected prose works as representative of modernism's fascination with social, sexual, and psychological alienation. Attention to the nuanced portrayal of deviance through formal innovations in fiction. Taught in English. Offered in alternate years.—II. Finney

160. Love in the Middle Ages (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 22. Analysis of the phenomenon of love in selected medieval lyrical poems and romances of the twelfth and thirteenth century Blütezeit. Origins of courtly love, love and individualism, love and the Church, love and adultery. Not offered every year. GE credit: ArtHum—I. McConnell

168. Multiculturalism in German Literature (4)
Lecture/discussion—3 hours; term paper or discussion—1 hour. Prerequisite: course 22. Examples of German Literature from the High Middle ages to the present that explore the "encounter with the other" (people of color, different beliefs and cultures, and inner-German minorities). Offered in alternate years. GE credit: ArtHum, Div.—II. Arnett

185. The Age of Bismarck (4)
Discussion—3 hours; term paper. Prerequisite: course 22. Notable literary repercussions of the zenith of Germany's international status at the time of Bismarck's Chancellorship. The poetry of Storm, the prose of Fontane, the drama of Hauptmann. Offered in alternate years. GE credit: ArtHum.—II. Bernd

192. Field Work in German (1-12)
Internship—3-36 hours. Prerequisite: course 109A or consent of instructor. Total immersion program in Germany or a German speaking setting in the U.S. to further develop students proficiency in the German language. May be repeated twice or up to 12 units of credit with consent of instructor. (P/NP grading only.)

194HA-194HB. Honors Program (3-3)
Independent study—2 hours; term paper. Prerequisite: open only to majors with a 3.5 minimum GPA in at least 135 graduation units. (A) Research of an integrative nature (in either "General" or "Area Studies Emphasis" fields of major), guided by thesis advisor chosen by student; (B) Writing of Honors Thesis on topic selected by student in consultation with thesis advisor. (P/NP grading only. Deferred grading only, pending completion of course sequence.)

197T. Tutoring German (2-4)
Lecture—2-4 hours; term paper. Prerequisite: course 22. Tutoring and leading of special discussion sections in first-year language classes. Offers teaching opportunities under guidance of staff after initial observation period. Exposes course participants to all phases of language teaching; instant feedback and discussion. (P/NP grading only.)—Arnett

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

202. Middle High German (4)
Discussion—3 hours; lecture—1 hour. Outline of grammar; selections from Middle High German epic, romance, and lyric poetry.—II. (II.) McConnell

206. Cognitive Grammar for Applied Linguists (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Analysis of grammar and application of cognitive grammar to language instruction. Syntactical problems and analyses relevant to the language the student will teach. Not offered every year.—III. Arnett

210. Techniques of Literary Scholarship (4)
Seminar—3 hours; term paper. The bibliographical, organizational, and methodological tools and resources for advanced, independent research.—I. (I.)

211. Concepts in Literary Theory (4)
Seminar—3 hours; written reports. Advanced course in concepts of literary theory and criticism. Discussion of the emergence of theoretical concepts and their impact on the understanding and appreciation of literary works. Discussion in German and English, readings in German.—II. (II.)

212. Contemporary Approaches to Literary Theory (4)
Seminar—3 hours; term paper. Study of contemporary theoretical approaches such as structuralism, deconstruction, feminism, Marxism/Frankfurt School, and reception theory in conjunction with the works of major authors.—III. (III.) Finney

239. Narrative and Narrative Theory (4)
Seminar—3 hours; term paper. Studies, in a theoretical and literary historical context, major elements of 19th- and 20th-century narrative, such as techniques of framing, refraction, and montage; narrative perspective; mimesis; and self-consciousness. Focuses on paradigmatic prose texts alongside a spectrum of critical approaches. Offered in alternate years.—I. Finney

240. Forms of German Verse (4)
Seminar—3 hours; term paper. The development of German verse from the Middle Ages to the present, with special emphasis on different techniques of text analysis and interpretation. May be repeated for credit with consent of instructor. Offered in alternate years.—II. Bernd

241. The German Drama (4)
Seminar—3 hours; term paper. The major forms of German drama from its origins to the middle of the twentieth century. May be repeated for credit with consent of instructor.—I. (I.) Finney

242. The German Novelle (4)
Seminar—3 hours; term paper. The major German Novellisten, with particular emphasis on the flowering of this genre in the nineteenth century. May be repeated for credit with consent of instructor.—II. (II.) Bernd

243. Fontane and the Rise of the Modern German Novel (4)
Seminar—3 hours; term paper. Fontane, the father of the modern German novel and the chief German representative of the European novel at its greatest, in the context of the nineteenth-century European political and social scene.—II. (II.) Bernd

244. Gender and Comedy (4)
Seminar—3 hours; term paper. Studies of genre and gender in German-language comedy by male and female writers from the 18th century to the present. Authors treated include Lessing, Kleist, Büchner, Ebner-Eschenbach, Hauptmann, Hofmannsthal, Frisch, Langner, and Jelinek. Offered in alternate years.—III. Finney

252. The Writings of Lessing (4)
Seminar—3 hours; term paper. Study of Lessing's theory of literature with particular emphasis upon his critical attacks on French drama.—I. (I.) Bernd

253. Goethe (4)
Seminar—3 hours; term paper. Study of the origins of Goethe's thought in German Pietism, and his principal artistic, autobiographical, scientific, and philosophical works.—I. (I.) Bernd

254. Schiller (4)
Seminar—3 hours; term paper. A critical analysis of Schiller's major works and his impact on the intellectual climate in Germany during the late eighteenth and early nineteenth centuries.—III. (III.)

255. Aesthetics in the Age of Goethe (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Emergence of aesthetic autonomy from eighteenth century normative poetics during the Age of Goethe. The shift from a model based on the imitation of nature (and the Ancients) to a new concept grounded in the individuality of aesthetic experience.—I.

257. Heinrich von Kleist (4)
Seminar—3 hours; term paper. Kleist's important dramatic and prose works; special attention will be given to the peculiar hermeneutic problems in modern German, French, and Anglo-American Kleist criticism.—III. (III.) Bernd

258. The Novels of Thomas Mann (4)
Seminar—3 hours; term paper. Reading of selected novels with emphasis on aesthetic techniques, originality, ethical and political views, and influence on the contemporary literary scene in Germany.—II. (II.)

259. Studies in Kafka (4)
Seminar—3 hours; term paper. Study of Kafka's narrative techniques with special emphasis in the shorter works on the existential development from its roots in Expressionism.—II. (II.) Finney

260. The Poetry of Rilke (4)
Seminar—3 hours; term paper. Study of the principal motifs, myths, images, and problems in the poetry of Rainer Maria Rilke.—I. (I.)

261. Brecht and the Epic Theater (4)
Seminar—3 hours; term paper. A reading of Brecht's works with emphasis on the ideas which impelled the development of new literary forms and concepts.—III. (III.)

262. Studies in Turn-of-the-Century Culture (4)
Seminar—3 hours; term paper. Investigates literary currents in turn-of-the-century Germany and Austria against the background of contemporaneous developments in psychology, the visual arts, philosophy, and music. Authors treated include Hauptmann, Holz and Schlaf, Schnitzler, T. Mann, Wedekind, Musil, Hofmannsthal. Offered in alternate years.—(II.) Finney

285. Middle High German Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Extensive reading of Middle High German texts in the original language. Examines linguistic and literary problems. May be repeated for credit when topic differs.—III. (III.) McConnell

288. The Renaissance and Reformation in German Literature (4)
Seminar—3 hours; term paper. The parabolic and didactic style in Germany's literature during the sixteenth century. May be repeated for credit with consent of instructor.—I. (I.)

289. German Literature of the Baroque (4)
Seminar—3 hours; term paper. The "Elegantiaideal" and the varying methods used to portray it in seventeenth-century German literature. May be repeated for credit with consent of instructor.—I. (I.)

290. The Enlightenment in German Literature (4)
Seminar—3 hours; term paper. Revolt against the concept of the "Elegantiaideal," and evolution of a new literature based on reason and wit. May be repeated for credit with consent of instructor.—I. (I.)

292. Sentimentality and Sturm und Drang in German Literature (4)
Seminar—3 hours; written reports. Reaction to overemphasis on Reason: theories of Hamann and Herder and works of poets such as Lenz, Leisewitz, the early Goethe and Schiller. May be repeated for credit with consent of instructor.—III. (III.)

293. The Classical Age of German Literature (4)
Seminar—3 hours; term paper. Inquiry into the aesthetic and humanistic qualities of Germany's greatest literary epoch. May be repeated for credit with consent of instructor.—III. (III.) Bernd

294. The Romantic Period in German Literature (4)
Seminar—3 hours; term paper. Survey of the works of early nineteenth-century authors in reaction against the age of classicism. May be repeated for credit with consent of instructor.—I. (I.)

295. Poetic Realism in German Literature (4)
Seminar—3 hours; term paper. Outstanding figures in German literature between 1840 and 1890. Important phases in their developments will be treated. May be repeated for credit with consent of instructor.—I. (I.) Bernd

296. Twentieth-Century German Literature (4)
Seminar—3 hours; term paper. Considers the revolt of the Hauptmann generation, Symbolism, Expressionism, and the chief currents of the contemporary scene. May be repeated for credit with consent of instructor.—I. (I.) Finney

297. Special Topics in German Literature (4)
Seminar—3 hours; term paper. Various special topics in German literature, which may cut across the more usual period and genre rubrics. May be repeated for credit when topic differs.

298. Group Study (1-5)
299. Individual Study (1-12)
(S/U grading only.)

299D. Special Study for the Doctoral Dissertation (1-12)
(S/U grading only.)

Professional Courses

390A. The Teaching of German (2)
Lecture—2 hours. Prerequisite: graduate standing or consent of instructor. Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of new teaching assistants. (S/U grading only.)—I. (I.) Arnett

390B. The Teaching of German (2)
Lecture—2 hours. Prerequisite: graduate standing or consent of instructor. Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of new teaching assistants. (S/U grading only.)—II. (II.) Arnett

390C. The Teaching of German (2)
Lecture—2 hours. Prerequisite: graduate standing or consent of instructor. Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of new teaching assistants. (S/U grading only.)—III. (III.) Arnett

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Arnett

Professional Course

400. Tutorial and Instructional Internship (1-3)
Discussion—1-3 hours. Prerequisite: graduate standing. Apprentice training in ongoing undergraduate literature courses taught by regular staff, with supplementary weekly critique sessions; intern leadership of discussion sections under staff supervision. May be repeated for credit.—I, II, III. (I, II, III.)

Global and International Studies

(College of Letters and Science)

The interdisciplinary minor in Global and International Studies will enable students not only to learn about global and international issues at UC Davis, but also to gain first-hand academic experience abroad. The minor is designed for students who intend to focus their interest in global and international studies in either the Arts and Humanities or the Social Sciences.

Students will be expected to work closely with an academic adviser in developing an intellectually coherent program of study. Each proposal must be approved by the Academic Advisory Committee.

The minor is sponsored by the Humanities Program. For information, contact the Director of the Humanities Program or the Director of the Education Abroad Center.

Minor Program Requirements:

UNITS

Global and International Studies 24

Arts and Humanities Emphasis:
One course from Anthropology 4, 20, International Relations 1, Political Science 3 or Sociology 5 4
One upper division UC Davis general course on global or international studies in the Arts and Humanities..... 3-4
Course cluster requirement..... 16-17
The minor requires the selection of interrelated courses totaling a minimum of 16-17 upper division units in area and regional studies or thematic course clusters in global and international studies in the Arts and Humanities.

Suggested course clusters include:

1) Country or region-specific courses: Western Europe; Russian and East/Central Europe; Asia and the Pacific; Latin and South America; Africa and the Middle East; Jewish Studies; specific countries.

or

2) Courses clustered around a thematic field in global and international studies: people and nationalities; the individual and society, arts, language, literature and culture.

Study abroad and international internships. The course cluster requirement may be met in one of two ways: 1) completion of a minimum of 16-17 units in the course cluster emphasis by taking UC Davis accredited courses while participating in EAP or another study abroad program, or 2) completion of 12 units of course work in a UC Davis accredited international internship, plus UC Davis courses sufficient to total 16-17 units. Those students who are unable to study abroad or participate in an international internship may fulfill the requirement by taking appropriate global/international courses at UC Davis that are approved by the Academic Advisory Committee.

Social Science Emphasis:
One course from Anthropology 20, International Relations 1, Political Science 3, or Sociology 5..... 4
One upper division UC Davis general course on global or international studies in the Social Sciences..... 3-4
Course cluster requirement..... 16-17
The minor requires the selection of interrelated courses totaling a minimum of 16-17 upper division units in area and regional studies or thematic course clusters in global and international studies in the Social Sciences.

Suggested course clusters for the Social Science Emphasis:

1) Country or region-specific courses in the Social Sciences: Western Europe; Russian and East/Central Europe; Asia and the Pacific; Latin and South America; Africa and the Middle East; Jewish Studies; specific countries.

or

2) Courses clustered around a thematic field in global and international studies: world trade and development; peace and security; global environment, health, and natural resources.

Study abroad and international internships. This requirement may be met in one of two ways: 1) completion of a minimum of 16-17 units in the course cluster emphasis by taking UC Davis accredited courses while participating in EAP or another study abroad program, or 2) completion of 12 units of course work in a UC Davis accredited international internship, plus UC Davis courses sufficient to total 16-17 units. Those students who are unable to study abroad or participate in an international internship may fulfill the requirement by taking appropriate global/international courses at UC Davis that are approved by the Academic Advisory Committee.

Restriction. No more than two courses from a single UC Davis department may be offered in satisfaction of the minor requirements.

Foreign language study. Students are strongly encouraged to study a foreign language, particularly the language of the country in which and about which they intend to study.

Greek

See Classics

Hebrew

See Religious Studies

History

(College of Letters and Science)

Daniel R. Brower, Ph.D., Chairperson of the Department

Department Office, 2216 Social Sciences and Humanities Building (530-752-0776)

http://history.ucdavis.edu

Faculty

Arnold J. Bauer, Ph.D., Professor
David Biale, Ph.D., Professor
Robert Borgen, Ph.D., Professor
Beverly Bossler, Ph.D., Associate Professor
Cynthia L. Brantley, Ph.D., Professor
Daniel R. Brower, Jr., Ph.D., Professor
Joan Cadden, Ph.D., Professor
Steven Deyle, Ph.D., Assistant Professor
Omnia El Shadry, Ph.D., Assistant Professor
William W. Hagen, Ph.D., Professor
Karen Halttunen, Ph.D., Professor
Deborah E. Harkness, Ph.D., Associate Professor
Thomas H. Holloway, Ph.D., Professor
Kyu H. Kim, Ph.D., Assistant Professor
Catherine J. Kudlick, Ph.D., Associate Professor
Norma B. Landau, Ph.D., Professor
Benjamin Lawrance, Ph.D., Assistant Professor
Susan L. Mann, Ph.D., Professor
Ted W. Margadant, Ph.D., Professor
Lisa Materson, Ph.D., Assistant Professor
Sally McKee, Ph.D., Associate Professor, *Academic Senate Distinguished Teaching Award*
Nara Milanich, Ph.D., Assistant Professor
Kathryn S. Olmsted, Ph.D., Assistant Professor
Lorena Oropeza, Ph.D., Assistant Professor
Don C. Price, Ph.D., Professor
Eric Rauchway, Ph.D., Associate Professor
Andrés Reséndez, Ph.D., Professor
Michael Saler, Ph.D., Associate Professor
John Smolenski, Ph.D., Assistant Professor
Stylianos Spyridakis, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*

Kathleen Stuart, Ph.D., Associate Professor
Alan S. Taylor, Ph.D., Professor
Baki Tezcan, Ph.D., Assistant Professor
Krystyna von Henneberg, Ph.D., Assistant Professor
Charles Walker, Ph.D., Associate Professor
Clarence E. Walker, Ph.D., Professor
Louis S. Warren, Ph.D., Associate Professor

Emeriti Faculty

William M. Bowsky, Ph.D., Professor Emeritus
David Brody, Ph.D., Professor Emeritus
Daniel H. Calhoun, Ph.D., Professor Emeritus
Robert O. Crummey, Ph.D., Professor Emeritus
Manfred P. Fleischer, Ph.D., Professor Emeritus
David L. Jacobson, Ph.D., Professor Emeritus
Kwang-Ching Liu, Ph.D., Professor Emeritus
Barbara Metcalf, Ph.D., Professor Emerita
Rollie E. Poppino, Ph.D., Professor Emeritus
Ruth E. Rosen, Ph.D., Professor Emerita, *Academic Senate Distinguished Teaching Award*
Morton Rothstein, Ph.D., Professor Emeritus
Richard N. Schwab, Ph.D., Professor Emeritus
Wilson Smith, Ph.D., Professor Emeritus
F. Roy Willis, Ph.D., Professor Emeritus, *UC Davis Prize for Teaching and Scholarly Achievement*

The Major Program

The history major develops critical intelligence and fosters an understanding of ourselves and our world through the study of the past—both remote and recent.

The Program. A student electing a major in History may complete Plan I or Plan II. Plan I enables students to receive a broad education in histories of several geographic areas. Plan II encourages interested students, including those preparing for graduate work in history, to enroll in a seminar, to undertake independent work, and to study the history of historical thought as part of the major. Students preferring more active engagement in research and writing are encouraged to follow Plan II.

Career Alternatives. A degree in history is excellent preparation for a professional career such as teaching, law, journalism, public administration, or business management. Professional schools in these and related fields are looking for students who can weigh conflicting evidence, evaluate alternative courses of action or divergent points of view, and express conclusions logically in everyday language. These analytical skills are stressed in history classes, and their mastery gives the history student a solid preparation for subsequent training in a specialized career.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter (Plan I or II)..... 20
Five lower division courses, including at least two from each of two of the following fields..... 20
(a) Western Civilization: History 3, 4A, 4B, 4C, 10, 30
(b) Asian Civilization: History 8, 9A, 9B
(c) United States and Latin America: History 17A, 17B, 72A, 72B, 85, 86
(d) Africa: History 15

Depth Subject Matter—Plan I 40-41
Four upper division courses from one of the fields of concentration listed below.... 16
Three upper division courses from one of the other fields of concentration listed below 12
Two upper division courses from a field or fields other than those chosen to satisfy the two preceding requirements 8
One course from the following: History 101 or 102 or 103 (in field of concentration) 4-5

Total Units for the Major, Plan I 60-61

Depth Subject Matter—Plan II 42
Four upper division courses from one of the fields of concentration listed below. Include a two-quarter sequence of courses..... 16
Three upper division courses from one of the other fields listed..... 12
History 101 5
History 102 in field of concentration (in exceptional circumstances, a student may, with the permission of an adviser, take the seminar in another field)..... 5
History 103 in field of concentration..... 4

Total Units for the Major, Plan II 62

Fields of Concentration
a. Pre-Industrial Europe: History 102A, 102B, 102C, 102D, 102P, 102X, 111A, 111B, 111C, 121A, 121B, 121C, 122, 125, 130A, 130B, 130C, 131A, 131B, 131C, 133, 135A, 136, 139A, 144A, 148A, 151A, 151B.
b. Modern Europe: History 102E, 102F, 102I, 102X, 134A, 135B, 138A, 138B, 138C, 139B, 141, 142, 143, 144B, 145, 146A, 146B, 147A, 147B, 147C, 148B, 149A, 151C, 151D.
c. United States History: History 102K, 102L, 102M, 102X, 169A, 169B, 170A, 170B, 170C, 171, 173, 174A, 174B, 174C, 174D, 175A, 175B, 175C, 176A, 176B, 177A, 177B, 178, 180A, 180B, 180C, 181, 183A, 183B, 185A, 185B, 187A, 187B, 188A, 188B, 189A, 189B, 189C.
d. Asian History: History 102G, 102H, 102N, 102Q, 102R, 102X, 110, 191A, 191B, 191C, 191D, 191E, 191F, 194A, 194B, 194C, 194D, 194E, 196A, 196B.
e. African History: History 102O, 102X, 110, 115A, 115B, 115C, 116.
f. Latin American History: History 102J, 102X, 110, 161A, 161B, 162, 163A, 163B, 165, 166A, 166B, 168, 169A, 169B.
g. Within broad fields, a student may wish to concentrate some of the courses on a particular area or period, such as China or Great Britain or Medieval Europe. Special approval is not required.

Major Advisers. See the department's Web site for updated information.

History and Philosophy of Science. Courses from the History and Philosophy of Science program may count toward the History major. History and Philosophy of Science 130A fulfills upper division requirements in the field of pre-industrial Europe. History and Philosophy of Science 130B, 150, and 180 fulfill upper division requirements in either the U.S. or Modern Europe field.

Students can create a field in the History of Science upon consultation with a faculty adviser. They may draw upon the relevant History courses (History 85, 135A, 135B, 139A, 139B, 185A, and 185B) as well as History and Philosophy of Science offerings to do so.

Consult the History and Philosophy of Science program for a more detailed description of course offerings this area and the minor in History and Philosophy of Science.

Minor Program Requirements:

The minor in History consists of five upper division courses chosen so that at least three courses are in one field and at least one course is in another field. The two fields shall be chosen from among those defined in the catalog for the major. However, students may also, in consultation with and with the authorization of a faculty adviser, define other thematic fields.

UNITS

History 20
At least 20 units of upper division history courses..... 20
Examples of minor with thematic emphasis: Pre-Law (British and American Political and Constitutional Development); The Twentieth Century; The History of Ideas in Society.

Minor Advisers. Same as major advisers.

Honors and Honors Program. A student becomes eligible for graduation with honors by meeting the minimum GPA (usually 3.5) and course requirements established by the College of Letters and Science. To qualify for high or highest honors, students must also complete the History Department honors program with a GPA of 3.5 or above and write a thesis that meets the criteria for high honors or highest honors. Students apply to participate in the department honors program during the latter part of their junior year. Admission to the program is based on GPA, a thesis proposal, examples of previous writing, and the recommendation of a faculty member who is willing to sponsor the student's project, interviews, and faculty recommendations. Students admitted to the program must complete the History 104A, 104B, 104C sequence of honors courses, which requires the completion of a senior honors thesis. Students who anticipate seeking admission to the honors program are urged to complete at least one History 102 (under-graduate seminar) before the end of their junior year. Interested students are urged to consult with faculty in their field early in their junior year. Students may follow either Plan I or Plan II described above, and may substitute History 104B and 104C for any courses in their program other than History 102.

Students who anticipate pursuing graduate work in history or a teaching credential, and who do not wish to opt for the research emphasis embodied in the honors program, are encouraged to select Plan II of the major.

Study Abroad and the History Major. The department strongly encourages interested students to pursue their studies abroad. While there are no specific required courses or prerequisites, students are urged to take at least one history course that touches upon the geographic area where they plan to study abroad before departing. To receive a history degree from UC Davis, students must complete at least 18 upper division units in the history major at UC Davis (which can also include History 101, 102, 103). The remaining major requirements can be fulfilled abroad provided that (a) the course should be evaluated as at least four UC Davis units, (b) the course should be considered upper division by the standards set forth by the Education Abroad Program, or (c) the student presents copies of the course work, syllabus, and writing assignments to the department's liaison person with the EAP office for approval. Note: students who wish to receive credit for courses taken abroad under programs other than EAP may petition the Undergraduate Program Committee to do so.

Teaching Credential Subject Representative. See also the section on the Teacher Education Program.

Waiver Program for Single-Subject Teaching Credential in History. The Department of History is currently working with the School of Education to develop a program of study to satisfy the California Teaching Commission's Subject Matter Competency requirement for the single subject credential in history/social science. For more information, contact Nancy McTygue at the Area 3 History and Cultures Project, 175 Kerr Hall.

Graduate Study. The Department of History offers programs of study and research leading to the M.A. and Ph.D. degrees in history. Detailed information may be obtained by writing to the Graduate Adviser, Department of History.

Graduate Advisers. See the department's Web site for updated information.

American History and Institutions. This University requirement can be satisfied by passing any one of the following courses in History: 17A, 17B, 72A, 72B, 170A, 170B, 170C, 171A, 171B, 174A, 174B, 174C, 175A, 175B, 175C, 176A, 176B, 177A, 177B, 180A, 180B, 183A, 183B. The upper division courses may be used only with the consent of the instructor. (See also under University requirements.)

Courses in History (HIS)

Lower Division Courses

3. Cities: A Survey of Western Civilization (4)
Lecture—3 hours; discussion—1 hour. Survey of western civilization, focusing on nine cities, at the period of their greatest creativity: Athens, Rome, Constantinople, Paris, Florence, Amsterdam, London, Berlin, Moscow. Illustrated with slides, music, and optional films. GE credit: ArtHum.—II. (II.)

4A. History of Western Civilization (4)
Lecture—3 hours; discussion—1 hour. Growth of western civilization from late antiquity to the Renaissance. GE credit: ArtHum, Wrt.—I. (I.)

4B. History of Western Civilization (4)
Lecture—3 hours; discussion—1 hour. Development of western civilization from the Renaissance to the Eighteenth Century. GE credit: ArtHum, Wrt.—I, II, III. (I, II, III.)

4C. History of Western Civilization (4)
Lecture—3 hours; discussion—1 hour. Development of Western Civilization from the Eighteenth Century to the present. GE credit: ArtHum, Wrt.—I, II. (I, II.)

6. Introduction to the Middle East (4)
Lecture—3 hours; discussion—1 hour. Survey of the major social, economic, political and cultural transformations in the Middle East from the rise of Islam (c. 600 A.D.) to the present, emphasizing themes in religion and culture, politics and society. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—I. El Shakry, Teczan

7. Ethnicity, Race, and Identity in Latin America (4)
Lecture—3 hours; discussion—1 hour. Race in Latin America from the Conquest to contemporary social movements. Questions about identities and boundaries using a variety of materials to explore race and ethnicity over time. GE credit: ArtHum, Wrt.—I.

7A. History of Latin America to 1700 (4)
Lecture—3 hours; discussion—1 hour. Introduction to the history of Spanish and Portuguese America from the late pre-Columbian period through the initial phase and consolidation of a colonial regime (circa 1700). Topics include conquest, colonialism, racial mixture, gender, and labor systems. GE credit: ArtHum or SocSci, Div, Wrt.—I. (I.) Resendez

7B. History of Latin America, 1700-1900 (4)
Lecture—3 hours; discussion—1 hour. Latin America from colony to republic. The nature of Iberian colonialism, the causes for independence, the creation of nation states, the difficulties in consolidating these nations, and the rise of Liberalism and export economics in the nineteenth century. GE credit: ArtHum or SocSci, Div, Wrt.—II. (II.) Walker

7C. History of Latin America, 1900-present (4)
Lecture—3 hours; discussion—1 hour. Latin America since the beginning of the 20th century. Themes include export economies, oligarchic rule, crises of depression and war, corporatism, populism revolution and reform movements, cultural and ethnic issues, U.S.-Latin American relations, neo-liberal restructuring. GE credit: ArtHum or SocSci, Div, Wrt.—III. (III.) Holloway

8. History of Indian Civilization (4)
Lecture—3 hours; discussion—1 hour; written reports. Survey of Indian civilization from the rise of cities (ca. 2000 B.C.) to the present, emphasizing themes in religion, social and political organization, and art and literature that reflect cultural interaction and change. GE credit: ArtHum, Div.—III. (III.)

9A. History of East Asian Civilization (4)
Lecture—3 hours; discussion—1 hour. Surveys traditional Chinese civilization and its modern transformation. Emphasis is on thought and religion, political and social life, art and literature. Perspectives on contemporary China are provided. GE credit: ArtHum, Div, Wrt.—II, III. (II, III.)

9B. History of East Asian Civilization (4)
Lecture—3 hours; discussion—1 hour. Surveys traditional Japanese civilization and its modern transformation. Emphasis is on thought and religion, political and social life, art and literature. Perspectives on contemporary Japan are provided. GE credit: ArtHum, Div, Wrt.—I. (I.)

10A. World History to 1350 (4)
Lecture—3 hours; discussion—1 hour. Historical examination of the changing relationship of human societies to one another and to their natural settings through the year 1350, with particular attention to long-term trends and to periodic crises that reshaped the links of culture and nature on a global scale. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—I. Taylor, Resendez

10B. World History, c. 1350-1850 (4)
Lecture—3 hours; discussion—1 hour. Major topics in world history from the 14th century to the beginning of the 19th century. Topics will vary but may include oceans as systems of human communication and conflict; the global consequences of "industrious revolutions" in Europe and Asia, etc. Offered in alternate years. GE credit: ArtHum, Wrt.—II.

10C. World History III (4)
Lecture—3 hours; discussion—1 hour. Major topics from world history of the 19th and 20th centuries, emphasizing the rise and fall of Western colonial empires; Cold War and the superpowers; the spread of the nation-states; and process of globalization. GE credit: ArtHum, Wrt.—III. (III.)

15. Introduction to African History (4)
Lecture—3 hours; discussion—1 hour. Examination of the long-range historical context as background to current conditions in Africa. Includes the early development of African civilizations, the slave trade and its abolition, 20th century colonization, and African independent states. GE credit: ArtHum, Div, Wrt.—I. (I.)

17A. History of the United States (4)
Lecture—3 hours; discussion—1 hour. The experience of the American people from the Colonial Era to the Civil War. GE credit: ArtHum, Div, Wrt.—I, II. (I, II.)

17B. History of the United States (4)
Lecture—3 hours; discussion—1 hour. The experience of the American people from the Civil War to the end of the Cold War. Not open for credit to students who have completed course 17C. GE credit: ArtHum, Div, Wrt.—II, III. (II, III.)

72A. Social History of American Women and the Family (4)
Lecture—3 hours; discussion—1 hour. Social and cultural history of women, sex roles and the family from colonial America until the late nineteenth century emphasizing changes resulting from the secularization, commercialization, and industrialization of American society. GE credit: ArtHum, Div, Wrt.—I. (I.)

72B. Social History of American Women and the Family (4)
Lecture—3 hours; discussion—1 hour. Social and cultural history of women, sex roles, and the family in twentieth-century America, emphasizing female re-formers and revolutionaries, working class women, consumerism, the role of media, the "feminine mystique," changes in family life, and the emergent women's movement. GE credit: ArtHum, Div, Wrt.—II. (II.)

85. Nature, Man, and the Machine in America (4)
Seminar—4 hours; term paper. Prerequisite: consent of instructor. History of the attitudes and behavior of Americans toward their natural environment and their technology, from colonial times to the present. No final examination. Limited enrollment. GE credit: ArtHum.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

101. Introduction to Historical Thought and Writing (5)
Lecture/discussion—4 hours; term paper. Prerequisite: consent of instructor. Study of the history of historical thought and writing, analysis of critical and speculative philosophies of history and evaluation of modes of organization, interpretation, and style in historical writing.—III. (III.) Landau

102A-R, X. Undergraduate Proseminar in History (5)
Seminar—3 hours; term paper. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. **(A)** Ancient; **(B)** Medieval; **(D)** Modern Europe to 1815; **(E)** Europe since 1815; **(F)** Russia; **(G)** China to 1800; **(H)** China since 1800; **(I)** Britain; **(J)** Latin America since 1810; **(K)** American History to 1787; **(L)** United States, 1787-1896; **(M)** United States since 1896; **(N)** Japan; **(O)** Africa; **(P)** Christianity and Culture in Europe, 50-1850; **(Q)** India; **(R)** Muslim Societies; **(X)** Comparative History, selected topics in cultural, political, economic, and social history that deal comparatively with more than one geographic field. May be repeated for credit. Limited enrollment.—I, II, III. (I, II, III.)

103. Topics in Historical Research (4)
Discussion—3 hours; individual consultation with instructor; term paper. Prerequisite: consent of instructor. Individual research resulting in a research paper on a specific topic in one of various fields of history. May be repeated for credit.

104A. Introduction to Historical Research and Interpretation (4)
Seminar—3 hours; term paper. Prerequisite: acceptance into History Department Honors Program. Directed reading and research aimed at preparing students to select appropriate topics and methodologies for a senior honors essay and to situate their topics within a meaningful, broad context of historical interpretations. Culminates in the submission of a full prospectus for an honors essay.—I. (I.) Brower

104B. Honors Thesis (4)
Tutorial—4 hours. Prerequisite: course 104A. Research in preparation of a senior honors thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of sequence.)—II.

104C. Honors Thesis (4)
Tutorial—4 hours. Prerequisite: course 104A and 104B. Completion of a senior honors thesis under the direction of a faculty adviser.—III.

110. Themes in World History (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing; at least 8 units in history. Issues in world history from 1400 to the present. Topics will emphasize the interaction of diverse regions of the world as well as common patterns of historical change. Offered in alternate years. GE credit: ArtHum.

111A. Ancient History (4)
Lecture—3 hours; discussion or paper (student option). History of ancient empires of the Near East and of their historical legacy to the Western world. GE credit: ArtHum, Wrt.—II. (II.) Spyridakis

111B. Ancient History (4)
Lecture—3 hours; discussion or paper (student option). Political, cultural and intellectual study of the Greek world from Minoan-Mycenaean period to end of Hellenistic Age. GE credit: ArtHum, Wrt.—III. (III.) Spyridakis

111C. Ancient History (4)
Lecture—3 hours; discussion or paper (student option). Development of Rome from earliest times. Rise and fall of the Roman Republic; the Empire to 476 A.D. GE credit: ArtHum, Wrt.—II. (II.) Spyridakis

112A. Topics in Pre-Modern Jewish History (4)
Lecture—3 hours; term paper. Topics in the history of Jews from the Biblical era to the eras of Jewish emancipation. Topics can be framed chronologically (eg., medieval Jewry) or thematically (eg., trade and Jewish communities). May be repeated once for credit. GE credit: ArtHum, Div, Wrt.—I. (I.)

112B. Topics in Modern Jewish History (4)
Lecture—3 hours; term paper. Topics in the history of Jews from the era of Jewish emancipation to the present. Topics can be framed chronologically or thematically (eg. Zionism, assimilation, the post Holocaust Diaspora). May be repeated once for credit. GE credit: ArtHum, Div, Wrt.—III. (III.)

113. History of Modern Israel (4)
Lecture—3 hours; term paper. Topics include the rise and fall of utopian Zionism, the century-long struggle between Jews and Arabs, the development of modern Hebrew culture, the conflict between religious and secular Jews, and the nature of Israel's multicultural society. GE credit: ArtHum, Div, Wrt.—II. (II.) Biale, Ringelblum

115A. History of West Africa (4)
Lecture—3 hours; written reports. Prerequisite: courses 4A, 4B, 4C recommended. Introductory survey of the history of West Africa and the Congo region from the earliest times to the present. GE credit: ArtHum, Div, Wrt.—I. (I.) Brantley

115B. History of East and Central Africa (4)
Lecture—3 hours; written reports. Prerequisite: course 115A recommended. Introductory survey of the history of east and central Africa from 1000 to the present. This course is a part of an interdisciplinary East African sequence which includes History 115B (winter) and Political Science 138. GE credit: ArtHum, Div, Wrt.—II. (II.) Brantley

115C. History of Southern Africa, Swaziland, Lesotho, and Botswana from 1500 to the Present (4)
Lecture—3 hours; written reports. Prerequisite: courses 115A and 115B recommended. Introductory survey of the history of Southern Africa, including South Africa, Swaziland, Lesotho, and Botswana from 1500 to the present. GE credit: ArtHum, Div, Wrt.—II. (II.) Brantley

115D. History and Legacy of Colonialism in Africa (4)
Lecture—3 hours; term paper. Prerequisite: course 115A, 115B or 115C recommended. History of the implementation, development, and legacy of European Colonialism in Africa. A comparison of British, Belgian, French, and Portuguese colonial efforts and impacts. GE credit: SocSci, Div, Wrt.—I. (I.) Brantley

116. African History: Special Themes (4)
Lecture—3 hours; term paper. Prerequisite: courses 115A and 115B recommended. Themes of African history, such as African states and empires, slave trade, relationship of Egypt to rest of Africa, Bantu origins and migrations, and French policy of Assimilation and Association. GE credit: ArtHum.—Brantley

121A. Medieval History (4)
Lecture/discussion and panel presentations—3 hours. European history from "the fall of the Roman Empire" to the eighth century. GE credit: ArtHum, Wrt.—I. (I.)

121B. Medieval History (4)
Lecture/discussion and panel presentations—3 hours. European history from Charlemagne to the twelfth century. GE credit: ArtHum, Wrt.—III. (III.)

121C. Medieval History (4)
Lecture/discussion and panel presentations—3 hours. European history from the Crusades to the Renaissance. GE credit: ArtHum, Wrt.—I. (I.) Cadden

122. Selected Themes in Medieval History (4)
Lecture—3 hours; term paper. Each offering will focus on single major theme, such as medieval agrarian history, feudalism, the family, medieval Italy, or the Crusades. Readings include original sources in English translation and modern works. May be repeated for credit. GE credit: ArtHum.—III. (III.) Cadden

125. Topics in Early Modern European History (4)
Laboratory/discussion—3 hours; term paper. Prerequisite: course 4B recommended. Social and cultural history, 1300-1800. Topics such as medieval and Renaissance Italy, early modern Italy, Ancient Regime France, family and sexuality, and material culture and daily life. May be repeated for credit. GE credit: ArtHum, Wrt.—III. (III.) Harkness

130A. Christianity and Culture in Europe: 50-1450 (4)
Lecture—3 hours; written report or research paper. A history of the ideas and institutions of Christianity and their impact on the late Roman Empire and medieval Europe in terms of outlook on life, art, politics and economics. GE credit: ArtHum, Div, Wrt.—II. (II.)

130B. Christianity and Culture in Europe: 1450-1600 (4)
Lecture—3 hours; written report or research paper. A history of the Lutheran, Zwinglian-Calvinist, Radical, Anglican, and Catholic Reformations as foundation stones of a new culture in Europe, with special attention to the interconnections between the revival of antiquity and the different reform movements. GE credit: ArtHum.—II. (II.)

130C. Christianity and Culture in Europe: 1600-1850 (4)
Lecture—3 hours; written report or research paper. A survey of the intellectual, cultural and political reorientation of European society in the aftermath of the Wars of Religion. "Secularization" will be discussed in the context of the Enlightenment and Romanticism. GE credit: ArtHum.

131A. Early Modern European History (4)
Lecture—3 hours; written reports. Prerequisite: courses 4A and 4B recommended. Western European history from about 1350 to about 1500. GE credit: ArtHum.—Stuart

131B. European History During the Renaissance and Reformation (4)
Lecture—3 hours; term paper. Survey of European society, politics, and culture from the late 15th through the early 17th centuries, with particular focus on the Italian and Northern Renaissance, on the Protestant Reformation, and the Catholic Counter Reformation. GE credit: ArtHum, Wrt.—II. (II.) Stuart

131C. The Old Regime: Absolution, Enlightenment and Revolution in Europe (4)
Lecture—3 hours; term paper. Survey of European society, politics, and culture in the 17th and 18th centuries, focusing on religious warfare, absolutism, Scientific Revolution, Enlightenment and the growth of religious tolerance, the French Revolution and the collapse of the old regime. GE credit: ArtHum, Wrt.—II. (II.) Stuart

132. Crime and Punishment in Early Modern Europe (4)
Lecture—3 hours; term paper. Deviance and crime in early modern Europe, contrasting imaginary crimes, e.g. witchcraft, with "real" crimes such as highway robbery and infanticide. Examines impact of gender, sexual orientation, ethnicity, and class in processes of criminalization. GE credit: SocSci, Div, Wrt.—II. (II.) Stuart

133. The Age of Ideas (4)
Lecture—3 hours; written reports. The Enlightenment and its background in the seventeenth century. GE credit: ArtHum.

134A. The Age of Revolution (4)
Lecture—3 hours; written reports. Ideas and institutions during the French Revolution and the Napoleonic era. GE credit: ArtHum.—I. (I.) Margadant

135A. History of Science to the 18th Century (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Survey of the historical development of science, technology, and medicine from the ancient world to the eighteenth century, with special emphasis on Isaac Newton as the culmination of the seventeenth century scientific revolution. GE credit: ArtHum.—Cadden, Harkness

135B. History of Science, 18th to 20th Centuries (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Survey of the historical development of scientific thought in geology, biology, chemistry, physics, and cosmology from the eighteenth to the twentieth century, with special emphasis on emergence of broad explanatory principles that serve more than one science. GE credit: ArtHum.—I. (I.) Harkness

136. Scientific Revolution (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 135A or 135B recommended. History of science in Western Europe (1400-1750). Investigates the changing definitions of science in the age of Copernicus, Versalius, Harvey, Galileo and Newton. Considers the evolution of new ideas about nature, experiment, observation, and scientific theory. GE credit: ArtHum, Wrt.—III. (III.) Harkness

138A. Russian History: The Rise of the First Empire, 1500-1881 (4)
Lecture—3 hours; term paper. Prerequisite: courses 4B and 4C recommended. Expansion of the Russian state in Muscovite and imperial era. Emphasis on autocratic rule, the incorporation of non-Russian peoples, and emergence of Russia as a Great Power. Only two units of credit will be allowed to students who have completed former course 137B. GE credit: ArtHum, Wrt.—II. (II.) Brower

138B. Russian History: The Russian Revolution, 1880-1917 (4)
Lecture—3 hours; term paper. Prerequisite: courses 4B and 4C recommended. History of the fall of the Russian Empire and of the Revolution of 1917. Not open for credit to students who have received credit for former course 138. GE credit: ArtHum, Wrt.—I. (I.) Brower

138C. Russian History: The Rise and Fall of the Soviet Union, 1917 to the Present (4)
Lecture—3 hours; term paper. Prerequisite: courses 4B and 4C recommended. The emergence of the Soviet Union as a socialist system and a Great Power; the decline and collapse of the Soviet Union and the formation of independent nation states in its place. Not open for credit to students who have completed former course 137C. GE credit: ArtHum, Wrt.—III. (III.) Brower

139A. Medieval and Renaissance Medicine (4)
Laboratory/discussion—3 hours; term paper. The history of medicine, circa 1000-1700. Revival of ancient medicine; role of the universities; development of anatomy, chemistry and natural history; ideas about the body; cultural understanding of disease; hospital and the public health system. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt.—Cadden

139B. Medicine, Society, and Culture in Modern Europe (4)
Lecture—2 hours; discussion—1 hour; term paper. History of European medicine, 18th to 20th centuries, by examining the development of medical knowledge in epidemiology and anatomy; function of this knowledge, how it changed with technological breakthroughs and professionalization; and role of medicine in attitudes toward poverty, women, race, disease. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt.—(III.) Kudlick

140. The Rise of Capitalism in Europe (4)
Lecture—3 hours; term paper. Prerequisite: course 4B or 4C. Comparative analysis of major interpretations of the rise of merchant capitalism during the Middle Ages and Renaissance; European expansion overseas, 1450-1815; the transition to modern capitalism via industrial revolution. Interplay of social, political, cultural, and economic history. Offered in alternate years. GE credit: SocSci.—III. Hagen

141. France Since 1815 (4)
Lecture—3 hours; term paper. GE credit: ArtHum, Wrt.—II. (II.) Margadant

142A. History of the Holocaust (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. Topics include comparative genocide, medieval and modern antisemitism, modern German history, the rise of Nazism, Jewish life in Europe before the Nazi period, and the fate of the Jewish communities and other persecuted groups in Europe from 1933-1945. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I. Biale

142B. The Memory of the Holocaust (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. Examination of the literary, philosophical, theological and artistic responses to the Holocaust of the European Jews. Exploration of how memory is constructed, by whom and for what purposes. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. Biale

143. History of Eastern Europe and the Balkans (4)
Lecture—3 hours; essays. History of the Baltic, Danubian, and Balkan lands since the Middle Ages. National cultures and conflicts in the Polish Commonwealth and the Habsburg and Ottoman Empires; nationalist movements, 1789-1914; the twentieth century, including an analysis of the contemporary scene. GE credit: ArtHum, Div, Wrt.—II. (II.) Hagen

144A. History of Germany, 1450 to 1789 (4)
Lecture—3 hours; extensive writing. Survey of early modern Germany, 1450 to 1789, covering the theology and social history of the Reformation, the Peasants War of 1525, religious warfare, state building and absolutism, the rise of Prussia, Austro-Prussian dualism, and the German Enlightenment.—III. (III.) Stuart

144B. History of Germany since 1789 (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 144A recommended. History of the German lands in the age of the French Revolution; 19th-century liberalism, nationalism, and industrialization; the World Wars, National Socialism, and the Holocaust; east and west Germany in the Cold War; the post-reunification scene. (Not open for credit to students who have completed former course 144.) GE credit: ArtHum, Div, Wrt.—II. (II.) Hagen

145. War and Revolution in Europe, 1789-1918 (4)
Lecture—3 hours; term paper. Survey of revolutionary movements, international crises, and wars in Europe from the French Revolution to World War I. GE credit: ArtHum, Wrt.—III. (III.) Margadent

146A. Europe in the Twentieth Century (4)
Lecture—3 hours; term paper. Survey of the history of Europe from 1919 to 1939. GE credit: ArtHum, Wrt.—II. (II.) von Henneberg

146B. Europe in the Twentieth Century (4)
Lecture—3 hours; term paper. Survey of the history of Europe since 1939. GE credit: ArtHum, Wrt.—III. (III.) von Henneberg

147A. European Intellectual History, 1800-1870 (4)
Lecture—3 hours; term paper. European thought in the early industrial era. Shifting cultural frameworks, from romanticism to scientism; liberal and socialist reactions to social change. Focus on the work of Goethe, Hegel, J.S. Mill, Marx, Darwin and Flaubert. GE credit: ArtHum or SocSci, Wrt.—II. (II.) Saler

147B. European Intellectual History, 1870-1920 (4)
Lecture—3 hours; term paper. Cultural and intellectual watershed of the late nineteenth and early twentieth centuries. Emergence of modern art and literature; psychoanalysis and the new social sciences. Focus on the work of Baudelaire, Wagner, Nietzsche, Freud, Weber and Kafka. GE credit: ArtHum or SocSci, Wrt.—II. (II.) Saler

147C. European Intellectual History, 1920-1970 (4)
Lecture—3 hours; term paper. European thought and culture since World War I. Coverage includes: literature and politics; Communism and Western Marxism; Fascism; Existentialism; Structuralism; Feminism. Particular attention to Lenin, Brecht, Hitler, Sartre, Camus, Beckett, Marcuse, Foucault, Woolf and de Beauvoir. GE credit: ArtHum or SocSci, Div, Wrt.—III. (III.) Saler

148A. Women and Society in Europe: 1500-1789 (4)
Lecture—3 hours; term paper. Prerequisite: course 4B recommended. Roles and perceptions of women from the Renaissance to the French Revolution. Emphasis on social and economic factors as well as on discussions of women in the writings of political theorists and social commentators. GE credit: ArtHum, Div, Wrt.—II. (II.) Harkness, Kudlick

148B. Women and Society in Europe: 1789-1920 (4)
Lecture—3 hours; term paper. Prerequisite: course 4C and 148A recommended. Roles and perceptions of women from the French Revolution to World War I, primarily in France and England. Emphasis on social and economic developments within a loosely chronological and comparative framework. GE credit: ArtHum, Div, Wrt.—II. (II.) Kudlick

148C. Women and Society in Europe: 1914-Present (4)
Lecture—3 hours; term paper. Prerequisite: course 148B recommended. The history of 20th-century Europe from the perspective of women and the family, and of sexual and gender relations. Emphasis on the impact on women of major events and movements, such as World War I, fascism, Soviet communism, World War II, the welfare state, feminism, and mass culture. GE credit: ArtHum, Div, Wrt.—III. (III.)

149. Comparative Cultural History of Modern Britain and France, 1880-1914 (4)
Lecture—3 hours; term paper. Cultural comparison of the histories of Britain and France during the fin de siecle. Addresses cultural debates of the period (including gender, race, class) and the practices of cultural history. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—II. Kudlick, Saler

151A. England: The Middle Ages (4)
Lecture—3 hours; term paper. Prerequisite: course 4A recommended. Origins of England to the accession of the Lancastrians. Survey includes: impact of Norman Conquest on Anglo-Saxon institutions; rise of the Church, common law, parliament, and the economy; thought, arts, and literature to the age of Chaucer and Wyclif. GE credit: ArtHum, Wrt.—III. (III.)

151B. England: The Early Modern Centuries (4)
Lecture—3 hours; term paper. Prerequisite: courses 4A, 4B; course 151A recommended. From Lancaster and York to the Glorious Revolution. Includes growth of the Church of England; beginnings of modern worldwide economy; rise of the gentry and parliament; thought, arts, and literature in the times of More, Shakespeare, Hobbes, Wren, and Newton. GE credit: ArtHum, Wrt.

151C. Eighteenth-Century England (4)
Lecture—3 hours; term paper. English history from the Glorious Revolution to the French Revolution. Examination of the transformation of one of Europe's most politically unstable kingdoms into the firmly established constitutional monarchy which provided an environment fit to engender the industrial revolution. GE credit: ArtHum, Wrt.—I. (I.) Landau

151D. Industrial England (4)
Lecture—3 hours; term paper. English history from Waterloo to the Battle of Britain; the rise and continuance of the first industrial nation, examining the transformation of landed to class society, oligarchy to democracy and bureaucracy, Bentham to Bloomsbury, empire to commonwealth. GE credit: ArtHum, Div, Wrt.—Landau

160. Spain and America in the 16th Century (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. The Atlantic world in the 16th century, particularly the transcultural and reciprocal social and economic relations between Spain and America in the course of colonization. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(III.) Bauer

161A. History of Colonial Spanish America (4)
Lecture/discussion—3 hours; written reports. Pre-Columbian civilizations of Middle America and the Andean region (mainly Aztec and Inca); the impact of European conquest and colonization; the formation of a hybrid culture. Extensive use of photographic slides. GE credit: ArtHum, Div, Wrt.—I. (I.) Bauer

161B. Latin American History (4)
Lecture/discussion—3 hours; written reports. Evolution of modern Latin America: export economies; oligarchic rule; reform and revolution; the difficulties of the twentieth century. Emphasis on Mexico, Cuba, the Andean region, Chile, and Argentina. Photographic slides. GE credit: ArtHum, Div, Wrt.—II. (II.) Bauer, C. Walker

162. History of the Andean Region (4)
Lecture/discussion—3 hours; written and/or oral reports. History of the Andean region, the area that now comprises modern Peru, Bolivia, and Chile, from the beginning of human settlement to the present. GE credit: ArtHum, Div, Wrt.—III. (III.) C. Walker

163A. History of Brazil (4)
Lecture—3 hours; written reports. The history of colonial and imperial Brazil from 1500 to 1889. Offered in alternate years. GE credit: ArtHum.—III.

163B. History of Brazil (4)
Lecture—3 hours; written reports. The history of the Brazilian republic from 1889 to the present. Offered in alternate years. GE credit: ArtHum.—III.

164. History of Chile (4)
Lecture—3 hours; term paper. Prerequisite: course 161A, 161B, 165, or 168 recommended. Emphasis on the history of Chilean political economy from 1930 to the present. Various strategies of development (modernization, Marxism, Neo-Liberalism); the rise of mass politics; the course of foreign relations; and the richness of Chilean literature. Offered in alternate years. GE credit: ArtHum.—III. Bauer

165. Latin American Social Revolutions (4)
Lecture—3 hours; written reports. Major social upheavals since 1900 in selected Latin American nations; similarities and differences in cause, course, and consequence. GE credit: ArtHum.—II. (II.) Bauer

166A. History of Mexico to 1848 (4)
Lecture/discussion—3 hours; written and/or oral reports. Political, economic, and social development of pre-Columbian, colonial and national Mexico to 1848. Offered in alternate years. GE credit: ArtHum.—(III.) Resendez

166B. History of Mexico Since 1848 (4)
Lecture/discussion—3 hours; written and/or oral reports. History of Mexico from 1848 to the present. Offered in alternate years. GE credit: ArtHum.—I. (I.) Resendez

167. Modern Latin American Cultural and Intellectual History (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. Introduction to the cultural and intellectual history of modern Latin America including architecture, cinema, painting, music, and literature. Offered in alternate years. GE credit: ArtHum, Wrt.—I. Walker, Resendez

168. History of Inter-American Relations (4)
Lecture—3 hours; written reports. Diplomatic history of Latin America since independence, intra-Latin American relations, relations with the United States, participation in international organizations, and communism in Latin America. GE credit: ArtHum.—III. (III.)

169A. Mexican-American History (4)
Lecture/discussion—3 hours; written and/or oral reports. Economic, social, religious, cultural and political development of the Spanish-speaking population of the Southwestern United States from about 1800 to 1910. GE credit: ArtHum, Div, Wrt.—II. (II.) Oropeza

169B. Mexican-American History (4)
Lecture/discussion—3 hours; written and/or oral reports. Role of the Mexican and Mexican-American or Chicano in the economy, politics, religion, culture and society of the Southwestern United States since 1910. GE credit: ArtHum, Div, Wrt.—I. (I.)

170A. Colonial America (4)
Lecture—3 hours; term paper. Colonial society from 1607 to the American Revolution, with emphasis on European expansion, political, social and economic foundations, colonial thought and culture, and imperial rivalry. GE credit: ArtHum, Div, Wrt.—Smolenski, Taylor

170B. The American Revolution (4)
Lecture—3 hours; term paper. Analysis of the Revolutionary epoch with emphasis on the structure of British colonial policy, the rise of revolutionary movements, the War for Independence and its consequences, and the Confederation period. GE credit: ArtHum, Div, Wrt.—Smolenski, Taylor

170C. The Early National Period, 1789-1815 (4)
Lecture—3 hours. Political and social history of the American republic from the adoption of the Constitution through the War of 1812 and its consequences. GE credit: ArtHum.—III. (III.) Deyle

171A. Jacksonian America (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. The political and social history of the United States from the end of the War of 1812 to the Compromise of 1850. How the market revolution transformed American life, and led the nation towards war. GE credit: ArtHum, Div, Wrt.—II. (II.) Deyle

171B. Civil War and Reconstruction (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. Examination of the political and social history of the United States from the Compromise of 1850 to the end of Reconstruction in 1876. Causes of the war, the war itself, and the problems of reconstruction after the war. GE credit: ArtHum, Div, Wrt.—III. (III.) Deyle

171BF. The Civil War in American Film (1)
Discussion—1 hour; film viewing. Prerequisite: course 171B concurrently. Viewing and discussion of films with short writing assignments. (P/NP grading only.)—II, III. (II, III.) Deyle

171D. Selected Themes in 19th Century American History (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. Interpretative overview of a single topic in the history of the United States in the 19th century. Sample topics include social history, the 1850s, and southern history. May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum, Wrt.—III.

172. American Environmental History (4)
Lecture—3 hours; term paper. Prerequisite: course 17A. Examination of changing relations between people and nature in the area of the current United States from pre-Columbian times to the present. Topics include ecological change; perceptions of nature; social conflicts over "proper" uses of nature; environmental movement. Offered in alternate years. GE credit: ArtHum, Wrt.—III. Warren

173. Becoming an American: Immigration and American Culture (4)
Lecture—3 hours; term paper. Prerequisite: course 17B or 72B recommended. An introduction to the wide range of immigrant experiences and cycles of nativism that have shaped American culture in the twentieth century. From novels, memoirs and films, students will explore how external and internal immigration has created a multicultural society. Offered alternate years. GE credit: ArtHum, Div, Wrt.—(III.)

174A. The Gilded Age and Progressive Era: United States, 1876-1917 (4)
Lecture—3 hours; term paper. Prerequisite: course 17B. U.S. history and the construction of modern America from the end of Reconstruction to U.S. entry into World War I. Includes Southern redemption, Western incorporation, electoral corruption, labor movements, Populism, Progressivism, women's suffrage, U.S. imperial expansion, and immigration restriction. Offered in alternate years. GE credit: ArtHum, Wrt.—I.

174AD. Emergence of Modern America: Discussion (1)
Discussion—1 hour; short papers. Prerequisite: course 174A concurrently. Intensive discussion of topics and readings for course 174A. (P/NP grading only.)—I. (I.)

174B. War, Prosperity, and Depression: United States, 1917-1945 (4)
Lecture—3 hours; term paper. Prerequisite: course 17B. America's emergence as a world power, the business culture of the 1920s, the New Deal and World War II. Emphasis on such issues as government regulation of the economy, welfare capitalism, and class, racial, ethnic, and gender conflicts. Offered in alternate years. GE credit: ArtHum, Wrt.—II. Olmsted

174BD. America in War, Prosperity and Depression: Discussion (1)
Discussion—1 hour; short papers. Prerequisite: course 174B concurrently. Intensive discussion of topics and readings for course 174B. (P/NP grading only.)—II. (II.)

174C. The United States Since World War II, 1945 to the Present (4)
Lecture—3 hours; term paper. America's struggle to respond to new complexities in foreign relations, social tensions, family changes and media. Emphasis on such topics as: Cold War; anticommunist crusade; civil rights, feminist and environmentalist movement; New Left; counterculture; Vietnam; Watergate; and the moral majority. GE credit: ArtHum, Wrt.—III. (III.)

174CD. The United States Since World War II: Discussion (1)
Discussion—1 hour; short papers. Prerequisite: course 174C concurrently. Intensive discussion of topics and readings for course 174C. (P/NP grading only.)—III. (III.)

174D. Selected Themes in 20th Century American History (4)
Lecture—3 hours; term paper. Prerequisite: course 17B or the equivalent. Interpretive overview of a single topic in the history of the United States in the 20th century with attention to the phases and processes of historical change. May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum.—(II.)

174DD. Selected Themes in 20th Century American History: Discussion (1)
Discussion—1 hour; short papers. Prerequisite: course 174D concurrently. Intensive discussion of topics and readings for course 174D. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

175. American Intellectual History (4)
Lecture—3 hours; term paper. Prerequisite: course 17B and upper division standing. Ideas that have shaped politics and society in the United States from colonial times to the present. Topics include American liberalism, republicanism, democracy, constitutionalism, communitarianism, utopianism, pragmatism, feminism, Darwinism, nationalism, conservatism, and economics. Offered in alternate years. GE credit: ArtHum, Wrt.—I. Rauchway

176A. Cultural and Social History of the United States (4)
Lecture—3 hours; term paper. Study of social and cultural forces in American society in the nineteenth century with emphasis on social structure, work and leisure, socialization and the family, social reform movements and changes in cultural values. GE credit: ArtHum.—I. (I.) Halttunen

176B. Cultural and Social History of the United States (4)
Lecture—3 hours; term paper. Study of social and cultural forces in American society in the twentieth century with emphasis on social structure, work and leisure, socialization and the family, social reform movements and changes in cultural values. GE credit: ArtHum.—III. (III.) Halttunen

177A. History of Black People and American Race Relations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 17A or 17B. History of black people in the United States from the African background to Reconstruction. GE credit: ArtHum, Div, Wrt.—I. (I.) C. Walker

177B. History of Black People and American Race Relations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 17A or 17B. History of black people in the United States from the African background to Reconstruction. GE credit: ArtHum, Div, Wrt.—C. Walker

178A. Race in America, 1492-1865 (4)
Lecture—4 hours. Prerequisite: course 17A or 17B or 177A or 177B. Racial formation during the Age of Discovery, the Colonial Period, Early National and Antebellum periods up to the Civil War. Not open for credit to students who have completed course 178. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—III. Walker

178B. Race in America 1865-present (4)
Lecture/discussion—4 hours. Prerequisite: course 17A or 17B or 177A or 177B. Racial formation in the Post Civil War United States from 1860 to the present. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. Walker

180AN. American Political History, 1789-1896 (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. Growth of American politics from the birth of the republic to the end of the nineteenth century. Development of political parties, the expanding electorate, and how social issues such as slavery shaped the political process. Not open for credit to students who have completed course 180A. Offered in alternate years. GE credit: ArtHum, Wrt.—II. Deyle

180BN. American Political History, 1896-present (4)
Lecture—3 hours; term paper. Prerequisite: course 17B. Politics in the United States from 1896 to the present. Topics include race and partisan politics; communism and anti-communism; the New Deal and the centralization of government; and the rise of the imperial presidency. Not open for credit to students who have completed course 180A or 180C. GE credit: ArtHum, Wrt.—III. (III.) Rauchway, Olmsted

181. Religion in American History to 1890 (4)
Lecture—3 hours; term paper. Prerequisite: course 17A. American religious history from colonization through the Gilded Age. Topics include religious diversity in America; native American religion; Protestant evangelism; gender and religion; religion and bigotry; African American religion; religion in the Civil War; and religion's response to modernization. Offered in alternate years. GE credit: ArtHum, Wrt.—III. Smoleski

183A. The Frontier Experience: Trans-Mississippi West (4)
Lecture—3 hours; written and/or oral reports. The fur trade, western exploration and transportation, the Oregon Country, the Greater Southwest and the Mexican War, the Mormons, mining discovery, and the West during the Civil War. GE credit: ArtHum, Div, Wrt.—I. (I.) Taylor

183B. The Frontier Experience: Trans-Mississippi West (4)
Lecture—3 hours; written and/or oral reports. Spread of the mining kingdom, the range cattle industry, Indian-military affairs, settlement of the Great Plains and Rocky Mountain Regions and political organization of the West. GE credit: ArtHum, Div, Wrt.—II. (II.) Warren

184. History of Sexuality in America (4)
Lecture—3 hours; extensive writing. History of sexuality in America from pre-European through the late twentieth century. Topics include birth control, marriage, sexual violence, prostitution, inter-racial relationships, heterosexuality and homosexuality, the feminist, gay, and lesbian liberation movements, AIDS, commercialization of sexuality. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I. Materson

185A. History of Science in America (4)
Lecture—3 hours; research paper. Survey of the European background. Study of American scientific institutions, ideas, personalities, creative processes in science, and of relationships between society and science from colonial times to present. GE credit: ArtHum, Wrt.

185B. History of Technology in America (4)
Lecture—3 hours; research paper. Study of American technology, emphasizing biographical approach to historical understanding of technological change, creative processes, institutions, ideas, and relationships between technology and society from colonial times to present. GE credit: ArtHum, Wrt.—Smith

189. California History (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. California history from the precolonial period to the present including dispossession of California's Indians, political economy of the Spanish and Mexican periods, Gold Rush effects, industrialization, Hollywood, water politics, World War II, Proposition 13, and the emergence of the Silicon Valley. Not open for credit to students who have completed two courses of course 189A, 189B, 189C. GE credit: ArtHum, Wrt.—II. Warren

191A. Classical China (4)
Lecture—3 hours; term paper. History of Chinese civilization from its origins through the establishment of city states and the flowering of classical philosophy, to the rise and fall of the First Empire. GE credit: ArtHum, Div, Wrt.—I, II. (I, II.) Price

191B. High Imperial China (4)
Lecture—3 hours; term paper. Political disunion and the influx of Buddhism; reunification under the great dynasties of T'ang, Sung, and Ming with analysis of society, culture and thought. GE credit: ArtHum, Div, Wrt.—II. (II.) Bossler

191C. Late Imperial China (4)
Lecture—2 hours; discussion—1 hour; two long papers. Prerequisite: course 9A or upper division standing. Patterns and problems of Chinese life traced through the Ming and Ch'ing dynasties (c. 1500–1800), prior to the confrontation with the West in the Opium War. Readings include primary sources and novels portraying elite ethos as well as popular culture. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I. Mann

191D. Nineteenth Century China: The Empire Confronts the West (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: course 9A, or upper division standing. The decline and fall of the Chinese Empire, with particular attention to the social and political crises of the 19th century, and the response of government officials, intellectuals, and ordinary people to the increasing pressures of Western imperialism. GE credit: ArtHum, Div, Wrt.—I. (I.) Bossler

191E. The Chinese Revolution (4)
Lecture—2 hours; discussion—1 hour; extensive writing. Prerequisite: upper division standing. Analysis of China's cultural and political transformation from Confucian empire into Communist state. Emphasis on emergence and triumph of peasant revolutionary strategy (to 1949), with some attention to its implications for post-revolutionary culture and politics. GE credit: ArtHum, Div, Wrt.—II. (II.) Price

191F. History of the People's Republic of China (4)
Lecture—2 hours; discussion—1 hour; extensive writing. Prerequisite: upper division standing. Comprehensive analysis of recent Chinese history, including land reform, the Cultural Revolution, the post-Mao era, and the consequences of the new economic policies of the 1980s. Not open for credit to students who have completed course 190C. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(III.) Mann

192. Internship in History (1-12)
Prerequisite: enrollment dependent on availability of intern positions, with priority to History majors. Supervised internship and study as historian, archivist, curator, or in another history-related capacity, in an approved organization or institution. (P/NP grading only.)

193A. History of the Modern Middle East, 1750-1914 (4)
Lecture—3 hours; term paper. Prerequisite: course 6 recommended. Transformation of state and society within the Middle East from 1750 to 1914 under pressure of the changing world economy and European imperialism. Themes include colonialism, Orientalism, Arab intellectual renaissance, Islamic reform, state-formation, role of subaltern groups. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—II. El Shakry

193B. History of the Modern Middle East from 1914 (4)
Lecture—3 hours; term paper. Prerequisite: course 6 recommended. The Middle East from the turn of the 20th century to the present. Themes include the legacy of imperialism, cultural renaissance, the World Wars, nationalism, Palestine/Israel, Islamic revival, gender, revolutionary movements, politics of oil and war, cultural modernism, exile and diaspora. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—III. El Shakry

194A. Aristocratic and Feudal Japan (4)
Lecture—3 hours; term paper and/or discussion. Broad survey of the cultural, social, religious, and political aspects of Japanese history from mythological times through the sixteenth century emphasizing comparison of the organizations, values, and beliefs associated with the aristocratic and feudal periods. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(II.) Borgen

194B. Early Modern Japan (4)
Lecture—3 hours; term paper and/or discussion. Survey of the cultural, social, economic, and political aspects of Japanese history from the seventeenth through the nineteenth centuries emphasizing the development of those patterns of thought and political organization with which Japan met the challenge of the nineteenth-century Western expansionism. GE credit: ArtHum, Div.—I. (I.) Kim

194C. Modern Japan (4)
Lecture—3 hours; term paper and/or discussion. Survey of the cultural, social, economic, and political aspects of Japanese history in the twentieth century emphasizing labor and social movements, militarism and the Pacific war, and the emergence of Japan as a major economic power. GE credit: ArtHum, Div.—III. (III.) Kim

194D. Business and Labor in Modern Japan (4)
Lecture—3 hours; term paper or papers. Survey of labor and management relations in Japan from the mid-eighteenth century to the present. Offered in alternate years. GE credit: ArtHum.—I.

194E. Education and Technology in Modern Japan (4)
Lecture—3 hours; term papers. Survey of education and technology in Japan from the mid-eighteenth century to the present. Offered in alternate years. GE credit: ArtHum.—I.

195B. History of Modern Korea (4)
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: upper division standing. History of Modern Korea, from Yi dynasty period to 1990s. Political and socioeconomic changes in 19th century, modernization under Japanese colonialism, postwar economic growth and effects of the Cold War. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. Kim

196A. Medieval India (4)
Lecture—3 hours; discussion—1 hour; written reports. Survey of history of India in the millennium preceding arrival of British in the eighteenth century, focusing on interaction of the civilizations of Hinduism and Islam and on the changing nature of the state. GE credit: ArtHum, Div, Wrt.—I. (I.) Metcalf

196B. Modern India (4)
Lecture—3 hours; discussion—1 hour; written reports. Survey of cultural, social, economic, and political aspects of South Asian history from arrival of the British in the eighteenth century to formation of new independent states—India, Bangladesh, and Pakistan—in the twentieth century. GE credit: SocSci, Div, Wrt.—Metcalf

197T. Tutoring in History (2)
Discussion—1 hour; laboratory—3 hours. Prerequisite: enrolled as a History major with senior standing and consent of department chairperson. Tutoring of students in lower division courses. Weekly meeting with instructors in charge of courses. Written reports on methods and materials required. May be repeated once for credit. No final examination. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor; upper division standing. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

201A-T, X. Sources and General Literature of History (4)
Seminar—3 hours; term paper. Designed primarily for students preparing for higher degrees in history. **(A)** Ancient; **(B)** Medieval; **(C)** Renaissance and Reformation; **(D)** Early Modern Europe; **(E)** Europe since 1815; **(F)** China to 1880; **(G)** China since 1880; **(H)** Britain; **(I)** Latin America since 1810; **(J)** American History to 1787; **(K)** United States, 1787-1896; **(L)** United States since 1896; **(N)** Modern Japan; **(Q)** Cross-Cultural Women's History; **(S)** History of Science and Medicine; **(T)** Jewish History; **(X)** World History. May be repeated for credit when different subject area is studied.—I, II, III. (I, II, III.)

202A-I. Major Issues in Historical Interpretation (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of history. **(A)** Ancient; **(B)** Medieval Europe; **(C)** Modern Europe; **(D)** India; **(E)** Africa; **(F)** China; **(G)** Japan; **(H)** United States; **(I)** Latin America. Readings, papers, and class reports. May be repeated for credit when a different subject area is studied.—I, II, III. (I, II, III.)

203A. Research Seminar (4)
Seminar—3 hours; tutorial—1 hour. Designed for students preparing for higher degrees in history. Individual research and analysis resulting in substantial research paper of publishable quality. Completion required of all Ph.D. candidates. The three courses must be taken in continuous sequence, ordinarily during second year.—I. Bossler, Halttunen, Hagen

203B-203C. Research Seminar (4-4)
Seminar—3 hours; tutorial—1 hour. Prerequisite: course 203A. Designed for students preparing for higher degrees in history. Individual research and analysis resulting in substantial research paper of publishable quality. Completion required of all Ph.D. candidates. The three courses must be taken in continuous sequence, ordinarily during second year. (Deferred grading only, pending completion of sequence.)—II, III. Bossler, Halttunen, Hagen

204. Historiography (4)
Seminar—3 hours; term paper. Major issues in the philosophy and methodology of history.—I. (I.)

221. Medieval History (4)
Seminar—3 hours. Prerequisite: courses 121A, 121B, 121C recommended. Topics in the history of medieval and early Renaissance Europe.

245. Modern European History (4)
Seminar—3 hours. Prerequisite: course 201E. Primary sources and research methodologies in the history of modern France and Germany. May be repeated once for credit.—III. (III.)

261. Latin American History (4)
Seminar—3 hours. Prerequisite: two courses in Latin American history; reading knowledge of Spanish or Portuguese.—I, II, III. (I, II, III.) Bauer

271A-271B. United States History (4-4)
Seminar—3 hours; term paper. Prerequisite: course 201J-L or 202H. Research in literature, methods, and sources on aspects of United States history, culminating in each student completing a research paper in the field by the end of the second quarter. May be repeated for credit. (Deferred grading only, pending completion of sequence.)—II-III. (II-III.)

291A. Chinese History (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Research on topics to be chosen by the students for the purpose of writing article-length papers. May be repeated for credit. (Deferred grading only, pending completion of sequence.)—Price, Mann, Bossler

291B. Chinese History (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Completion of article-length papers on topics chosen by students. May be repeated for credit. (Deferred grading only, pending completion of sequence.)—Price, Mann, Bossler

291C. Chinese History (4)
Seminar—2 hours; tutorial—1 hour. Prerequisite: reading knowledge of Chinese. Readings in Chinese historical materials. Training in the use of Chinese reference works. May be repeated once for credit.—Price, Mann, Bossler

292. College Teaching Internship (4)
Internship—4 hours. Prerequisite: course 300 (may be taken concurrently). Student prepares and teaches one lower division history course in a nearby community college under the supervision of a UC Davis instructor and a community college instructor. (S/U grading only.)

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

299D. Individual Study (1-12)
(S/U grading only.)

Professional Courses

389. Introductory Seminar for Teaching Assistants (1)
Seminar—1 hour. Prerequisite: must be enrolled in course 390. An introduction to the broad comparative and theoretical issues of teaching methods and techniques in history. (S/U grading only.)—I, II, III. (I, II, III.)

390. Teaching History in College (2)
Discussion—2 hours. Designed for teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university. (S/U grading only.)—I, II, III. (I, II, III.)

History and Philosophy of Science

(College of Letters and Science)

Joan Cadden, Ph.D., Program Director

Program Office, 1238 Social Sciences and Humanities Building (530-752-9621)

http://hpslab.ucdavis.edu

Committee in Charge

Ann Bonham, Ph.D. *(Pharmacology and Toxicology)*
Joan Cadden, Ph.D. *(History)*
Patrick E. Carroll, Ph.D. *(Sociology)*
Carolyn de la Pena, Ph.D. *(American Studies)*
Kevin D. Hoover, D.Phil. *(Economics)*
Catherine J. Kudlick, Ph.D. *(History)*
Benjamin S. Orlove, Ph.D. *(Environmental Science and Policy)*
Paul Teller, Ph.D. *(Philosophy)*
Jessica Utts, Ph.D. *(Statistics)*

Minor Program Requirements:

The interdisciplinary minor in the history and philosophy of science invites students to examine historical and contemporary problems in a variety of scientific disciplines, and to explore concepts and procedures basic to science and how they have evolved. The minor is sponsored by the Program in the History and Philosophy of Science.

	UNITS
History and Philosophy of Science	**24**
Philosophy 30	4
Five courses from those listed below. One course must be from each of three areas: (a) history, (b) philosophy, and (c) science and technology studies	20
(a) History 102, 135A, 135B, 136, 139A, 139B, 185A, 185B, 188A, 188B;	
(b) Philosophy 106, 107, 108, 109, 110, 111;	
(c) Science and Technology Studies 20, 130A, 130B, 131, 150, 180.	

Minor adviser. P. Carroll, 2272 Social Sciences and Humanities Building, 530-752-5388.

Honors Challenge

Jessica Utts, Ph.D., Program Director

Program Office, 162 Kerr Hall (530-752-9797)

http://www-honors.ucdavis.edu

The Program of Study

The Davis Honors Challenge (DHC) is a program for highly motivated students interested in enhancing their education through special courses, closer contact with faculty, and dynamic interaction with academic peers. Interested students apply in the spring quarter for places the following year. First- and second-year students participating in the DHC take two honors courses and one problem oriented interdisciplinary seminar per academic year. Second-year students have the option to substitute an honors contract for an honors course. Third-year students are required to complete two honors contracts and one upper division honors seminar. Fourth-year students participate in a year-long team honors project. All students who successfully complete the program receive transcript notation for each year of participation.

Lower division departmental Honors courses, special DHC sections of regular courses, DHC seminars, and special studies opportunities constitute the course offerings of the Davis Honors Challenge. A complete list of these courses, with course registration numbers, is made available to admitted students through the Davis Honors Challenge Office.

Lower division seminars are offered each year during winter and spring quarters. The seminars are designed to foster critical thinking and analytic interpretation, improve oral and written communication skills, enhance research skills, provide experience with group dynamics and collaborative exploration of problems, and develop familiarity with electronic communication and visual presentations. Enrollment in each seminar is limited to 20 students. Updated program information is available at our web site.

Students not admitted to the program may not register for Davis Honors Challenge sections, seminars, or special study opportunities.

Courses in Davis Honors Challenge (HNR)

Lower Division Courses

90X. Honors Discussion Section (1)
Discussion—1 hour. Prerequisite: open only to students in the Davis Honors Challenge. Examination of special topics in selected lower division courses through additional readings, discussions, term papers, collaborative work, or special activities, including projects, field and laboratory experiences, computer simulations, creative works. May be repeated for credit.

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: open only to students in the Davis Honors Challenge. Supervised work experience under the auspices of the Davis Honors Challenge. May be repeated for credit for a total of 12 units. (P/NP grading only.)

94. Honors Seminar (4)
Seminar—4 hours. Prerequisite: open only to students in the Davis Honors Challenge. Collaborative, multidisciplinary exploration of complex contemporary problem. Focus on critical thinking and analytical interpretation, on oral and written communication, and on the use of electronic media in gathering information. May be repeated for credit. GE credit: Wrt.

98. Directed Group Study (1-5)
Discussion—1-5 hours. Prerequisite: open only to students in the Davis Honors Challenge. May be repeated for credit. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Independent study—1-5 hours. Prerequisite: student in the Davis Honors Challenge. (P/NP grading only.)

Upper Division Courses

190X. Honors Contract (1)
Independent study or discussion—3 hours. Prerequisite: open only to students in the Davis Honors Challenge. In-depth examination of material in an upper division course as defined in an Honors Contract Proposal submitted by the student. Contract must be approved by the instructor and the Honors Council of the Academic Senate. May be repeated for credit.

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: open only to students in the Davis Honors Challenge. Supervised work experience under the auspices of the Davis Honors Challenge. May be repeated for credit for a total of 12 units. (P/NP grading only.)

194. Honors Seminar (3)
Seminar—3 hours. Open only to students in the Davis Honors Challenge. Team-based work on actual problems drawn from the public or private sector. Focus on critical thinking and analytical interpretation, oral and written communication skills, and development of practical solutions to real-world problems. GE credit: Wrt.—II, III. (II, III.)

195. Honors Thesis/Honors Project (1-3)
Independent Study—3-9 hours. Prerequisite: Open only to students in the Davis Honors Challenge. Guided independent study of a selected topic leading to the presentation of an honors thesis/honors project. May be repeated for credit up to 9 units.

198. Directed Group Study (1-5)
Discussion—1-5 hours. Prerequisite: open only to students in the Davis Honors Challenge. May be repeated for credit. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Independent study—1-5 hours. Prerequisite: open only to students in the Davis Honors Challenge. May be repeated for credit. (P/NP grading only.)

Horticulture and Agronomy (A Graduate Group)

M. Andrew Walker, Ph.D., Chairperson of the Group

Group Office, 140 Environmental Horticulture (530-752-7738)

http://ggha.ucdavis.edu

Faculty

Douglas O. Adams, Ph.D., Associate Professor *(Viticulture and Enology)*
Shane Ball, Ph.D., Cooperative Extension Specialist *(Agronomy and Range Science)*
Michael G. Barbour, Ph.D., Professor, *Academic Senate Distinguished Teaching Award (Environmental Horticulture)*
Kendra Baumgartner, Ph.D., Lecturer *(Plant Pathology)*
David E. Bayer, Ph.D., Professor *(Vegetable Crops)*
Alison M. Berry, Ph.D., Professor *(Environmental Horticulture)*
Arnold J. Bloom, Ph.D., Professor *(Vegetable Crops)*
Kent J. Bradford, Ph.D., Professor *(Vegetable Crops)*
Patrick H. Brown, Ph.D., Associate Professor *(Pomology)*
David W. Burger, Ph.D., Professor *(Environmental Horticulture)*
Marita Cantwell, Ph.D., Lecturer *(Vegetable Crops)*
Roger T. Chetelat, Ph.D., Lecturer *(Vegetable Crops)*
Carlos H. Crisosto, Ph.D., Lecturer *(Pomology)*
Abhaya M. Dandekar, Ph.D., Professor *(Pomology)*
Theodore M. DeJong, Ph.D., Professor *(Pomology)*
R. Ford Denison, Ph.D., Professor *(Agronomy and Range Science)*
Joseph M. DiTomaso, Ph.D., Lecturer *(Vegetable Crops)*
Nick K. Dokoozlian, Ph.D., Lecturer *(Viticulture and Enology)*

Jorge Dubcovsky, Ph.D., Associate Professor *(Agronomy and Range Science)*
Don J. Durzan, Ph.D., Professor *(Environmental Horticulture)*
Jan Dvorak, Ph.D., Professor *(Agronomy and Range Science)*
Clyde L. Elmore, Ph.D., Lecturer *(Vegetable Crops)*
Richard Y. Evans, Ph.D., Lecturer *(Environmental Horticulture)*
Steven A. Fennimore, Ph.D., Lecturer *(Vegetable Crops)*
Louise Ferguson, Ph.D., Lecturer *(Pomology)*
Albert J. Fischer, Ph.D., Assistant Professor *(Vegetable Crops)*
Theodore C. Foin, Jr., Ph.D., Professor *(Agronomy and Range Science)*
Mark Francis, M.L.A., Professor *(Landscape Architecture)*
Shu Geng, Ph.D., Professor *(Agronomy and Range Science)*
Paul L. Gepts, Ph.D., Professor *(Agronomy and Range Science)*
Sham S. Goyal, Ph.D., Lecturer *(Agronomy and Range Science)*
Thomas M. Gradziel, Ph.D., Associate Professor *(Pomology)*
W. Douglas Gubler, Ph.D., Lecturer *(Plant Pathology)*
James A. Harding, Ph.D., Professor *(Environmental Horticulture)*
Timothy K. Hartz, Ph.D., Lecturer *(Vegetable Crops)*
James E. Hill, Ph.D., Lecturer *(Agronomy and Range Science)*
William Horwath, Ph.D., Assistant Professor *(Land, Air and Water Resources)*
Leland F. Jackson, Ph.D., Lecturer *(Agronomy and Range Science)*
Louise E. Jackson, Ph.D., Associate Professor *(Vegetable Crops)*
Judy Jernstedt, Ph.D., Professor *(Agronomy and Range Science)*
R. Scott Johnson, Ph.D., Lecturer *(Pomology)*
Adel A. Kader, Ph.D., Professor *(Pomology)*
Stephen R. Kaffka, Ph.D., Lecturer *(Agronomy and Range Science)*
John M. Labavitch, Ph.D., Professor *(Pomology)*
Emilio A. Laca, Ph.D., Assistant Professor *(Agronomy and Range Science)*
Bruce Lampinen, Ph.D., Cooperative Extension Specialist *(Pomology)*
W. Thomas Lanini, Ph.D., Lecturer *(Vegetable Crops)*
J. Heinrich Lieth, Ph.D., Professor *(Environmental Horticulture)*
James D. MacDonald, Ph.D., Professor *(Plant Pathology)*
Mark A. Matthews, Ph.D., Professor *(Viticulture and Enology)*
Gale McGranahan, Ph.D., Lecturer *(Pomology)*
E. Greg McPherson, Ph.D., Lecturer *(Environmental Horticulture)*
Carole P. Meredith, Ph.D., Professor *(Viticulture and Enology)*
Richard W. Michelmore, Ph.D., Professor *(Vegetable Crops)*
Elizabeth J. Mitcham, Ph.D., Lecturer *(Pomology)*
Jeffrey P. Mitchell, Ph.D., Lecturer *(Vegetable Crops)*
Donald J. Nevins, Ph.D., Professor *(Vegetable Crops)*
Robert F. Norris, Ph.D., Associate Professor *(Vegetable Crops)*
Dan E. Parfitt, Ph.D., Lecturer *(Pomology)*
Michael P. Parrella, Ph.D., Professor *(Entomology)*
Donald A. Phillips, Ph.D., Professor *(Agronomy and Range Science)*
Richard E. Plant, Ph.D., Professor *(Agronomy and Range Science)*
Vito S. Polito, Ph.D., Professor *(Pomology)*
Daniel Potter, Ph.D., Assistant Professor *(Pomology)*
Daniel H. Putnam, Ph.D., Lecturer *(Agronomy and Range Science)*
Carlos F. Quiros, Ph.D., Professor *(Vegetable Crops)*
D.William Rains, Ph.D., Professor *(Agronomy and Range Science)*
Michael S. Reid, Ph.D., Professor *(Environmental Horticulture)*
Kate M. Scow, Ph.D., Professor *(Soil Science)*
Kenneth A. Shackel, Ph.D., Associate Professor *(Pomology)*
Douglas V. Shaw, Ph.D., Professor *(Pomology)*
David R. Smart, Ph.D., Assistant Professor *(Viticulture and Enology)*
Stephen M. Southwick, Ph.D., Lecturer *(Pomology)*
Dina St. Clair, Ph.D., Associate Professor *(Vegetable Crops)*
Trevor V. Suslow, Ph.D., Lecturer *(Vegetable Crops)*
Ellen G. Sutter, Ph.D., Professor *(Pomology)*
Steve R. Temple, Ph.D., Lecturer *(Agronomy and Range Science)*
Larry R. Teuber, Ph.D., Professor *(Agronomy and Range Science)*
Robert L. Travis, Ph.D., Professor *(Agronomy and Range Science)*
Mark Van Horn, M.S., Lecturer *(Pomology)*
Chris van Kessel, Ph.D., Professor *(Agronomy and Range Science)*
Ronald E. Voss, Ph.D., Lecturer *(Vegetable Crops)*
M. Andrew Walker, Ph.D., Associate Professor *(Viticulture and Enology)*
Steve Weinbaum, Ph.D., Professor *(Pomology)*
Thea A. Wilkins, Ph.D., Associate Professor *(Agronomy and Range Science)*
Larry E. Williams, Ph.D., Professor *(Viticulture and Enology)*
James A. Wolpert, Ph.D., Cooperative Extension Specialist *(Viticulture and Enology)*
Lin L. Wu, Ph.D., Professor *(Environmental Horticulture)*
John I. Yoder, Ph.D., Professor *(Vegetable Crops)*
Truman P. Young, Ph.D., Assistant Professor *(Environmental Horticulture)*

Graduate Study. The Graduate Group in Horticulture and Agronomy offers programs of study leading to the M.S. degree. The programs provide opportunities for specialized study in the production, management, and utilization of horticultural and agronomic plants and the postharvest handling of horticultural commodities. Options include agronomy, environmental horticulture, pomology, vegetable crops, viticulture and weed science. Within an option, the student can specialize in one of a number of areas, including agroecology, biotechnology, breeding and crop improvement, crop physiology, crop production, mineral nutrition, modeling and quantitative horticulture, pest management, plant growth and development, postharvest physiology, revegetation/restoration, and water relations. Research may be conducted on an applied or basic problem having a physiological, genetic, or ecological emphasis.

Preparation. A level of competence equivalent to that of a sound undergraduate program in Plant Science is required. This includes coursework in general biology, chemistry, physics, statistics, genetics and introductory plant physiology. A few limited deficiencies in any of these areas can be made up after admission to the graduate program. Specific requirements are outlined in detail and may be obtained from the Group office.

Graduate Advisers. Consult the Group office.

Courses in Horticulture (HRT)

Graduate Courses

203. Research Perspectives in Horticulture (3)
Lecture—1 hour; lecture/discussion—2 hours. Prerequisite: Plant Biology 111 and 112, or Environmental Horticulture 102 or the equivalent. Following lectures/discussions of scientific methodology, students develop research proposals aided by classroom discussions and individual interactions with instructors. Lectures and critiques of "classical papers" provide a sense of the evolution of the current concepts in perennial plant biology. Offered in alternate years.—(I.) Weinbaum, DeJong

251. Modeling Horticultural Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Plant Biology 142, calculus, or consent of instructor. Development and application of models. Emphasis on physiological and ecological models, with examples from areas of interest to class participants. Applications to horticultural systems.—II. (II.) Lieth

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing at UCD. Seminars presented by invited speakers, students, or faculty on selected topics in horticulture. (S/U grading only.)—I. (I.)

Human Anatomy

See Cell Biology and Human Anatomy (in Medicine, School of)

Human and Community Development

(College of Agricultural and Environmental Sciences)
Beth A. Ober, Ph.D., Chairperson of the Department
Michael P. Smith, Ph.D., Associate Chairperson of the Department
Department Advising Office, 1303 Hart Hall (530-752-2244 or 530-752-1805)
Community Studies and Development, Human Development and Family Studies, and International Agricultural Development
http://hcd.ucdavis.edu

Faculty—Community Studies and Development

Ted Bradshaw, Ph.D., Associate Professor
Stephen B. Brush, Ph.D., Professor
Luis E. Guarnizo, Ph.D., Associate Professor
Frank Hirtz, Ph.D., Associate Professor
Martin F. Kenney, Ph.D., Professor
William Lacy, Ph.D., Professor
Janet Momsen, Ph.D., Professor
Michael P. Smith, Ph.D., Professor
Miriam J. Wells, Ph.D., Professor

Emeriti Faculty

Isao Fujimoto, M.A., Senior Lecturer Emeritus
Orville E. Thompson, Ph.D., Professor Emeritus

Affiliated Faculty

David Campbell, Ph.D., Assistant Specialist in Cooperative Extension
Jim Grieshop, Ph.D., Specialist in Cooperative Extension
Laurie Lippin, Ph.D., Lecturer
Harland Padfield, Ph.D., Lecturer
Alvin D. Sokolow, Ph.D., Specialist in Cooperative Extension
Bernadette Tarallo, Ph.D., Lecturer
Robert Wiener, Ph.D., Lecturer

Faculty—Human Development and Family Studies

Carolyn M. Aldwin, Ph.D., Professor
Brenda K. Bryant, Ph.D., Professor
Zhe Chen, Associate Professor
Katherine Conger, Ph.D., Assistant Professor
Rand Conger, Ph.D., Professor
Xiaojia Ge, Ph.D., Professor
Lawrence V. Harper, Ph.D., Professor
Rosemarie Kraft, Ph.D., Lecturer
Beth A. Ober, Ph.D., Professor
Carol Rodning, Ph.D., Associate Professor

Emeriti Faculty

Keith Barton, Ph.D., Professor Emeritus
Emmy E. Werner, Ph.D., Professor Emeritus

Affiliated Faculty

Marc Braverman, Ph.D., Specialist in Cooperative Extension

Michael R. Levenson, Ph.D., Associate Adjunct Professor
Ann Mastergeorge, Ph.D., Assistant Research Psychologist
Lenna Ontai-Grzebik, Ph.D., Assistant Specialist in Cooperative Extension
Richard Ponzio, Ph.D., Specialist in Cooperative Extension

Faculty—International Agricultural Development

Faculty includes members from various departments across colleges.

Major Programs. See Community and Regional Development, Human Development, and International Agricultural Development.

Human Development

(College of Agricultural and Environmental Sciences)

Faculty. See Department of Human and Community Development.

The Major Program

Human development explores the developmental process in humans throughout the life cycle. Biological, cognitive, and personality/sociocultural aspects of development are studied

The Program. Human development majors complete a group of preparatory courses in anthropology, general biology, genetics, history, philosophy, physiology, psychology, and statistics. Upper division students can design their programs in consultation with a faculty member to emphasize a particular interest. For instance, students can study the social and biological aspects of human development while emphasizing child or adult development.

Internships and Career Alternatives. At least one practicum course is required. A second practicum or supervised internship can be used to fulfill the restricted elective requirement for the major. In addition, students can intern in schools, early childhood education or senior centers, hospitals, rehabilitation centers, probation offices, group foster homes, mental health clinics, or as tutors for handicapped or bilingual students. Human development graduates fill a wide variety of positions in preschools, elementary and special educational settings, programs designed for parents, families, and the elderly, as well as governmental jobs related to social services for people of all ages. Students who emphasize biological aspects of human development can apply to medical school or pursue training for positions in the health sciences. Human development prepares students to pursue advanced degrees in behavioral and social sciences, education, social work, family law, or health sciences.

Preparatory Requirements. UC Davis students who wish to change their major to Human Development must complete the following courses with a combined grade point average of at least 2.50. All of the following courses must be taken for a letter grade:

Psychology 1

Statistics 10 or 13 or Psychology 41 or Sociology 46A and 46B

One course from Anthropology 1, 2 or 15

One course from Biological Sciences 1A, 10, 101; Microbiology 10; Molecular and Cellular Biology 10; or Neurobiology, Physiology, and Behavior 10, 12 or 101

B.S. Major Requirements:

	UNITS
English Composition Requirement	**12**
See College requirement	0-8
Choose from English 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, 104F	4
Preparatory Subject Matter	**39-47**
Two courses from Anthropology 1, 2, or 15	8-9
Biological Sciences 1A, 10, Microbiology 10, or Neurobiology, Physiology, and Behavior 12	3-5
Molecular and Cellular Biology 10 or Biological Sciences 101†	4
History 17A, 17B, 72A, 72B, or Political Science 1	4
Two courses from Philosophy 5, 30, 31, 32, or 38	8
Neurobiology, Physiology, and Behavior 10, 101, or Psychology 101	4-5
Psychology 1	4
Psychology 41 or Sociology 46A and 46B, or Statistics 10 or 13	4-8
Breadth/General Education	**16-24**
Satisfaction of General Education requirement	12
Depth Subject Matter	**50-55**
Human Development 100A, 100B, 100C	12
Human Development 120 or 121	4
Biological Sciences 101†, Human Development 117, 180, Nutrition 101, or Psychology 121	3-5
Human Development 102, 110, 130, 160, or 162*	4
Human Development 101, 103, 132, or 163*	4
Human Development 140-140L, or 141 or 142 or 143*	4-6
Restricted Electives	**19-20**
Five additional upper division courses chosen from among Human Development courses or from a list of restricted electives in consultation with faculty adviser. May include one practicum.	
Unrestricted Electives	**54-67**
Total Units for the Degree	**180**

† Biological Sciences 101 cannot be used to satisfy both the Preparatory Subject Matter and the Depth Subject Matter Requirements.

* At least one course from among these groupings must focus on childhood/adolescence (101, 102, 103, 110, 130, 132) and one must focus on adulthood/aging (143, 160, 162, 163).

Major Adviser. X. Ge.

Minor Program Requirements:

The Department of Human and Community Development offers two minors.

	UNITS
Aging and Adult Development	**21-26**
Human Development 100C, 117, 143, 160, 162, or 163	15-18
Select two courses from the following: Human Development 110, 180; Community and Regional Development 173; Psychology 121, 123, 126, 155; Sociology 127	6-8

Minor Adviser. C. Aldwin, B. Ober.

	UNITS
Human Development	**20**
Human Development 100A and 100B	8
Human Development 100C or 110	4
Two courses from Human Development 101, 102, 103, 130, 132, or 163	8

Minor Adviser. L.V. Harper.

Related Major Program. See the major in Community and Regional Development.

Graduate Study. Graduate study is available through a Master of Science degree in child development, and a Ph.D. degree in human development. See the Child Development Graduate Group and Human Development Graduate Group. Refer also to the Graduate Studies chapter of this catalog.

Courses in Human Development (HDE)

Questions pertaining to the following courses should be directed to the instructor or to the Human and Community Development Advising Office, 1303 Hart Hall (530-752-2244).

Lower Division Courses

12. Human Sexuality (3)
Lecture—3 hours. Vocabulary, structure and function of reproductive system; sexual response; pre-natal development; pregnancy and childbirth; development of sexuality; rape and sexual assault; birth control; sexually transmitted diseases; homosexuality; establishing and maintaining intimacy; sexual dysfunctions; communication; enhancing sexual interaction; cultural differences in attitudes towards sexuality. GE credit: Div.—I, II. (I., II) Staff

13. Parenting (4)
Lecture/discussion—4 hours. Provides the basis for understanding the nature of the parenting process. Consideration of aspects of parenting that begin before conception and develop throughout the life of the child and parent. GE credit: SocSci.—Bryant

15. Family and the Life Cycle (4)
Lecture—4 hours. Prerequisite: Psychology 1, or 15 and 16. Socialization in families throughout the life cycle. Impact of alcoholism and abuse. Sources of strength and help. Not open for credit to students who have completed courses 100A, 100B, 110 and/or Psychology 112, 114, and 115. GE credit: SocSci.

92. Internship (1-6)
Internship—3-18 hours. Prerequisite: field work experience or at least one course (e.g. course 30, 100A, 100B, 140, 140L) related to the fieldwork assignment; consent of instructor. Supervised internship, off and on campus, in community and institutional settings. (P/NP grading only.)

98. Directed Group Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

100A. Infancy and Early Childhood (4)
Lecture—4 hours. Prerequisite: Psychology 1 or 15, Biological Sciences 1A or 10. Analysis of the biological, social, and cultural influences in the psychological growth and development of children, prenatal through age six.—I, II, summer. (I, II.) Harper, Chen

100B. Middle Childhood and Adolescence (4)
Lecture—4 hours; three brief observations of school-age children. Prerequisite: course 100A or the equivalent; introductory biology. Analysis of the interplay of biological and social-cultural factors in the emotional, cognitive and social development from middle childhood through adolescence.—II, III. (II, III.) Harper

100C. Adulthood and Aging (4)
Lecture—4 hours. Prerequisite: Psychology 1 or 15. Development during early, middle, and late adulthood; biological, cognitive, and psycho-social aspects of adult development. Emphasis on normative patterns of development which characterize "successful aging."—I, III. Aldwin

101. Cognitive Development (4)
Lecture—3 hours; term paper. Prerequisite: course 100A or 100B or Psychology 140. Pass 1 restricted to Human Development or Psychology majors. Theories, methods, evidence, and debates in the field of cognitive development, such as nature/nurture, constraints on learning, and the role of plasticity. Topics include attention, memory, concepts about the physical and social world, and language. (Same course as Psychology 141.) GE credit: Wrt.—I, II, III. (I, II, III.) Chen, Goodman, Lagattuta, Rivera

102. Social and Personality Development (4)
Lecture—3 hours; term paper. Prerequisite: course 100A or 100B or Psychology 140. Pass 1 open to Human Development or Psychology majors. Social

and personality development of children, infancy through adolescence. Topics include the development of personality, achievement motivation, self-understanding, sex-role identity, and antisocial behavior. Emphasis on the interface between biological and social factors. (Same course as Psychology 142.) GE credit: SocSci, Wrt.—I, II, III. (I, II, III.) Conger, Lagattuta, Rivera, Robins, Rodning

103. Cross-Cultural Study of Children (4)
Lecture—4 hours. Prerequisite: course 100A or consent of instructor. Cross-cultural studies of children in developing countries and among minority groups in the U.S. GE credit: Div.—III.

110. Contemporary American Family (4)
Lecture—4 hours. Prerequisite: introductory psychology. Factors currently influencing American families including changing economic conditions, changing sex roles, divorce, and parenthood; theories and research on family interaction.—II, III. K. Conger

117. Longevity (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Nature, origin, determinants, and limits of longevity with particular reference to humans; emphasis on implications of findings from non-human model systems including natural history, ecology and evolution of the life span; description of basic demographic techniques including life table methods. (Same course as Entomology 117.) GE credit: SciEng, Wrt.—I. Carey

120. Research Methods in Human Development (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 100A or 100B, and Statistics 13 or Education 114 or Psychology 41 or Sociology 46A and 46B. Topics include scientific view of human development; origins of scientific inquiry; research strategies; preparation for conducting research; descriptive statistics and statistical inference (hypothesis testing); statistical analysis and understanding results. Major emphasis on experimentation, collecting data and analyzing results.—I, II, III. Acredelo, Barton

121. Psychological Assessment (4)
Lecture—4 hours. Prerequisite: courses 100A-100B; elementary statistics. Current issues and methodology related to the process of psychological assessment with children.—I. Barton

130. Emotionally Disturbed Children (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 100A and 100B or consent of instructor. Discussion of psychosis, neurosis, behavior disorders, and learning difficulties in children.—I, III. Bryant

132. Individual Differences in Cognition (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B or consent of instructor. Individual differences in cognition, including learning disabilities and giftedness. Education implications and neurodevelopmental substrates of individual differences in cognition.—II, III. Kraft

140. Communication and Interaction with Young Children (2)
Lecture—2 hours. Prerequisite: courses 30, 100A, and 140L (concurrent enrollment recommended). Theory and practice in the area of effective interaction with young children. Humanistic, child-centered approaches; awareness of goals, beliefs, and values as these affect interactions. *To enroll, students must sign up for laboratory time at the Child and Family Studies Center.*—I, II, III. (I, II, III.) Young

140L. Laboratory in Early Childhood (3-6)
Discussion—3 hours; laboratory—6-15 hours. Prerequisite: course 140 (may be taken concurrently). Application of theories of learning and development to interaction with children six months to five years at Early Childhood Laboratory. Applied skills in communication, discipline and curriculum. May be repeated for credit for a total of 12 units. (P/NP grading only.)—I, II, III. (I, II, III.) Young

141. Field Studies with Children and Adolescents (4-6)
Discussion—2 hours, field study—6-12 hours. Prerequisite: course 100B or the equivalent and consent of instructor. Study of children's affective, cognitive and social development within the context of family/school environments, hospitals and foster group homes. May be repeated for credit for a total of 12 units following consultation with and consent of instructor.—I, II, III. Kraft, Ponzio

142. Field Studies with Exceptional Children (4-6)
Discussion—1.5 hours; field study—6-12 hours. Prerequisite: consent of instructor and one course from courses 130, 131, or 132 (may be taken concurrently). Field study with children who are identified as developmentally disabled, emotionally distressed, or intellectually gifted. May be repeated for credit for a total of 12 units following consultation with and consent of instructor.—I. Bryant

143. Field Studies of the Elderly (4-6)
Discussion—2 hours; field work—6-12 hours. Prerequisite: course 100C or 160 may be taken concurrently. To apply theory and research on adult development and aging, to work with older adults in a variety of settings, and to develop skills relevant to that application. Students will also develop a small research project.—II. Ober

151. Shared Child Care (4)
Lecture—4 hours. Prerequisite: course 100A or 110, Psychology 112, or Anthropology 131. Examines roles of caregivers other than parents in contemporary society, and the impact of grandparents, siblings, family day care providers, foster parents, church- and employer-sponsored child care on children's development. Reviews child care legislation and social policy issues. May be offered via UC Davis Washington Center.

160. Social Aspects of Aging (4)
Lecture—4 hours. Prerequisite: course 100C or Psychology 115. How the social context affects adult development and aging. Emphasis on demography, social policy, culture, and adaptation. Oral histories as class projects. Offered in alternate years. GE credit: Div.—II. Aldwin

162. Issues in Aging (3)
Lecture—2 hours; lecture/discussion—1 hour. Prerequisite: course 100C or 160. Research and policy issues concerning the elderly and aging in contemporary society. Offered in alternate years.

163. Cognitive Neuropsychology in Adulthood and Aging (4)
Lecture/discussion—4 hours. Prerequisite: Psychology 1; course 100C recommended. Theories, methods, and findings concerning the relationship between cognitive processes and brain functioning. Readings, lectures, and in-class discussions cover research on normal younger and older adults, neuropsychological case studies, and selected patient groups (e.g., amnesia, schizophrenia, Alzheimer's disease).

180. Aging and Health (3)
Lecture—3 hours. Prerequisite: upper division standing; course 100C recommended. Changing nature and determinants of health and illness in the older population, including normal aging changes, chronic health problems, and disease prevention. Systems of formal and informal care for the elderly. One field trip required.

190C. Introductory Research Conference (1)
Discussion—1 hour. Prerequisite: involvement in ongoing research. Instructors lead discussions with undergraduate students who involve themselves in a research project. Research papers are reviewed and aspects of project proposals developed out of class are presented and evaluated. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: upper division standing and consent of instructor. Supervised internship off and on campus, in community, and institutional settings. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

200A. Early Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing; basic biology or physiology; one upper division course in psychology or a related field; one upper division or graduate course in developmental psychology (may be taken concurrently). Theory and research on the biological, social, cognitive, and cultural aspects of development from conception to the age of five years.—I. Rodning

200B. Middle Childhood and Adolescence (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing; basic biology or physiology, and at least two upper division or graduate-level courses in psychology or related fields. Theory and research on biological, cognitive, social, and cultural influences on behavioral development from age five years until late adolescence.—II. Bryant

200C. Development in Adulthood (4)
Lecture/discussion—4 hours. Prerequisite: courses 200A and 200B. Theory and research focusing on social, personality, cognitive, and biological development from early to late adulthood. Emphasis is on theory development and continuity and change.—III. Ober

201. Social-Emotional Development in Infancy (4)
Lecture/discussion—4 hours. Prerequisite: course 200A. Analysis of theory, methods, and research on social-emotional development in infancy. Emphasizes the development of primary and secondary emotions, and the development of attachment. Other possible topics include infant temperament, sex differences, compliance, and self-regulation. Offered in alternte years.

203. Adolescent Behavioral and Emotional Development (4)
Lecture/discussion—4 hours. Prerequisite: course 200B. Analysis of recent theories, research methods, and major findings on adolescent behavioral and emotional development, including contextual and genetic influences on adolescence, pubertal transitions, and social/family contexts and processes. Emphasis on multi-level mechanisms underlying adolescent behavioral and emotional development. Offered in alternate years.

210. Theories of Behavioral Development (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: graduate standing in behavioral sciences. Consideration of enduring issues in theories of behavioral development; analysis of adequacy of major theoretical schools (e.g., social learning, Piagetian) as scientific theories. Offered in alternate years.—I. Harper

211. Physiological Correlates of Behavioral Development (3)
Seminar—3 hours. Prerequisite: consent of instructor. An overview of mechanisms of organismic development and the implications of developmental biology for the analysis of behavioral ontogeny; consideration of parallels between processes of organismic development and behavioral development in children and infra-human mammals.—I. Harper

212. Adaptation and Aging (3)
Lecture/discussion—3 hours. Prerequisite: course 200C. Interdisciplinary perspective of the ways biological, psychological, and sociocultural factors affect aging and adaptation in late life. Focus is on the ways in which stress, coping, and social support affect health and the factors which contribute to optimal aging. Offered in alternate years.—II. Aldwin

213. Cross-Cultural Study of Children (3)
Lecture—2 hours; discussion—1 hour; field project or paper. Prerequisite: graduate standing in Human Development, Education, Anthropology, Psychology or Sociology. Current theory and research concerned with comparative child development. Introduction into the major issues and methods of cross-cultural research (e.g., biological, cognitive and social development of children in different cultures and subcultures in U.S.A.). Offered in alternate years.

217. Development of Cortical and Perceptual Laterality (3)
Seminar—3 hours. Prerequisite: graduate standing in child or human development or consent of instructor. Current theory and research regarding the development of human cortical and perceptual laterality—emphasizing the relationship of this development to thinking and behavior. Offered in alternate years.

220. Research Methods in Human Growth and Development (3)
Lecture—3 hours. Prerequisite: Statistics 13 or the equivalent and at least two upper division courses in human biology or developmental psychology. Theory and research methods in biological growth, and cognitive and social/emotional development from prenatal period to death.—II. Barton

221. Psychological Assessment of Children (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 121 or consent of instructor. Study of children's behavior through examination, analysis and evaluation of perceptual-motor, cognitive, affective and social development. Problems in assessment of exceptional children considered. Assignments focus on preparation of a comprehensive report on one child.

222. Applied Research and Program Evaluation (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing and consent of instructor. Focuses on the design and conduct of applied research and evaluation studies, especially with regard to programs serving children and their families. Offered in alternate years.—III. Braverman

225. Behavioral Development and Food Intake (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing in Human Development (and related fields) and Nutrition. Multidisciplinary view covering key theoretical and research issues in basic human development processes related to food intake.

231. Issues in Cognitive and Linguistic Development (3)
Seminar—3 hours. Prerequisite: consent of instructor. Study and evaluation of key issues in the theoretical and empirical literature on cognitive and linguistic development.—III. Kraft

232. Cognition and Aging (3)
Lecture/discussion—3 hours. Prerequisite: course 200C. The manner in which cognitive processes are affected by aging as well as an understanding of the changes in the central nervous system occurring with aging. Offered in alternate years.

234. Children's Learning and Thinking (3)
Seminar—3 hours. Prerequisite: course 200A or Psychology 212 recommended. Analysis of theories, research methods, and major findings of children's higher order cognition, including origins of knowledge, development of problem solving skills, reasoning strategies, and scientific concepts, with an emphasis on the underlying mechanism involved in children's thinking and learning processes. Offered in alternate years.—III. Chen

237. Parent-Child Interaction (3)
Seminar—3 hours. Prerequisite: consent of instructor; upper division course on the family recommended. Current theory and research. Emphasis on parental behavior in other animals and other cultures, childrearing practices, the child's perception of parents, the differential influence of each parent on the child's psychological well-being, sex-role development, and moral development. Offered in alternate years.

238. The Context of Individual Development (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing in Human Development, Child Development, Education, Psychology, Anthropology, Sociology, or consent of instructor. Analysis of human development within the context of daily life. Contextualizing theories and methods of developmental psychology will be distinguished from contextual theories and methods. Developmental psychology models will be distinguished from child psychology models. Offered in alternate years.

241. Consultation Approaches to Child Development (3)
Lecture—1 hour; discussion—1 hour; laboratory—3 hours. Prerequisite: graduate standing; supervised field experience with children (e.g., course 140, 141, 142, may be taken concurrently); and consent of instructor. Analysis and application of theories and approaches of consultation and child development to facilitate delivery of child-related services (e.g., educational and mental health). Develop working knowledge of consultation skills for working with adults directly interacting with children and adolescents. Offered in alternate years.

242. Adolescent Health Behavior: Theory and Programs (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing in child or human development, or consent of instructor; course 200B recommended. Theoretical conceptions relating to adolescent behaviors that have potential impact on health (e.g., use of tobacco, alcohol and other drugs; sexual behavior; accident prevention). Development and evaluation of programs that aim to influence adolescents' behaviors or attitudes in these areas. Offered in alternate years.

290. Seminar (3)
Seminar—3 hours. Discussion and evaluation of theories, research, and issues in human development. Different topics each quarter.—I, II, III. (I, II, III.)

290C. Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Supervising instructors lead research discussions with their graduate students. Research papers are reviewed and project proposals are presented and evaluated. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291. Research Issues in Human Development (3)
Lecture—3 hours. Prerequisite: graduate standing in the behavioral sciences. In-depth presentations of research issues in particular areas of behavioral development.—I, II. Kraft, R. Conger

292. Graduate Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor and satisfactory completion of placement relevant courses (for example, Education 213, 216, course 222, 241, 242, Law 272, 273). Individually designed supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor. (S/U grading only.)—I, II, III.

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Human Development (A Graduate Group)

Lawrence V. Harper, Ph.D., Group Chairperson

Group Office, 1303 Hart Hall (530-752-1926)

http://humandevelopment.ucdavis.edu

Faculty

Curtis R. Acredolo, Ph.D., Adjunct Associate Professor *(Human and Community Development)*
Linda P. Acredolo, Ph.D., Professor *(Psychology)*
Carolyn M. Aldwin, Ph.D., Professor *(Human and Community Development)*
Thomas F. Anders, M.D., Professor *(Psychiatry)*
Marylynn S. Barkley, Ph.D., M.D., Associate Professor *(Neurobiology, Physiology, and Behavior)*
Keith Barton, Ph.D., Professor *(Human and Community Development)*
Marc Braverman, Ph.D., 4-H Specialist in Cooperative Extension *(Human and Community Development)*
Carol S. Bruch, J.D., Professor Emeritus
Brenda K. Bryant, Ph.D., Professor *(Human and Community Development)*
Zhe Chen, Ph.D., Associate Professor *(Human and Community Development)*
Katherine J. Conger, Ph.D., Assistant Professor *(Human and Community Development)*
Rand Conger, Ph.D., Professor *(Human and Community Development)*
George DeVos, Ph.D., Professor Emeritus
Kathryn G. Dewey, Ph.D., Professor *(Nutrition)*
Anne Driscoll, Dr.PH., Assistant Child Development Researcher *(Human and Community Development)*
Dorothy Eichorn, Ph.D., Research Psychologist Emeritus
Robert A. Emmons, Ph.D., Professor *(Psychology)*
Frank Falkner, M.D., Professor Emeritus
Patricia Gandara, Ph.D., Associate Professor *(Education)*
Xiaojia Ge, Ph.D., Associate Professor *(Human and Community Development)*
Beth Goodlin-Jones, Ph.D., Assistant Adjunct Professor *(Psychiatry)*
Gail Goodman, Ph.D., Professor *(Psychology)*
Randi Hagerman, M.D., Director *(M.I.N.D. Institute)*
Robin L. Hansen, M.D., Associate Professor *(Pediatrics)*
Lawrence V. Harper, Ph.D., Professor *(Human and Community Development)*
Emily S. Harris, M.D., Assistant Professor *(Psychiatry)*
Glenn R. Hawkes, Ph.D., Professor Emeritus
Suad Joseph, Ph.D., Professor *(Anthropology, Women and Gender Studies)*
Penelope Knapp, M.D., Professor *(Psychiatry)*
Rosemarie H. Kraft, Ph.D., Lecturer *(Human and Community Development)*
Michael R. Levenson, Ph.D., Assistant Research Psychologist *(Human and Community Development)*
Seymour Levine, Ph.D., Adjunct Professor *(Psychiatry)*
Thomas L. Morrison, Ph.D., Professor *(Psychiatry)*
Beth A. Ober, Ph.D., Professor *(Human and Community Development)*
John Ogbu, Ph.D., Professor *(Anthropology, UC Berkeley)*
Ernesto Pollitt, Ph.D., Professor *(Pediatrics)*
Susan Rivera, Ph.D., Assistant Professor *(Psychology)*
Richard W. Robins, Ph.D., Assistant Professor *(Psychology)*
Carol J. Rodning, Ph.D., Associate Professor *(Human and Community Development)*
Michael Russell, Ph.D., Assistant Professor *(Anesthesiology)*
Stephen Russell, Ph.D., Associate Specialist in Cooperative Extension *(Human and Community Development)*
Jonathan H. Sandoval, Ph.D., Professor *(Education)*
Phillip Shaver, Ph.D., Professor *(Psychology)*
Karen Watson-Gegeo, Ph.D., Professor *(Education)*
Miriam J. Wells, Ph.D., Professor *(Human and Community Development)*
John Werner, Ph.D., Professor *(Opthalmology, Neurobiology, Physiology, and Behavior)*
Keith Widaman, Ph.D., Professor *(Psychology)*

Graduate Study. The interdisciplinary and interdepartmental Graduate Group in Human Development offers a program of study leading to the Ph.D. degree. The program provides lifespan study of human behavioral development, with a balance of emphasis on biological, cognitive, and socio-emotional development in context. Recipients of the degree will be prepared to teach, to conduct

research, and to be actively involved in public service in human behavioral development. Applicants seeking consideration for early admission and fellowships must be submitted by December 1. The final application deadline is April 1.

Graduate Adviser. Contact the Group Office.

Humanities

(College of Letters and Science)

Georges Van Den Abbeele, Ph.D., Program Director

Program Office, 176 Voorhies (530-752-2257)

http://humanities.ucdavis.edu

Committee in Charge

JoAnn Cannon, Ph.D. *(French and Italian)*
Karen Halttunen, Ph.D. *(History)*
Deborah Harkness, Ph.D. *(History)*
Inés Hernández-Ávila, Ph.D. *(Native American Studies)*
Jack Hicks, Ph.D. *(English)*
Kari Lokke, Ph.D. *(Comparative Literature)*
Dean MacCannell, Ph.D. *(Environmental Design)*
Jay Mechling, Ph.D. *(American Studies)*
Pablo Ortiz, D.M.A. *(Music)*
Leslie Rabine, Ph.D. *(Women and Gender Studies)*
Georges Van Den Abbeele, Ph.D. *(French)*
Clarence Walker, Ph.D. *(History)*
Gina Werfel, M.F.A. *(Art)*
George Wilson, Ph.D. *(Philosophy)*
Aram Yengoyan, Ph.D. *(Anthropology)*

The Program of Study

The Humanities program offers courses in the Humanities proper and also sponsors the minor in Global and International Studies. Courses in the Humanities proper are interdisciplinary in scope and aim to develop critical thinking and writing skills (most courses fulfill partial or complete GE requirements) in three areas: major authors and texts, major periods, major themes in world culture.

Courses in Humanities (HUM)

Lower Division Courses

1. Humanities Forum (2)
Lecture—2 hours. Reading and discussion of a single work representative of a particular culture, historical period, or genre and significant for its ongoing cultural impact in the humanities, sciences, social sciences, technology, and popular arenas. Attention to provocative implications for contemporary society. May be repeated once for credit if topic differs.—I, II, III. (I, II, III.)

1D. Issues and Concepts in the Humanities (2)
Discussion—2 hours. Prerequisite: course 1 concurrently. Small group discussions and preparation of short papers for course 1. May be repeated once for credit if topic differs. GE credit with concurrent enrollment in course 1: ArtHum, Wrt.

3. Medicine and Humanities (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: completion of Subject A requirement. Evolution of the "medical arts" into the "science of medicine." The culture of medicine in the context of society, medical ethics. GE credit: SocSci, Wrt.—III. Flores-Ortiz

4. Animals and Human Culture (2)
Lecture—2 hours. The meaning of human relations with animals studied across a variety of historical periods and culture and from a variety of humanistic perspectives. Offered in alternate years.—I. Schiesari

4D. Animals and Human Culture Discussion (2)
Discussion—2 hours. Prerequisite: concurrent enrollment in course 4. Small group discussions and preparation of short papers for course 4. Offered in alternate years. GE credit with concurrent enrollment in course 4: ArtHum, Wrt.—I. Schiesari

5. Representation of the Law in Literature and Film (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: completion of Subject A requirement. The relationships among literature, film, and the law, from Greek tragedy to popular American fiction and films. Common themes in law and literature portraying human experience. GE credit: ArtHum or SocSci, Wrt.

6. Wagner and Star Wars (4)
Lecture/discussion—3 hours; extensive writing. Wagner's Ring and Lucas' Star Wars, as examples of 19th and 20th centuries approaches to the arts and their relationship with the society. GE credit: ArtHum or SocSci, Wrt.—Ortiz

7. Travel and Travel Literature (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: Subject A requirement. History of travel from the age of exploration to the modern era. Contemporary trends in travel, including mass tourism, adventure travel, and ecotravel. Social, economic, and cultural issues related to modern trends in travel. Analysis of literary representations of travel. GE credit: ArtHum, Div, Wrt.—II. Van Den Abbeele

8. Introduction to Perspectives on Narrative (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: satisfaction of Subject A requirement. Interdisciplinary approach to the use of story across time, culture, and discipline. How the telling and retelling of particular stories reflect the values, concerns, and assumptions of their original audiences and genres. GE credit: ArtHum or SocSci, Div, Wrt.

9. Don Quixote and the Modern World (2)
Lecture—2 hours. Reading Don Quixote as emblem of modernity in the West. Issues of reality versus illusion, heroism, freedom and self-fulfillment, racial tolerance and love. Don Quixote in other cultural and popular media: film, dance, art, musical drama, and television. Offered in alternate years. GE credit with concurrent enrollment in course 9D: ArtHum, Wrt.—Martin

9D. Don Quixote and the Modern World Discussion (2)
Discussion—2 hours. Prerequisite: course 9 concurrently. Small group discussions and preparation of short papers for course 9. Offered in alternate years.—Martin

11. Shakespeare in Performance (4)
Lecture/discussion—4 hours. Reading, viewing, and discussion of one or two Shakespeare plays with focus on the relationship between text and performance (on stage and on film); analysis of the relationship between presentation of Shakespeare and cultural world view, meaning, and aesthetics. GE credit: ArtHum, Wrt.—Dolan

12. History of the Book (4)
Lecture/discussion—3 hours; extensive writing. The invention and impact of writing systems on cultures, including the invention of paper, the introduction of the codex, illustrations, the book-buying client, and the history of censorship and book burning and their connection to the technology of the word. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt.

15. Language and Identity (4)
Lecture/discussion—3 hours; extensive writing. Introduction to topics related to the construction of identity through language use, including geographical and social factors affecting language groups. Language ideology affecting linguistic groups, including bilinguals and non-native speakers of English. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. Arnett

40. Introduction to Computing in the Humanities (4)
Lecture—3 hours; laboratory—3 hours. Survey of current approaches to use of computers in such fields as language, literature, history, art, music, and drama. Laboratory in text creation and analysis.—Roddy

60. Narrative and Argumentative Approaches to Major Current Issues in the Media, Culture, and Society (4)
Lecture/discussion—3 hours; term paper. Prerequisite: English A or the equivalent. Interdisciplinary approach to contemporary issues (abortion, AIDS, civil rights, war and peace, welfare state) around which individuals, communities and institutions define themselves in American society, by applying principles of narrative theory to the narratives where those issues are embedded. GE credit: ArtHum or SocSci, Div, Wrt.

Upper Division Courses

140. Advanced Computing in the Humanities (4)
Lecture—3 hours; laboratory—3 hours; research project. Prerequisite: course 40 or consent of instructor. The computer as support for the humanities. Topics include advanced textual analysis, editing, vocabulary control, and data base management (design, application and evaluation, and search strategies).—Roddy

144. Marx, Nietzsche, Freud (4)
Lecture/discussion—3 hours; term paper. Study of major texts of these thinkers, selected with an eye to their impact on 20th-century economics, ethics, and attitudes toward eros. Particular focus on conceptions of the self and the individual's relation to society. Offered in alternate years. GE credit: ArtHum, Wrt.—Finney

180. Topics in the Humanities (4)
Lecture/discussion—4 hours; term paper. Analysis of interdisciplinary issues in the humanities. Topics will vary. May be repeated once for credit. GE credit: ArtHum, Wrt.—III.

198. Directed Group Study (1-4)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-4)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

250. Topics in the Humanities (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics in the humanities, selected by the instructor. May be repeated once for credit.—I, II, III. (I, II, III.)

299. Individual Research (1-4)
Individual research in the humanities resulting in a formal written research report. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. (S/U grading only.)

Hydrologic Sciences (A Graduate Group)

Randy A. Dahlgren, Ph.D., Chairperson of the Group

Group Office, 113 Veihmeyer Hall (530-752-0453)

http://lawr.ucdavis.edu/hyd

Faculty

Lewis Bledsoe, Ph.D., Associate Research Engineer *(Civil and Environmental Engineering)*
William Casey, Ph.D., Professor *(Land, Air and Water Resources)*
Randy Dahlgren, Ph.D., Professor *(Land, Air and Water Resources)*
Jeanie Darby, Ph.D., Professor *(Civil and Environmental Engineering)*
Harrison Dunning, LL.B., Professor *(School of Law)*
Graham Fogg, Ph.D., Professor *(Land, Air and Water Resources)*
Timothy Ginn, Ph.D., Associate Professor *(Civil and Environmental Engineering)*

Charles Goldman, Ph.D., Professor *(Environmental Science and Policy)*
Mark Grismer, Ph.D., Professor *(Land, Air and Water Resources)*
David Hinton, Professor *(Anatomy, Physiology, and Cell Biology)*
Britt Holmen, Assistant Researcher *(Crocker Nuclear Laboratory)*
Jan Hopmans, Ph.D., Professor *(Land, Air and Water Resources)*
William Horwath, Ph.D., Assistant Professor *(Land, Air and Water Resources)*
Theodore Hsiao, Ph.D., Professor *(Land, Air and Water Resources)*
Alan Jackman, Ph.D., Professor *(Chemical Engineering and Materials Science)*
Michael Johnson, Associate Research Engineering *(Civil and Environmental Engineering)*
M. Levent Kavvas, Ph.D., Professor *(Civil and Environmental Engineering)*
Bruce Kutter, Ph.D., Professor *(Civil and Environmental Engineering)*
Bruce Larock, Ph.D., Professor *(Civil and Environmental Engineering)*
Jay Lund, Ph.D., Professor *(Civil and Environmental Engineering)*
Miguel Marino, Ph.D., Professor *(Land, Air and Water Resources)*
Jeffrey Mount, Ph.D., Professor *(Geology)*
Alexandra Navrotsky, Ph.D., Professor *(Land, Air and Water Resources)*
Gregory Pasternack, Ph.D., Assistant Professor *(Land, Air and Water Resources)*
Kyaw Paw U, Ph.D., Professor *(Land, Air and Water Resources)*
Carlos Puente, Ph.D., Associate Professor *(Land, Air and Water Resources)*
Eliska Rejmankova, Ph.D., Associate Professor *(Environmental Science and Policy)*
Dennis Rolston, Ph.D., Professor *(Land, Air and Water Resources)*
Paul Sabatier, Ph.D., Professor *(Environmental Science and Policy)*
Geoffrey Schladow, Ph.D., Associate Professor *(Civil and Environmental Engineering)*
Kate Scow, Ph.D., Professor *(Land, Air and Water Resources)*
Roger Shaw, Ph.D., Professor *(Land, Air and Water Resources)*
Marlyn Shelton, Ph.D., Professor *(Land, Air and Water Resources)*
Susan Ustin, Ph.D., Associate Professor *(Land, Air and Water Resources)*
Wesley Wallender, Ph.D., Professor *(Land, Air and Water Resources)*
Bryan Weare, Ph.D., Professor *(Land, Air and Water Resources)*
Marca Weinberg, Ph.D., Assistant Professor *(Environmental Science and Policy)*
Stephen Whitaker, Ph.D., Professor *(Chemical Engineering and Materials Science)*
Tom Young, Assistant Professor *(Civil and Environmental Engineering)*
Minghua Zhang, Ph.D., Assistant Adjunct Professor *(Land, Air and Water Resources)*

Emeriti Faculty

Kenneth Tanji, Sc.D., Professor

Affiliated Faculty

Teresa Fan, Ph.D., Assistant Researcher *(Land, Air and Water Resources)*
Suduan Gao, Ph.D., Assistant Researcher *(Land, Air and Water Resources)*
David Goldhamer, Ph.D., Irrigation Specialist *(Land, Air and Water Resources)*
Stephen Grattan, Ph.D., Water Relations Specialist *(Land, Air and Water Resources)*
Blaine Hanson, Ph.D., Irrigation Specialist *(Land, Air and Water Resources)*
Thomas Harter, Ph.D., Assistant Cooperative Extension Specialist *(Land, Air and Water Resources)*
Terry Prichard, M.S., Water Management Specialist *(Land, Air and Water Resources)*
Lawrence Schwankl, Ph.D., Irrigation Specialist *(Land, Air and Water Resources)*
Richard Snyder, Ph.D., Biometeorologist Specialist *(Land, Air and Water Resources)*
Kenneth Tate, Extension Rangeland Specialist *(Agronomy and Range Science)*

Graduate Study. The Graduate Group in Hydrologic Sciences is an interdisciplinary program offering M.S. and Ph.D. degrees. Course work is available from many programs, including Hydrologic Sciences, Civil and Environmental Engineering, Geology, and Soil Science. Education in the group broadens the skills and knowledge of the physical science or engineering student interested in the occurrence, distribution, circulation and properties of water on earth. Because of water's ubiquity and importance to physical, chemical and biological processes, hydrologic sciences involve the geologic, atmospheric and oceanic sciences, as well as engineering and other applied physical sciences. Basic to the program are core courses in fluid dynamics, hydrologic phenomena, hydrobiology, hydrogeochemistry, hydrologic techniques, and hydrologic policy. Students can pursue specializations in hydrogeochemistry, surface hydrology, subsurface hydrology, irrigation and drainage, watershed hydrology and water resources management. The subsurface hydrology specialization includes hydrogeology and vadose-zone hydrology.

Preparation. Applicants to the program are expected to have completed or to be completing an undergraduate degree in environmental or physical sciences, mathematics, or engineering. Undergraduate study must include one year each of calculus, of physics with calculus, and of chemistry. Additional courses in applied statistics, computer programming, and geology are recommended.

Specialization. Each student will pursue an individual program of advanced study under the direction of a group of faculty members with similar interests but diverse backgrounds. Course work in addition to the above is typically taken in the most appropriate departments.

Graduate Adviser. M.E. Grismer, J.W. Hopmans *(Land, Air and Water Resources).*

Courses in Hydrologic Sciences (HYD)

Graduate Courses

200. Survey of Hydrologic Sciences (1)
Seminar—1 hour; paper. Prerequisite: open to students in the Hydrologic Sciences program. Seminar course exposes students to the diversity of sciences involved in the program. Students prepare a paper and presentation in their area of research interest. May be repeated twice for credit. (S/U grading only.)—I, II, III. (I, II, III.) Grismer

205. Continuum Mechanics of Natural Systems (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 21D and 22B, Physics 9B. Continuum mechanics of static and dynamic air, water, earth and biological systems using hydraulic, heat and electrical conductivity; diffusivity; dispersion; strain; stress; deformation gradient; velocity gradient; stretch and spin tensors. (Same course as Biological Systems Engineering 205.)—I. Wallender

210. Vadose Zone Transport Processes and Modeling (3)
Lecture/discussion—3 hours. Prerequisite: Soil Science 107, Mathematics 22B, programming language, or consent of instructor. Principles and modeling of water flow and chemical transport in the vadose zone, with specific applications to soils. Topics include hydraulic properties, finite difference application to unsaturated water flow, parameter optimization, diffusive and convective transport in gaseous and liquid phases. Offered in alternate years.—(III.) Hopmans, Rolston

212. Evapotranspiration (3)
Lecture—3 hours. Prerequisite: course 103. Review of lower atmosphere properties; introduction to similarity theory; surface roughness parameterization, calculation of energy fluxes, local advection and turbulence measurements will be studied in the field. Offered in alternate years.—III.

243. Water Resource Planning and Management (3)
Lecture—3 hours. Prerequisite: course 141 or Civil and Environmental Engineering 142. Applications of deterministic and stochastic mathematical programming techniques to water resource planning, analysis, design and management. Water allocation, capacity expansion, and reservoir operation. Conjunctive use of surface water and groundwater. Water quality management. Irrigation planning and operation models. (Same course as Biological Systems Engineering 243.)—I. (I.) Marino

252. Hillslope Geomorphology and Sediment Budgets (4)
Lecture—3 hours; fieldwork—3 hours. Prerequisite: course 141 or Geology 35 or Civil and Environmental Engineering 142 or consent of instructor. Exploration of theoretical and empirical foundations of sediment production on hillslopes using computer models and field experiments to promote an understanding of how watersheds evolve naturally and with human impacts. Offered in alternate years.—III. Pasternack

256. Geomorphology of Estuaries and Deltas (4)
Lecture—3 hours; fieldwork—3 hours. Prerequisite: course 141 or Geology 35 or Civil and Environmental Engineering 42 or consent of instructor. Survey of the processes and landforms associated with sediment deposition in the coastal zone. Application of geomorphic principles to coastal management issues. Offered in alternate years.—III. Pasternack

264. Modeling of Hydrologic Processes (3)
Lecture—3 hours. Prerequisite: course 141 or the equivalent and Statistics 102 or the equivalent. Techniques used to model the spatio-temporal structure of rainfall and runoff are introduced. Procedures studied include those based on stochastic point processes, chaos theory, fractal geometry, and fractional noises. Offered in alternate years.—(III.) Puente

269. Numerical Modeling of Groundwater Systems (3)
Lecture—3 hours. Prerequisite: course 145A or Civil Engineering 144 and course 145B, Mathematics 22B. Finite difference and finite element techniques in modeling groundwater flow and transport. Fundamentals of constructing and calibrating models with hands-on applications. Methods and limitations of numerical solution of transport equations. Model interpretation and ethics.—III. (III.) Fogg

273. Introduction to Geostatistics (3)
Lecture—3 hours. Prerequisite: Statistics 130A and 130B, or the equivalent. Statistical treatment of spatial data with emphasis on hydrologic problems. Topics include theory of random functions, variogram analysis, Kriging, co-Kriging, indicator geostatistics, and stochastic simulation of spatial variability. Demonstration and use of interactive geostatistical software included. Offered in alternate years.—I. Fogg

275. Analysis of Spatial Processes (3)
Lecture—3 hours. Prerequisite: Statistics 102 or the equivalent; course 273 or Statistics 273A recommended. Characterization of homogeneous random fields; extremes and spectral parameters; geometry of excursions, local averaging; scale of fluctuation; non-Gaussian and irregular random fields; geostatistical applications. Offered in alternate years.—(III.) Puente

286. Selected Topics in Environmental Remote Sensing (3)
Discussion—2 hours; lecture—1 hour; project. Prerequisite: Environmental and Resource Sciences 186 or the equivalent; Environmental and Resource Sciences 186L recommended. In depth investigation of advanced topics in remote sensing applications, measurements, and theory. Not offered every year.—Ustin

290. Seminar in Hydrologic Science (1)
Seminar—1 hour. Prerequisite: graduate standing and background in Hydrologic Science, consent of instructor. Seminars and critical review of problems, issues, and research in hydrologic sciences. Oral presentations of research. Topics will vary. May be repeated for credit. (S/U grading only.)—III. (III.)

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Professional Courses

410. OSHA HAZWOPER Refresher Course (1)
Lecture—1 hour. Updates hazardous materials handling information for purposes of keeping certification current. Certification lapses until the refresher course is complete. (P/NP grading only.)—II. (II.) Grismer

440. Hazardous Waste Operations Training (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: upper division standing in College of Agricultural and Environmental Sciences. Forty-hour course designed to meet the requirements of Federal OSHA regulation CFR 1910.120. Covers the health, regulatory, processing and safe handling issues/problems associated with working with hazardous materials. (P/NP grading only.)—III. (III.) Grismer

Hydrology

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Land, Air and Water Resources, Hydrology Section.

The Major Program

Hydrology is the study of the occurrence, distribution, circulation, and behavior of water in the environment of Earth. It includes measurement and analysis of water phenomena in the subsurface, on the Earth's surface, and in the atmosphere, for the purpose of understanding and addressing problems that affect sustainability of both water quantity and water quality.

The Program. Hydrologists generally need strong backgrounds in physics, mathematics, chemistry, biology, geology, field methods, and computer methods. Knowledge of biology and chemistry is important for understanding modulators of water quality. Geology is essential for those working in groundwater hydrology. Field methods are necessary for observing and measuring hydrologic phenomena, and computer methods and mathematics are routinely needed for collectively analyzing field data and forecasting future system behavior.

Contemporary hydrologic problems include more efficient use and development of groundwater and surface water resources; pollution of subsurface and surface waters from such sources as urban runoff, leaky underground storage tanks, and agricultural drainage; water quality criteria for drinking water and for fish and aquatic life; acidic precipitation and its impact on the environment; and the role of water in natural disasters such as flooding, landslides, and land subsidence. Other contemporary concerns include artificial recharge of groundwater, remote sensing for water resources, risk analysis in the operation of surface water reservoirs, and hydrologic prediction under uncertainty. The resolution of these problems demands hydrologic scientists with the comprehensive, mulitdisciplinary education embodied in this program.

Internships and Career Alternatives. Numerous opportunities for internships exist with state and federal agencies in the Greater Sacramento–Davis area. Career opportunities in hydrologic science are available in private consulting firms, environmental interest groups, and government agencies dealing with water resources, including the U.S. Geological Survey, U.S. Department of Agriculture (Fish and Wildlife, Agricltural Research, Forest Service, and Soil Conservation Service), Environmental Protection Agency, national research laboratories (Lawrence Livermore National Laboratory, Oak Ridge National Laboratory), and California Departments of Water Resources, Water Resources Control Board, Regional Water Quality Control Boards, Conservation, Fish and Game, and Toxic Substances. The major is excellent preparation for advanced degrees in hydrologic science and related fields.

B.S. Major Requirements:

	UNITS
Written/Oral Expression	**0-8**
See College requirement	
Preparatory Subject Matter	**67**
Biological Sciences 1A, 1C	10
Chemistry 2A, 2B, 2C	15
Physics 9A, 9B	8
Mathematics 21A, 21B, 21C, 21D, 22A, 22B	22
Geology 50, 50L	5
Hydrologic Science 10	3
Engineering 6 or the equivalent	4
Breadth/General Education	**18-24**
Depth Subject Matter	**46-53**
Engineering 103 or the equivalent	4
Civil and Environmental Engineering 114 or Statistics 130A and 130B	4-6
Hydrologic Science 134, 141, 142, 144, 151	21
Soil Science 107	5
Select one of Hydrologic Science 150, Agricultural and Resource Economics 147, Environmental Science and Policy 161, 166	3-4
Select three of Hydrologic Science 110, 115, 124, 143, 146; Civil and Environmental Engineering 141 and 141L	9-13
Restricted Electives	**16-26**
To supplement or expand areas of student interest selected with approval of adviser	
Unrestricted Electives	**6-20**
(including units earned from 192 and 199 courses)	
Total Units for the Degree	**180**

Major Adviser. C. E. Puente.

Minor Program Requirements:

The Hydrology Section of the Department of Land, Air and Water Resources offers the minor in Hydrology for environmental or natural science students who have an interest in water/environmental issues. The interested student should have completed preparatory course work in calculus (Mathematics 16B), chemistry (Chemistry 2A; Chemistry 2B recommended), physics (Physics 5A), and biology (Biological Sciences 1A). Course work in the minor provides fundamental skills and knowledge of the hydrologic sciences. The program is sufficiently flexible for students to pursue particular water issues or problems of interest to them.

	UNITS
Hydrology	**19-24**
Engineering 103 and Hydrologic Science 141; or Environmental and Resource Sciences 100 and 100L	8-10
Hydrologic Science 144 and Soil Science 107	8
Environmental and Resource Sciences 136 or Hydrologic Science 134	3-6

Graduate Study. See the Hydrologic Sciences Graduate Group.

Courses in Hydrologic Science (HYD)

Questions pertaining to the following courses should be directed to the instructor or to the Resource Sciences Teaching Center, 111A Veihmeyer Hall or 122 Hoagland Hall (530-752-1669).

Lower Division Courses

10. Water and Power (3)
Lecture—2 hours; discussion—1 hour. Introduction to water resources issues, including both scientific and socio-political aspects. History of water resources development in California as related to current and future sustainability of water quantity and quality. Roles of science and policy in solving water problems. GE credit: SciEng, Wrt.—III. (III.) Fogg

47. Watershed Processes and Water Quality in the Tahoe Basin (2)
Lecture/laboratory—21 hours; fieldwork—9 hours; discussion—3 hours; term paper. Prerequisite: basic knowledge of environmental, soil, or hydrologic sciences. Course involves 3 days of instruction in Tahoe City. Watershed processes, runoff water quality management, and restoration in the Lake Tahoe Basin. Soils, precipitation-runoff, revegetation and adaptive management related to erosion control, effective solutions, and development of restoration strategies. Students develop and initiate field restoration. (Same course as Environmental and Resource Sciences 47.)—Grismer

92. Hydrologic Science Internship (1-12)
Internship—3-36 hours. Prerequisite: lower division student, consent of instructor. Work experience off and on campus in Hydrologic Science. Internship supervised by a member of the faculty. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

110. Irrigation Principles and Practices (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Physics 5A; Soil Science 100 recommended. General course for agricultural and engineering students dealing with soil and plant aspects of irrigation and drainage. Soil-water movement and storage, plant responses to irrigation regimes, water use by crops; procedures for determining frequency and depth of irrigation, drainage. Not open for credit to students who have completed Water Science 110.—III. (III.) Schawankl

115. Irrigation and Drainage Systems (4)
Lecture—4 hours. Prerequisite: Engineering 103A or course 103. Engineering and scientific principles applied to the design of surface, sprinkle and micro irrigation systems and drainage systems within economic, biological, and environmental constraints. Interaction between irrigation and drainage will be emphasized. Not open for credit to students who have completed Water Science 145. (Same course as Biological Systems Engineering 145.)—II. (II.) Wallender, Grismer, Hills

117. Irrigation Water Management (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 110 or 124. Irrigation principles of soil-water and plant-water relations with irrigation system characteristics and other factors into an analytical framework for irrigation water management. Case studies discussed. Not open for credit to students who have completed Water Science 172.—III. (III.) Hopmans

122. Biology of Running Waters (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: introductory course in biology and junior standing. The study of lotic aquatic animals and plants in relation to their environment; various factors affecting the distribution of freshwater plants and animals is emphasized in a manner particularly suitable for students of freshwater ecology, soil and water science, and renewable natural resources. Not open for credit to students who have completed Water Science 122.—I. (I.)

122L. Biology of Running Waters Laboratory (2)
Laboratory—2 hours (including 2 or 3 weekend field trips). Prerequisite: introductory course in biology or consent of instructor and junior standing; course 122 (concurrently). Course allows interested students to obtain experience in sampling, processing, and synthesizing field data. Field trips will allow students to obtain an understanding of the structure and function of stream ecosystems. Not open for credit to students who have completed Water Science 122L.—I. (I.)

124. Plant-Water-Soil Relationships (4)
Lecture—3 hours; discussion—2 hours. Prerequisite: course 100; Soil Science 100 recommended, and one additional course in botany or plant physiology; or consent of instructor. Principles of plant interactions with soil and water environments and their applications in crop and environmental management. Includes nutrient and water uptake and transport; transpiration; soil processes affecting supplies; deficiencies and plant responses. Not open for credit to students who have completed Water Science 104.—III. (III.) Hsiao

134. Aqueous Geochemistry (6)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 2B. The chemistry of natural waters; dielectric properties of water; thermodynamic and mass-action relations; metal hydrolysis; acid-base equilibria; metal-coordination chemistry; solubility calculations; electron-exchange reactions; and rate laws.—III. (III.) Casey

141. Physical Hydrology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 9B, Mathematics 21B; course 100 recommended. Introduction to the processes that constitute the hydrologic cycle. Special emphasis on a quantitative description of the following processes: precipitation, infiltration, evaporation, transpiration, surface runoff, and groundwater runoff.—I. (I.) Puente

142. Systems Hydrology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 141 or Civil and Environmental Engineering 142. General course considering hydrologic processes from a systems or statistical model perspective. General probability concepts are applied to frequency, time series and spatial data analysis. Linear systems are also considered in conjunction with Kalman filter techniques.—II. (II.) Puente

143. Hydrological Processes in Ecosystems (3)
Lecture—3 hours. Prerequisite: course 141 or Environmental and Resource Science 100. Movement and storage of water are integral parts of landscape and ecosystem functioning. Hydrological processes in individual ecosystems and the role of water linking the myriad components of the landscape.—(I.) Pasternack

144. Groundwater Hydrology (3)
Lecture—3 hours. Prerequisite: Mathematics 16B or 21A; Hydrologic Science 103 or Engineering 103 recommended. Fundamentals of groundwater hydrology—occurrence, movement and distribution of groundwater, well-flow systems—well construction, operation and maintenance; groundwater contamination—exploration and quality assessment. (Same course as Biological Systems Engineering 144.) Not open for credit to students who have completed course 145A.—I. (I.) Marino

146. Hydrogeology and Contaminant Transport (5)
Lecture—3 hours; laboratory—2 hours; term paper. Prerequisite: course 144 or Civil and Environmental Engineering 144 or the equivalent. Physical and chemical processes affecting groundwater flow and contaminant transport, with emphasis on realistic hydrogeologic examples. Groundwater geology and chemistry. Fundamentals of groundwater flow and transport analysis. Laboratory includes field pumping test and work with physical and computer models. (Same course as Geology 156.)—II. Fogg

147. Runoff, Erosion and Water Quality Management in the Tahoe Basin (3)
Lecture/laboratory—30 hours; fieldwork—15 hours; discussion—10 hours; term paper. Prerequisite: Physics 7B or 9B, Mathematics 16C or 21C, Civil and Environmental Engineering 142 or course 141 or Environmental and Resource Sciences 100. 5 days of instruction in Tahoe City. Practical hydrology and runoff water quality management from Tahoe Basin slopes. Development of hillslope and riparian restoration concepts, modeling and applications from physical science perspectives including precipitation-runoff relationships, sediment transport, and detention ponds. (Same course as Biological Systems Engineering 147.)—Grismer

150. Water Law (3)
Lecture—3 hours. Prerequisite: Environmental and Resource Sciences 100 or 121 or consent of instructor. Principles and issues of California Water Law. Types of water rights, groundwater rights and management, and protection of instream uses. Water projects, role of federal government and federal/state relations. Basic water quality acts, endangered species act, water transfers and current water issues.—II.

151. Field Methods in Hydrology (4)
Lecture—2 hours; laboratory—3 hours; fieldwork—3 hours. Prerequisite: Environmental and Resource Sciences 100 or course 141. Measurement methods and data analysis for evaluation of water storage, movement and contamination in the field. Equipment such as data loggers, water and sediment samplers, pressure transducers, weather stations, surveying equipment, and flow meters will be used.—II. (II.) Pasternack

182. Environmental Analysis using GIS (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: Applied Biological Systems Technology 180 or the equivalent GIS experience and skills; general biology and/or ecology courses recommended. Ecosystem and landscape modeling with emphasis on hydrology and solute transport. Spatial analysis of environmental risk analysis including ecological risk assessment, natural resource management. Spatial database structures, scripting, data models, and error analysis in GIS. (Same course as Applied Biological Systems Technology 182.) Offered in alternate years.—III. Zhang

192. Hydrologic Science Internship (1-12)
Internship—3-40 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in water science. Internship supervised by a member of the faculty. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: senior standing. (P/NP grading only.)

Immunology (A Graduate Group)

M. Eric Gershwin, M.D., Chairperson of the Group
Group Office, 1202D Meyer Hall (530-754-7684)

Faculty

Hilary P. Benton, Ph.D., Associate Professor *(Anatomy, Physiology, and Cell Biology)*
Christopher L. Bowlus, M.D., Assistant Professor *(Internal Medicine)*
Anthony T. W. Cheung, Ph.D., Professor *(Pathology)*
Patricia A. Conrad, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Kent L. Erickson, Ph.D., Professor *(Cell Biology and Human Anatomy)*
Laurel J. Gershwin, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
M. Eric Gershwin, M.D., Professor *(Internal Medicine)*
Tzipora Goldkorn, Ph.D., Associate Professor *(Internal Medicine)*
Sergei A. Grando, M.D., Ph.D., D.Sc., Professor *(Dermatology)*
Kirk C. Klasing, Ph.D., Professor *(Animal Science)*
Kit S. Lam, M.D., Ph.D., Professor *(Internal Medicine)*
Rance B. LeFebvre, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Cheryl A. London, D.V.M., Ph.D., Assistant Professor *(Surgical and Radiological Sciences)*
Melinda H. MacDonald, D.V.M., Ph.D., Assistant Professor *(Surgical and Radiological Sciences)*
Christopher J. Miller, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
F. Charles Mohr, D.V.M., Ph.D., Associate Professor *(Pathology, Microbiology, and Immunology)*
Robert T. O'Donnell, M.D., Ph.D., Assistant Professor *(Internal Medicine)*
Kent E. Pinkerton, Ph.D., Professor-In-Residence *(Anatomy, Physiology, and Cell Biology)*
Dick L. Robbins, M.D., Professor *(Internal Medicine)*
Robert J. Scibienski, Ph.D., Senior Lecturer *(Medical Microbiology and Immunology)*
Jeffrey L. Stott, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Suzanne S. Teuber, M.D., Associate Professor *(Internal Medicine)*
Jose V. Torres, Ph.D., Associate Professor *(Medical Microbiology and Immunology)*
Joseph M. Tuscano, M.D., Assistant Professor *(Internal Medicine)*
Tilahun D. Yilma, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*

Affiliated Faculty

Mari S. Golub, Ph.D., Adjunct Professor *(Internal Medicine)*
Patrick S. C. Leung, Ph.D., Associate Adjunct Professor *(Internal Medicine)*
Maureen McKisic, Ph.D., Assistant Adjunct Professor *(Center for Comparative Medicine)*
Gary Rhodes, Ph.D., Associate Adjunct Professor *(Pathology)*
Grace L. Rosenquist, Ph.D., Assistant Adjunct Professor *(Neurobiology, Physiology, and Behavior)*
Ellen E. Sparger, D.V.M., Ph.D., Adjunct Professor *(Medicine and Epidemiology)*
Charles B. Stephensen, Ph.D., Adjunct Professor *(Nutrition)*
Judy Van de Water, Ph.D., Associate Adjunct Professor *(Internal Medicine)*

Graduate Study. The Graduate Group in Immunology is a multidisciplinary group offering programs of study leading to the M.S. and Ph.D. degrees in various aspects of immunology. Possible areas of specialization include molecular immunology, immunochemistry, immunogenetics, cellular immunology, clinical immunology, tumor and developmental immunology, arthritis and inflammation, auto-immunity and virology.

Preparation. Applicants for candidacy to these programs should have completed undergraduate preparation in mathematics, physics, chemistry, biochemistry, molecular and cellular biology or related biological and medical sciences.

For work leading to the Ph.D. degree, the requirements include cell biology, chemical immunology, cellular immunology, immunohematology, and advanced immunology. In addition to these general requirements, more specialized preparation in at least one of the following is required: (a) microbiological specialties (bacteriology, virology, parasitology, medical microbiology); (b) zoological specialties (cell biology, endocrinology, embryology, protozoology, histology, cytology, physiology); (c) medical specialties (pathology, anatomy, pharmacology, clinical pathology, reproduction, hematology, epidemiology); (d) biochemistry/biophysics specialties (biologically active molecules, control mechanisms); (e) genetic specialties (developmental genetics, population genetics, cytogenetics, molecular genetics).

Graduate Adviser. Contact the Group Office.

Courses in Immunology (IMM)

Additional courses are available and listed under the individual sponsoring departments. Contact the group office for information.

Graduate Courses

201. Introductory Immunology (3)
Lecture—3 hours. Prerequisite: graduate standing. Comprehensive introduction to the principles of immunology.—I. (I.) Miller, Rhodes

292. Immunotoxicology Seminar (2)
Seminar—2 hours. Prerequisite: graduate standing in Pharmacology/Toxicology, Immunology, Physiology, or Biochemistry. Seminar presentations dealing with principles of xenobiotic effects on immune system functions and specific examples of drugs and environmental chemicals exerting toxic effects on the immune system. Offered in alternate years. (S/U grading only.)—I. Golub

293. Current Concepts in Immunology (4)
Lecture/discussion—4 hours. Prerequisite: Pathology, Microbiology and Immunology 126 or consent of instructor. Innate and acquired immunity as defense mechanisms against disease. Mechanisms regulating the distinct cell types driving these responses and current concepts in the literature.—II. McKisic

294. Comparative Clinical Immunology (4)
Lecture/discussion—4 hours. Prerequisite: Pathology, Microbiology, and Immunology 126 or consent of instructor. Clinical immunology in animals and man. Pathogenesis of representative infectious diseases, hypersensitive reactions, and autoimmunity. Emphasis on specific and nonspecific immune effector mechanisms to combat infections or mediate pathology. Not open for credit to students who have completed course 294A. Offered in alternate years.—McKisic

295. Cytokines (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 293 or consent of instructor. Cytokines and their involvement in human and animal physiology/disease, molecular mechanisms and receptor signaling. Immune and non-immune actions. Overlapping/redundant functions (referred to as the "cytokine network"). Offered in alternate years.—III. Benton

296. Advanced Topics in Immunology (2)
Seminar—2 hours. Prerequisite: graduate standing or consent of instructor. Presentation, discussion, and analysis of faculty research topics in immunology. Required for Immunology Graduate Students every year until they have passed their qualifying exam. May be repeated for credit. (S/U grading only.)—I. (I.) Benton

Independent Study Program

Information:

Chairperson
Committee on Courses of Instruction
c/o Academic Senate Office (530-752-2220)

The Independent Study Program provides an opportunity for upper division students to design and pursue a full quarter (12-15 units) of individual study in an area of special interest.

A program qualifying as Independent Study will consist of one or more courses in the 190–199 series. While the theme of such a program may be reasonably broad, a recognizable common thread should unite all the academic work you undertake during an independent study quarter. Regularly offered formal courses will only be acceptable as a part of such a program if they clearly fit its theme and contribute something essential toward the realization of its objectives. The program is not to be considered a way to take more variable-unit courses than normally permitted.

The procedure for enrolling in an Independent Study Program is as follows:

1. develop, in general terms, a plan of study;
2. locate a faculty sponsor or panel of sponsors, and with their help and approval develop a detailed plan;
3. complete a project proposal form (obtained from the Academic Senate Office) and submit it to the Academic Senate Committee on Courses of Instruction.

The deadline for applications is the tenth day of instruction of the term before the term in which the project is to be undertaken. (See the Academic Calendar at the front of the catalog for specific dates.)

You must report the completion or termination of the project to the Committee on Courses of Instruction.

Individual Major

(College of Agricultural and Environmental Sciences and College of Letters and Science)

The Major Program

The Individual Major, an integrated program composed of courses from two or more disciplines, is designed by the student and is subject to approval by faculty advisers and appropriate college committees. This major enables a student to pursue a specific interest that cannot be accommodated within the framework of an existing major. It must clearly and specifically meet the student's educational goals as well as meet university and college academic standards.

College of Agricultural and Environmental Sciences

Program Office, 150 Mrak Hall
(530-752- 4491)

Student Proposal. An Individual Major may be organized by a student having a specific academic interest not represented by an established major. Each student wishing an Individual Major should submit a proposal to the Dean *at least four quarters before graduation,* for review by the Individual Major Subcommittee. This proposal must include (1) a description of the special educational aims of the student, including a statement indicating why the educational objectives cannot be met by existing majors; (2) a list of planned courses; and (3) faculty adviser recommendations. It is critical that students contact a college counselor for consultation and development of the proposal.

UNITS

English Composition requirement 4-8
See College requirement

Preparatory Subject Matter ..... (variable)
Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements.

Breadth/General Education 18-24
Satisfaction of General Education requirement

Depth Subject Matter 45-54
Upper division course work must include (a) interrelated courses of 45 upper division units from two or more areas of study; (b) at least one of the two or more areas of study must be within the College of Agricultural and Environmental Sciences; (c) at least 30 of the 45 upper division units that are required in the program must be taken from courses provided by the College of Agricultural and Environmental Sciences.

Unrestricted Electives ..... (variable)

Total Units for the Degree 180

Master Adviser. E. Caswell-Chen *(Environmental and Resource Sciences).*

College of Letters and Science

Program Office, 200 Social Sciences and Humanities Building (Dean's Office)
530-752-0392; http://www.ls.ucdavis.edu/Students

Committee in Charge

JoAnn Cannon, Ph.D., Chairperson *(French and Italian)*
Dennis Dingemans, Ph.D. *(Social Sciences)*
Jeanette Natzle, Ph.D. *(Molecular and Cellular Biology)*
G. Thomas Sallee, Ph.D. *(Mathematics)*
Raymond Waddington, Ph.D. *(English)*

Student Proposal. A student who wishes to propose an individual major must submit the proposal to the Faculty Committee on Individual Majors in the College of Letters and Science prior to reaching 120 units. The proposal must be submitted *by the end of the fourth week* of the quarter. This proposal will consist of (1) an essay, identifying the specific educational and professional objectives, including an indication of why the objectives cannot be met within existing majors, (2) a list of courses planned to complete the major, and (3) faculty adviser recommendations. The proposal will be reviewed and a decision provided the quarter of submittal. It is important for you to make arrangements to speak with a counselor in the college early in the development of your major.

A.B. and B.S. Major Requirements:

UNITS

Preparatory Subject Matter ..... (variable)
Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements.

Depth Subject Matter 45-54
Upper division units must include: *(a)* interrelated and complementary courses from two or more departments which provide a unified pattern and focus; *(b)* at least 30 units from Letters and Science teaching departments or programs; *(c)* no more than 10 units in courses numbered 194H, 198 and 199; *(d)* for the A.B. degree, a maximum of 80 units toward the major; for the B.S. degree, a maximum of 110 units toward the major.

Total Units for Degree 180

Major Advisers (selected by student). Principal Adviser: a faculty member in a teaching department or program in the College of Letters and Science in major field of emphasis. Secondary Adviser: a faculty member from secondary area of interest.

Honors Program. By the fourth week of the last quarter of the junior year, students potentially eligible for high or highest honors at graduation (see College section), may petition the Individual Majors Committee for tentative acceptance into an honors program.

Final admission will depend upon the Committee's approval of a senior thesis prospectus that has been agreed upon by the student and faculty adviser. The prospectus must be presented to the Committee by the end of the fourth full week of instruction of the first quarter of the senior year. Graduation with high or highest honors will be conditional upon both the maintenance of the required grade point average and the completion of the senior thesis project. Students who anticipate doing a senior honors thesis should allow up to 3 units of independent study in the program during each of two quarters in the senior year as course options.

Integrated Pest Management (A Graduate Group)

B.C. Kirkpatrick, Ph.D., Chairperson of the Group

Group Office, 367 Briggs Hall (530-752-0475)

Faculty. Includes faculty members from the Colleges of Agricultural and Environmental Sciences and Letters and Science.

Graduate Study. The Graduate Group in Integrated Pest Management offers programs of study and research leading to the M.S. degree. Students may conduct independent research or participate in on-going projects on integrated crop management and sustainable agriculture. Weeds, insects, plant pathogens, nematodes, rodents, and other pests are treated as parts of complex ecosystems and not as isolated problems. Courses include concepts and systems of plant protection and pest management, diagnosis and control of plant pest problems, toxicology and legal ramifications, and equipment for pest control operations. Detailed information can be obtained from the Group Chairperson and the application for Graduate Admission and Fellowship.

Graduate Adviser. B.C. Kirkpatrick *(Plant Pathology)*.

Courses in Integrated Pest Management (IPM)

Graduate Courses

201. Concepts and Systems of Plant Protection and Pest Management (4)
Lecture—2 hours; discussion—1 hour; laboratory—2 hours. Prerequisite: Agricultural Systems and Environment 120, Entomology 110, Plant Pathology 120, Plant Biology 120 (may be taken concurrently), Nematology 100; Plant Biology 117 or Evolution and Ecology 101 recommended. Ecological perspectives of agricultural systems, the role of pests and pest management in these systems, and the monitoring and modeling of the systems. Offered in alternate years.—(II.) Webster

202A-202B. Diagnosis of Plant Pest Problems and the Control of Causal Agents (4-4)
Discussion—1 hour; fieldwork—9 hours. Prerequisite: Entomology 110, Plant Pathology 120, Plant Biology 120, Nematology 100 (may be taken concurrently). Problems and assessment of losses caused by insects, pathogens, weeds, nematodes, and other pests. Methods of determining infestation levels and establishing economic thresholds, and control of these pests with emphasis on integration of available management practices into programs.—I-III. (I-III.) Rosenheim

290. Seminar (1-2)
(S/U grading only.)

298. Group Study (1-5)

299. Research (1-12)
(S/U grading only.)

Integrated Studies Honors Program

James F. Shackelford, Ph.D., Program Director

Program Office, 2292 Social Sciences and Humanities Building (530-752-9760)

http://integratedstudies.ucdavis.edu

Committee in Charge

Jay E. Mechling, Ph.D. Chairperson *(American Studies)*
Terence M. Murphy, Ph.D. *(Biological Sciences)*
James F. Shackelford, Ph.D. *(Chemical Engineering and Materials Science)*
Miriam J. Wells, Ph.D. *(Human and Community Development)*

Faculty

David Biale, Ph.D., Professor *(History)*
John Boe, Ph.D., Lecturer *(English)*
Hannah Collins, Acting Professor *(Art and Art History)*
Ed Costantini, Ph.D., Professor Emeritus *(Political Science)*
Evan Fletcher, Ph.D., Lecturer *(Center for Neuroscience)*
Sandra Graham, Ph.D., Assistant Professor *(Music)*
Jared Haynes, M.A., Lecturer *(English)*
Robin Hill, B.F.A., *(Art and Art History)*
Naomi Janowitz, Ph.D., Professor *(Religious Studies)*
Peter Lindert, Ph.D., Professor *(Economics)*
Winder McConnell, Ph.D., Professor *(German and Russian)*
Jay Mechling, Ph.D., Professor *(American Studies)*
Terence Murphy, Ph.D., Professor *(Plant Biology)*
Laurie San Martin, Ph.D., Assistant Professor *(Music)*
Eric Schroeder, Ph.D., Lecturer *(English)*
Kenneth A. Shackel, Ph.D., Professor *(Pomology)*
Jessica Utts, Ph.D., Professor *(Statistics)*

The Program of Study

The Integrated Studies Honors Program is an invitational, first-year, residential honors program. Established in 1969, the program aims to help high-achieving students integrate knowledge gained from their study of the humanities, natural sciences, and social sciences and expand their learning experiences through interdisciplinary or multidisciplinary courses. Enrollment is limited to 25 students per class, and program membership is limited to the top 3% of the entering class.

Students enroll in three Integrated Studies Honors Program courses and two seminars during the year. **Students not admitted to the Program may not register for Integrated Studies Honors Program courses or seminars.**

Courses in Integrated Studies (IST)

Lower Division Courses

8. Colloquium (1)
Discussion—1 hour. Lectures, films, and readings on the interrelation between the arts and sciences. May be repeated for credit. (P/NP grading only.)—I, II. (I, II.)

8A. Special Topics in Natural Science and Mathematics (4)
Lecture—3 hours; discussion—1 hour. Group study of a special topic in natural sciences and mathematics. Course varies with topic offered. Limited enrollment. May be repeated for credit. GE credit: SciEng, Wrt.—I, II, III. (I, II, III.)

8B. Special Topics in Humanities (4)
Lecture—3 hours; discussion—1 hour. Group study of a special topic in humanities. Course varies with topic offered. Limited enrollment. May be repeated for credit. GE credit: ArtHum, Wrt.—I, II, III. (I, II, III.)

8C. Special Topics in the Social Sciences (4)
Lecture—3 hours; discussion—1 hour. Group study of a special topic in social sciences. Course varies with topic offered. Limited enrollment. May be repeated for credit. GE credit: SocSci, Wrt.—I, II, III. (I, II, III.)

9. Seminar (1)
Lecture—1 hour. Preparation of a research report. Normally taken with course 8. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

Upper Division Course

190. Topics in Integrated Studies (1)
Seminar—1 hour. Prerequisite: course 9. Discussion of the integration of the arts and sciences, focusing on a special topic. May be repeated three times for credit when topic differs. (P/NP grading only.) Not offered every year.—Shackelford

197T. Tutoring in Integrated Studies (1-4)
Tutorial—1 hour. Prerequisite: consent of Director of Integrated Studies. Tutoring in Integrated Studies courses, usually in small discussion groups. Weekly discussions with the instructor on the subject matter of the course being tutored and on the art and craft of teaching. May be repeated eight times for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

Interior Design

See Design

Internal Medicine

See Medicine, School of

International Agricultural Development

(College of Agricultural and Environmental Sciences)

International Agricultural Development is an interdisciplinary major in the Human and Community Development department.

Faculty. Includes members from various departments across colleges.

The Major Program

The goal of international agricultural development is to improve food production, nutrition, marketing, and health in less technically advanced countries. Students in this major are trained in technical areas of agriculture that can be applied to the problems of world hunger and health.

The Program. Principle subjects of study within the major are Agricultural Production, Economic Development, Environmental Issues, Nutrition, Rural Communities, and Trade and Commodity Development. Courses are in social sciences, humanities, and economic environments in which agriculture operates in countries outside the United States.

Career Alternatives. The study of international agricultural development prepares a student for a variety of careers. Some students choose service through the Peace Corps. Others seek employment in international trade, while others choose to work for a governmental or private agency in a foreign nation. Religious groups and organizations also employ university-trained individuals for agricultural work in conjunction with missions and other types of human service work overseas. The major is also preparation for further graduate work in agricultural development.

B.S. Major Requirements:

UNITS

English Composition Requirement..... 0-8
See College requirement

International Agricultural Development Abroad 0-20
A maximum of five courses abroad, selected with approval of an adviser, may be applied toward the 12 upper division courses in the major.

Preparatory Subject Matter 47
Choose 47 units from either the Social Science or Natural Science core in consultation with adviser.
Social Sciences core:
Agricultural and Resource Economics 15; Agricultural Management and

Rangeland Resources 1; Animal Science 41 and 41L or Agricultural Management and Rangeland Resources 2; Chemistry 10; Community and Regional Development 1 or 17; Economics 1A and 1B; International Agricultural Development 10; Mathematics 16A and 16B; Nutrition 10 or 20; Sociology 1 or Anthropology 2; Soil Science 10; Statistics 13 or Sociology 46B

Natural Science core:
Animal Science 41 and 41L or Agricultural Management and Rangeland Resources 2; Biological Sciences 1A and 1B or 1A and 1C; Chemisty 2A and 2B; Chemistry 8A and 8B or Physics 1A and 1B; Economics 1A or Agricultural and Resource Economics 15; International Agricultural Development 10; Mathematics 16A and 16B; Nutrition 10 or 20; Soil Science 10 or 100; Statistics 13

Breadth/General Education 6-24
Satisfaction of General Education requirement

Depth Subject Matter..... 36-37
Agricultural and Resource Economics 147 or Agricultural Management and Rangeland Resources 101 or Geography 161..... 4
Economics 115A 4
International Agricultural Development 142 or 160 2
International Agricultural Development 103 and 104 8
International Agricultural Development 110 or 111 4
Sociology 170..... 4
Agricultural Management and Rangeland Resources 110A or 110B or 135 or Plant Biology 142 3-4
Political Science 123 or 124 or Sociology 145A..... 4
Textiles and Clothing 174 3

Foreign Language Requirement 0-15
Students must complete 15-unit level in one language or pass the foreign language proficiency examination. A score of 5, 4, or 3 on a foreign language College Board Advanced Placement Examination (except Latin) or a score of 550 on the College Board SAT II: Subject Test will also satisfy this requirement.

Internship Requirement 4-8
Students must complete at least 4 units of internship and may use up to 8 units toward major requirements. Internships can be chosen in consultation with an adviser. Internship requirement waived for students enrolled in the UC Education Abroad Program.

Areas of Specialization 30-35

Agricultural Production Option:
Agricultural and Resource Economics 140, Agricultural Management and Rangeland Resources 101 and 105, Plant Biology 152 or Animal Genetics 107

Additional 14-15 units of restricted electives in consultation with an adviser.

Economic Development Option:
Agricultural and Resource Economics 100A and 100B, Economics 115B

Agricultural and Resource Economics 120, 130, 140, 175 and International Agricultural Development 195A or 195B

Environmental Issues Option:
Environmental Science and Policy 100 or 110, 160, 171 and Plant Biology 151

Agricultural and Resource Economics 147, Agricultural Management and Rangeland Resources 101, Environmental Horticulture 150, Environmental Science and Policy 126, 161, 175 and International Agricultural Development 195A or 195B

Rural Communities Option:
Community and Regional Development 140, 151, 151L, 152, 154

Community and Regional Development 164 or 172 or 173 or 174, International Agricultural Development 195A or 195B, additional restricted electives chosen in consultation with an adviser

Trade and Development in Agricultural Commodities Option:
Agricultural and Resource Economics 100A, 113, 130, Plant Biology 172

Agricultural and Resource Economics 138, Economics 160A, 160B, Food Science and Technology 100A, 109, 160, International Agricultural Development 195A or 195B, Textiles and Clothing 162, 163

Total Units for the Degree 180

Specialization Advisers
A listing of faculty in the various areas of specialization and with interests in International Agricultural Development is available from the Major Adviser.

Major Adviser. S.B. Brush *(Human and Community Development).*

Minor Program Requirements:

UNITS

International Agricultural Development 22
International Agricultural Development 10 and 110 or 111 8
Agricultural Management and Rangeland Resources 101 and 110A or 110B..... 6
International Agricultural Development 103, 104, 195A or 195B, Agricultural and Resource Economics 115A..... 8

Minor Adviser. S.B. Brush (1331 Hart Hall).

Graduate Study. A program of study and research leading to the M.S. degree is available in International Agricultural Development. Detailed information regarding graduate study may be obtained by writing to the Coordinator of Graduate Recruitment (I.A.D.), Graduate Studies, UC Davis.

Graduate Advisers. J. Hill *(Agronomy and Range Science),* F.W. Hirtz *(Human and Community Develoment),* L.S. Jarvis *(Agricultural and Resource Economics),* J.D. Momsen *(Human and Community Develoment),* D.E. Rains *(Agronomy and Range Science).*

Related Courses. See Agricultural and Resource Economics 148, 215C, Agricultural Management and Rangeland Resources 111, Anthropology 221, Economics 115A-115B, 215A-215B-215C, Geography 142, Nutrition 20, Sociology 144.

Courses in International Agricultural Development (IAD)

Questions pertaining to the following courses should be directed to the instructor or to the Department of Human and Community Development Advising Center in 1303 Hart Hall (530-752-2244).

Lower Division Courses

10. Introduction to International Agricultural Development (4)
Lecture—3 hours; discussion—1 hour. Theories, practices and institutions relating to agricultural development; the interaction of changing social, cultural and economic organization through successive stages of economic development; impact of new agricultural technology on underdeveloped regions. GE credit: SocSci, Div, Wrt.—II. Brush

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Supervised internship, off and on campus, in community and institutional settings. (P/NP grading only.)

Upper Division Courses

103. Social Change and Agricultural Development (4)
Lecture/discussion—4 hours. Prerequisite: introductory social science course (Anthropology, Sociology, Economics, International Agricultural Development). How social and cultural factors influence technological change in agriculture; theories of diffusion of innovations; social impact analysis and technology assessment. GE credit: SocSci, Div.—I. Brush

104. Gender and Environment in the Developing World (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 recommended. Examines how environmental problems in the countries of Africa, Asia and Latin America affect men and women differently and the impact of structural adjustment on the environment in rural and urban areas.—III. (III.) Momsen

110. Agricultural Production Economics (4)
Lecture—4 hours. Prerequisite: upper division status and an introductory course in microeconomics (Economics 1A). Economic analysis of agricultural production in low income countries, from field-level data collection to national food policy. Emphasis on construction and use of farm models in project evaluation. Offered in alternate years.

111. Agricultural Marketing Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division status and an introductory course in microeconomics recommended (Economics 1A). Economic analysis of agricultural marketing systems in low income countries, including the functions of transportation, storage, packaging, handling, grading and standardization, processing, and market news. Emphasis is given to evaluation of interventions in marketing systems to speed economic development.—II. (II.) Moore

142. Equipment and Technology for Small Farms (2)
Lecture—1 hour; laboratory—3 hours. Types and characteristics of agricultural equipment and technologies appropriate for small commercial farming. Adjustment and calibration of equipment. Selection of and budgeting for equipment. (Same course as Applied Biological Systems Technology 142.)

160. Agroforestry: Global and Local Perspectives (3)
Lecture/discussion—3 hours. Prerequisite: Agricultural Management and Rangeland Resources 2 or Biological Sciences 1C, Plant Biology 142 or a general ecology course (Environmental Science and Policy 100). Traditional and evolving use of trees in agricultural ecosystems; their multiple roles in environmental stabilization and production of food, fuel, and fiber; and socioeconomic barriers to the adoption and implementation of agroforestry practices. (Same course as Agricultural Management and Rangeland Resources 160.) Offered in alternate years.—I. Weinbaum

162. Field Course in Tropical Ecology and Sustainable Agricultural Development (13)
Lecture—15 hours; discussion—7.5 hours; fieldwork—30 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Students accepted based on academic merit, personal experience, and academic discipline to provide a multidisciplinary atmosphere. Course in Panama. Sustainable agricultural systems to protect tropical rainforest ecosystems, sustainable agriculture in the Panama Canal watershed, language and culture of Panama and the U.S.A. (Same course as Pomology 162.) GE credit: SciEng, Div, Wrt.—Potter, Brown

170. Program Development for International Agriculture (4)
Lecture/discussion—4 hours. Prerequisite: course 10. Principles of leadership and management for international agricultural development. Organizations and organizational behavior, and the implications for planning and administering organizations involved in the global development effort.—II. Marcotte

190. Proseminar in International Agricultural Development (1)
Seminar—1 hour. Presentation and discussion of current topics in international agricultural development by visiting lecturers, staff and students. May be repeated for credit. (P/NP grading only.)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Supervised internship, off and on campus, in community and institutional settings. (P/NP grading only.)

195A. Field Study in Agricultural Development—California (3)
Lecture—2 hours total; seminar—8 hours total; fieldwork—four 2-day visits. Prerequisite: consent of instructor. Students will incur travel expenses. Observation of agricultural development strategies and effects on rural communities. Discussion with farmers, workers and organizational staff members. Study of farm commodities, institutions and experiences in dealing with agricultural development problems. International influence on U.S. agriculture. (P/NP grading only.)—III. (III.) Marcotte

195B. Field Study in Agricultural Development—Mexico (3)
Lecture—2 hours total; seminar—8 hours total; fieldwork—8-day trip to Mexico. Prerequisite: consent of instructor. Students will incur travel expenses. Observation of agricultural development strategies and effects on rural communities. Discussion with farmers, workers and organizational staff members. Study of farm commodities, institutions and experiences in dealing with agricultural development problems. International influence on U.S. agriculture. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

200N. Philosophy and Practice of Agricultural Development (5)
Lecture/discussion—5 hours; term paper. Introduction to key elements of the philosophy and practice of agricultural development in less developed countries. Introduction to the major paradigms of development, the historical context within which these paradigms have operated, and the various development techniques and initiatives that have emerged from agricultural production to institutional capacity building and management. Not open for credit to students who have completed former course 202.—I. (I.) Marcotte

201. The Economics of Small Farms and Farming Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 100A. Economic perspective on small farm development. Establishes a basis for predicting farmers' responses to changes in the economic environment, and for proposing government policies to increase small farm production and improve farmer and national welfare.—II. (II.) Vosti

202N. Analysis and Determinants of Farming Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural Management and Rangeland Resources 150 or the equivalent. The unifying concepts of cropping systems in temperate and tropical climatic zones; agroecosystems stability, diversity and sustainability; management strategies, resource use efficiency and their interactions; the role of animals, their impact on energy use efficiency, nutrient cycling, and providing food and power. Not open for credit to students who have completed former course 200.—III. (III.) Van Kessel, Pittroff

203N. Project Planning and Evaluation (4)
Discussion—1 hour; workshop—3 hours. Prerequisite: courses 200N (or former course 202), 201, 202N (or former course 200). Interdisciplinary setting for application of student skills and specialization to a "real world" development project. Focus on team-building and effective interdisciplinary problem-solving methods, with the objective of producing a project document and presentation within a specified deadline. Not open for credit to students who have completed former course 203.—III. Sainz, Rains

217. Conservation and Sustainable Development in Third World Nations (4)
Lecture/discussion—3 hours; fieldwork—2 hours. Prerequisite: at least one course from two of these three groups: a) Environmental Science and Policy 160, 161, 168A, 168B; b) Environmental Science and Policy 101, 133, International Agricultural Development 103, Geography 142; c) Anthropology 126, 131, Geography 141, Sociololgy 144, 145A, 145B. Examination of the patterns of resource ownership, control and management in agricultural lands, extractive zones (fisheries, forests) and wildlands, with emphases on conservation and sustainability. Comparison of industrial democracies and poorer nations. (Same course as Ecology 217.)

220. Food and Nutrition Strategies in Developing Countries (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 100A. Identifies important topical problems in food and nutrition policy, develops theoretical frameworks suitable for their analysis, examines the empirical information relevant to the problems and, using theory data, draws appropriate policy implications. Offered in alternate years.—III. Jarvis

290. Seminar in International Agricultural Development (1-2)
Seminar—1-2 hours. Prerequisite: consent of instructor. Discussion and critical evaluation of advanced topics and issues in international agricultural development. May be repeated for credit. (S/U grading only.)—I, II. Rains, Van Horn

291. Topics in International Agricultural Development (1-3)
Lecture/discussion—1-3 hours. Prerequisite: consent of instructor. Selected topics dealing with current issues in agricultural development in lesser developed nations. Variable content. May be repeated once for credit.

292. Graduate Internship (1-12)
Internship—3-36 hours. Prerequisite: participation in H. Humphrey Fellow Program or consent of instructor. Individually designed supervised internship, off or on campus, in community, business or institutional setting. Developed with advice of faculty mentor and Humphrey Coordinator. (S/U grading only.)

298. Directed Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

International Agricultural Development (A Graduate Group)

Roberto D. Sainz, Chairperson of the Group
Group Office, 1303 Hart Hall (530-752-1926)
http://iad.ucdavis.edu

Faculty

Lindsay Allen, Ph.D., Professor *(Nutrition)*
Diane M. Barrett, Ph.D., Specialist in Cooperative Extension *(Food Science and Technology)*
David Boyd, Ph.D., Associate Professor *(Anthropology)*
Ted Bradshaw, Ph.D., Associate Professor *(Human and Community Development)*
Kenneth H. Brown, Ph.D., Professor *(Nutrition)*
Patrick H. Brown, Ph.D., Professor *(Pomology)*
Stephen B. Brush, Ph.D., Professor *(Human and Community Development)*
Marita Cantwell, Ph.D., Lecturer *(Vegetable Crops Extension)*
Tim E. Carpenter, Ph.D., Professor *(Medicine and Epidemiology)*
Colin A. Carter, Ph.D., Professor *(Agricultural Resource and Economics)*
Patricia A. Conrad, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Montague W. Demment, Ph.D., Professor *(Agronomy and Range Science)*
Johannes J. DeVries, Ph.D., Lecturer *(Civil and Environmental Engineering)*
Kathryn G. Dewey, Ph.D., Professor *(Nutrition)*
Dennis Dingemans, Ph.D., Professor *(Geography)*
Serge I. Doroshov, Ph.D., Professor *(Animal Science)*
Karen Paige Ericksen, Ph.D., Professor *(Psychology)*
James Fadel, Ph.D., Professor *(Animal Science)*
Theodore C. Foin, Ph.D., Professor *(Agronomy and Range Science)*
Isao Fujimoto, M.A., Lecturer Emeritus
Shu Geng, Ph.D., Professor *(Agronomy and Range Science)*
Paul L. Gepts, Ph.D., Professor *(Agronomy and Range Science)*
Barbara G. Goldman, Ph.D., Lecturer *(Education, Human and Community Development)*
Thomas Gradziel, Ph.D., Associate Professor *(Pomology)*
Richard D. Green, Ph.D., Professor *(Agricultural and Resource Economics)*
James I. Grieshop, Ph.D., Specialist in Cooperative Extension *(Human and Community Development)*
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Luis Guarnizo, Ph.D., Associate Professor *(Human and Community Development)*
Bruce R. Hartsough, Ph.D., Professor *(Biological and Agricultural Engineering)*
Timothy K. Hartz, Ph.D., Lecturer *(Vegetable Crops Extension)*
Glenn Hawkes, Ph.D., Professor Emeritus
David W. Hird, D.V.M., Ph.D., Professor *(Medicine and Epidemiology)*
Frank W. Hirtz, Ph.D., Associate Professor *(Human and Community Development)*
Theodore C. Hsiao, Ph.D., Professor *(Land, Air, and Water Resources)*
Silas S. O. Hung, Ph.D., Professor *(Animal Science)*
Lovell S. Jarvis, Ph.D., Professor *(Agricultural and Resource Economics)*
Bryan M. Jenkins, Ph.D., Professor *(Biological and Agricultural Engineering)*
Desmond A. Jolly, Ph.D., Lecturer *(Agricultural and Resource Economics)*
Suad Joseph, Ph.D., Professor *(Anthropology, Women and Gender Studies)*
Martin Kenney, Ph.D., Professor *(Human and Community Development)*
Emilio A. Laca, Ph.D., Assistant Professor *(Agronomy and Range Science)*
W. Thomas Lanini, Ph.D., Lecturer *(Vegetable Crops)*
Jay Lund, Ph.D., Professor *(Civil and Environmental Engineering)*
E. Dean MacCannell, Ph.D., Professor *(Environmental Design)*
David J. Mackill, Ph.D., Lecturer *(USDA Rice Research)*
Miguel A. Marino, Ph.D., Professor *(Land, Air, and Water Resources, Civil and Environmental Engineering)*
Philip E. Martin, Ph.D., Professor *(Agricultural and Resource Economics)*
Mark A. Matthews, Ph.D., Professor *(Viticulture and Enology)*
Gale McGranahan, Ph.D., Lecturer *(Pomology)*
Jeffrey P. Mitchell, Ph.D., Lecturer *(Vegetable Crops)*
Janet D. Momsen, Ph.D., Professor *(Human and Community Development)*
Donald Nevins, Ph.D., Professor *(Vegetable Crops)*
Benjamin Orlove, Ph.D., Professor *(Environmental Science and Policy)*
Raul H. Piedrahita, Ph.D., Professor *(Biological and Agricultural Engineering)*

Ernesto Pollitt, Ph.D., Professor *(Pediatrics)*
Dan Potter, Ph.D., Assistant Professor *(Pomology)*
D. William Rains, Ph.D., Professor *(Agronomy and Range Science)*
Michael S. Reid, Ph.D., Professor *(Environmental Horticulture)*
Pamela C. Ronald, Ph.D., Associate Professor *(Plant Pathology)*
Scott Rozelle, Ph.D., Associate Professor *(Agricultural and Resource Economics)*
Roberto D. Sainz, Ph.D., Associate Professor *(Animal Science)*
Richard Sexton, Ph.D., Professor *(Agricultural and Resource Economics)*
Michael J. Singer, Ph.D., Professor *(Land, Air and Water Resources)*
R. Paul Singh, Ph.D., Professor *(Biological and Agricultural Engineering)*
Michael P. Smith, Ph.D., Professor *(Human and Community Development)*
Alvin D. Sokolow, Ph.D., Specialist in Cooperative Extension *(Human and Community Development)*
Daniel A. Sumner, Ph.D., Professor *(Agricultural and Resource Economics)*
J. Edward Taylor, Ph.D., Professor *(Agricultural and Resource Economics)*
Steven R. Temple, Ph.D., Lecturer *(Agronomy and Range Science)*
Larry R. Teuber, Ph.D., Professor *(Agronomy and Range Science)*
Orville E. Thompson, Ph.D., Professor Emeritus
Mark Van Horn, M.Sci., Lecturer *(Agronomy and Range Science)*
Chris van Kessel, Ph.D., Professor *(Agronomy and Range Science)*
Ronald E. Voss, Ph.D., Lecturer *(Vegetable Crops Extension)*
Steven Weinbaum, Ph.D., Professor *(Pomology)*
Miriam J. Wells, Ph.D., Professor *(Human and Community Development)*
Diane L. Wolf, Ph.D., Associate Professor *(Sociology)*
Wing Woo, Ph.D., Professor *(Economics)*
Lin Wu, Ph.D., Professor *(Environmental Horticulture)*
Aram A. Yengoyan, Ph.D., Professor *(Anthropology)*
Tilahun D. Yilma, Ph.D., Professor *(Pathology, Microbiology, and Immology)*
Frank G. Zalom, Ph.D., Lecturer *(Entomology)*
Richard A. Zinn, Ph.D., Professor *(Animal Science)*

Graduate Study. The International Agricultural Development M.S. degree program prepares students for careers in global agricultural and rural development, especially of developing and less-industrialized regions. This is an interdisciplinary program designed to provide students with knowledge and skills that will enable them to implement, facilitate, and manage programs that enhance agricultural development, resource management, and rural life.

Students are prepared to accomplish biological and technological improvement in agricultural and natural systems to facilitate social innovation. Training in International Agricultural Development includes both breadth and depth components. Breadth components, required of all M.S. students, aim to establish an understanding of the issues in international development as it relates to agriculture and the environment. These include the history and philosophy of development, leadership and management techniques, fundamentals of crop and livestock farming systems, and agricultural economics. Students acquire depth in their own areas of specialization within the agricultural and social sciences. The areas are agricultural and resource economics, agricultural engineering, agronomy, animal science, anthropology, aquaculture, avain science, community development, ecology, economics, entomology, environmental design, environmental toxicology, food science, gender, geography, horticulture, nutrition, plant pathology, plant biology, plant protection and pest management, political science, pomology, preventive veterinary medicine, range science, sociology, soil science, sustainable agriculture, vegetable crops, viticulture, and water science.

Practical and on-site experience with development issues is encouraged and facilitated by guidance from the group's approximately 80 faculty members, who posses a wide range of experience in international development.

Graduate Adviser. Contact the Group Office.

International Commercial Law

Courses in International Commercial Law (ICL)

201. Orientation in United States Law (7)
Lecture/discussion—20 hours. Prerequisite: law school education or the equivalent. Investigation of the Common Law System of the United States. Includes structure of the U.S. government, Constitutional law, contracts, torts, real property, consumer law, securities law, intellectual property, antitrust, taxation, labor law, environmental law, ethics, remedies, legal research and trial practice.—Johnson

204. International Joint Ventures (3)
Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. International and U.S. business and legal transactions. Legal planning, problem solving, decision making and negotiations related to the break-up and dissolution of a major international joint venture. U.S. laws including finance, tax, bankruptcy, labor, antitrust, environmental, corporate structures and intellectual property. Offered in alternate years.—Smith

211. Negotiations and Alternative Dispute Resolution (1)
Lecture/discussion—10 hours. Prerequisite: course 201, law school education or the equivalent. Mechanisms for resolving disputes including the alternatives to litigation such as negotiation, mediation, and arbitration. Advantages and disadvantages of each approach. Offered in alternate years.—Smith

215. Business Associations (4)
Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. Legal rules and concepts applicable to business associations including general partnerships, joint ventures, limited partnerships, limited liability entities, and sole proprietorships. Offered in alternate years.—Joo

216. International Business Transactions (2)
Lecture/discussion—20 hours. Prerequisite: course 201 and law school education or the equivalent. Legal problems arising from international business transactions. Focus on international sales contracts, choice of law, forum selection clauses, letters of credit, transfers of technology, regulation of bribery, development of joint ventures, repatriation of profits, foreign exchange problems, and national efforts to control imports. Offered in alternate years.—Chander

219. Advanced Writing Project (4)
Project. Prerequisite: course 201, law school education or the equivalent. The completion of a written research project under the active supervision of a faculty member in satisfaction of the research-writing requirement. (S/U grading only.)

220. United States Taxation of Multinational Investments (2)
Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. An analysis of the United States taxation of multinational investments including jurisdiction of tax, the U.S. tax system, foreign tax credits, treaties, and transfer pricing. Offered in alternate years.—Simmons

236. United States Securities Law and Regulation (2)
Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. Structural and jurisdictional issues associated with securities practice. Topics include the regulation of public offerings, transactions by corporate insiders, regulation of corporate disclosure and conduct, and the liabilities of corporations and individuals under anti-fraud provisions. Offered in alternate years.—Chander

242. Private International Law (1)
Lecture/discussion—10 hours. Prerequisite: course 201, law school education or the equivalent. How law operates across state and national borders. Topics include choice of applicable law and transactions involving multiple international jurisdiction, recognition of foreign judgments, and jurisdiction. Analysis of problems practitioners frequently encounter in international commercial law. Offered in alternate years.—Wolff

247. Banking Law (1)
Lecture/discussion—10 hours. Prerequisite: course 201, law school education or the equivalent. Institutional features of international banking transactions, the structure of a large financial deal, and the mechanics of overseeing large loans. Emphasis on negotiable instruments such as bills of lading, letters of credit, standby letters of credit, and interbank transactions. Offered in alternate years.—Simmons

249. Comparative Law (1)
Lecture/discussion—10 hours. Prerequisite: course 201 and law school education or the equivalent. A comparative study of the development of schools of legal thought, chiefly Common law systems and Civil law traditions. Attention to the historical reasons for their divergence, contemporary approaches to universal problems such as succession, torts, and contracts, the cross-fertilization of laws and difficulties commonly associated with importing foreign law into new territory. Offered in alternate years.—Johnson

250. International Trade Law (3)
Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. An investigation of global trading systems including international trade in goods and services, e-commerce, international intellectual property, international tax planning and investment. Includes substantive and procedural provisions of the World Trade Organization (WTO) and the North American Free Trade Agreement (NAFTA). Offered in alternate years.—Smith

251. United States Litigation Issues (1)
Lecture/discussion—10 hours. Prerequisite: course 201, law school education or the equivalent. Prevention and resolution of disputes in international commerce. Emphasis on preparing for a trial in the United States. Includes the study of pre-trial motions, jury selection, opening statements, rules of evidence, closing arguments, and the selection of appropriate strategies. Offered in alternate years.—Smith

262. Antitrust (1)
Lecture/discussion—10 hours. Prerequisite: course 201, law school education or the equivalent. Historical and institutional background of antitrust law in the United States. The statutory framework including price fixing, limits on distribution, monopolization and mergers, and reporting requirements. Offered in alternate years.—Johnson

270. Financing International Transactions (3)
Lecture/discussion—20 hours. Prerequisite: course 201 and law school education or the equivalent. How capital is raised in international markets. Investment strategies for U.S. markets. Taxation of financial investments, international currency regulation, and assessing rates of return on international investments. Offered in alternate years.—Simmons

274. Intellectual Property (2)
Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. An intensive study of intellectual property law. Areas covered include copyright, trademark and patent law and unfair competition. Offered in alternate years.—Kurtz

290A-290B. American Legal System Research Seminar (1)
Seminar—5 hours. Prerequisite: course 201 and law school education or the equivalent. The American legal system and its structure. Methods of conducting legal research in the United States. Presenting

the results of legal research. Attention to analysis, synthesis, organization, and editing techniques common to legal writing. May be repeated once for credit. (Deferred grading only, pending completion of sequence. S/U grading only.)—Bassett

291C. International Commercial Law Seminar (4)
Seminar—20 hours. Prerequisite: course 201, law school education or the equivalent. Advanced seminar on a current topic in International Commercial Law. Offered at the University of Cologne in Cologne, Germany for two weeks each summer. The topic will change each year.

299. Advanced Research in Legal Problems (1-4)
Prerequisite: course 201, law school education or the equivalent. (S/U grading only.)

International Nutrition

Kenneth H. Brown, M.D., Program Director

Program Office, 3150 Meyer Hall (530-752-1992)

http://www-nutrition.ucdavis.edu/pin/DESEMPH.HTM

Faculty

Monique Borgerhoff-Mulder, Ph.D., Professor *(Anthropology)*
Kenneth H. Brown, M.D., Professor *(Nutrition)*
Kathryn G. Dewey, Ph.D., Professor *(Nutrition)*
Louis E. Grivetti, Ph.D., Professor *(Nutrition)*
Charles H. Halsted, M.D., Professor *(Internal Medicine)*
Lovell S. Jarvis, Ph.D., Professor *(Agricultural and Resource Economics)*
Bo L. Lönnerdal, Ph.D., Professor *(Nutrition)*
Benjamin Orlove, Ph.D., Professor *(Environmental Science and Policy)*
Barbara O. Schneeman, Ph.D., Professor *(Nutrition)*
Fernando E. Viteri, M.D., Ph.D., Professor *(Nutrition Science, UC Berkeley)*

Emeriti Faculty

Lindsay H. Allen, Ph.D., Professor Emeritus
Janet King, Ph.D., Professor Emeritus
Ernesto Pollitt, Ph.D., Professor Emeritus

Affiliated Faculty

Marjorie Haskell, Ph.D., Assistant Researcher *(Nutrition)*
Lucia Kaiser, Ph.D., Specialist in Cooperative Extension *(Nutrition)*
Shannon Kelleher, Ph.D., Assistant Researcher *(Nutrition)*
Charles B. Stephensen, Ph.D., Associate Adjunct Professor *(Nutrition)*
Marta Van Loan, Ph.D., Associate Adjunct Professor *(Nutrition)*
Steven A. Vosti, Ph.D., Assistant Adjunct Professor *(Agricultural and Resource Economics)*

Graduate Study. The Program in International Nutrition, an organized research unit located in the Department of Nutrition, coordinates specialized course work and research leading to the designated emphasis in International Nutrition for students in various graduate programs. The program focuses on both theoretical and practical issues concerning the identification, treatment, and prevention of human nutritional problems in low-income countries and in disadvantaged ethnic minority groups in the United States. Students enrolled in the designated emphasis are expected to (1) complete the course requirements already established by their respective graduate programs, (2) participate in a weekly advanced seminar in international nutrition, (3) complete additional core courses in international nutrition (Nutrition 219A, 219B, 258) and selected courses in the related disciplines of epidemiology, statistics, and social and behavioral sciences, and (4) conduct their dissertation research on a relevant topic under the supervision of a professor who is a member of the Program in International Nutrition.

Students accepted into the following doctoral programs are automatically eligible to participate in the designated emphasis: Nutrition, Agricultural and Resource Economics, Epidemiology, Anthropology, and Human Development. Students from other programs may also be accepted by special request to the Program Director. Upon graduation, students receive a Ph.D. in their major field, with specific recognition for the designated emphasis in international nutrition.

Graduate Adviser. Contact the Program Office.

International Relations

(College of Letters and Science)

Jeannette Money, Ph.D., Program Director

Program Office, 1270 Social Sciences and Humanities Building (530-752-3063)

Committee in Charge

Paul Bergin, Ph.D. *(Economics)*
Robert Blake, Ph.D. *(Spanish)*
Cynthia L. Brantley, Ph.D. *(History)*
Scott S. Gartner, Ph.D. *(Political Science)*
Luis E. Guarnizo, Ph.D. *(Human and Community Development)*
Jean-Xavier Guinard, Ph.D. *(Food Science and Technology)*
Daniel Yuichi Kono, Ph.D. *(Political Science)*
Peter Schiffman, Ph.D. *(Geology, Education Abroad Program)*

The Major Program

Problems of security, development, ethnic conflict, human rights, health, and the environment are increasingly confronted at a global rather than a national level. With its theoretical models and real-world application, the study of international relations is an exciting and highly relevant interdisciplinary major.

The Program. Graduation with a major in international relations requires completion of introductory courses in political science, economics, geography, and history. Upper division work is composed of twelve courses chosen from one of four tracks that en-compass major topical areas in combination with an area studies emphasis: I. World Trade and Development; II. Peace and Security; III. Global Environment, Health, and Natural Resources; IV. Peoples and Nationalities. The major also requires fluency in English and a working knowledge (approximately 24 to 30 units of course credits or equivalent fluency) of one other modern language.

Programs, Internships, and Career Alternatives. One program of special interest to international relations majors is the Education Abroad Program, which provides insights into the life and culture of other countries. At UC Davis, the Internship and Career Center assists students in obtaining legislative, legal, and business internships. In addition, the UC Davis Washington Center arranges internships and runs a full-credit academic program in Washington, D.C. with a full range of opportunities for International Relations majors (see also the UC Davis Washington Center listing). International relations graduates are prepared for employment in government agencies (such as the Foreign Service), state agencies, international or non-governmental organizations (such as the United Nations), foundations, and companies having interests in international business, trade, or finance. The stringent language requirement of the major program enhances career prospects in jobs which demand knowledge of the language and culture of other countries.

International Relations Abroad. International Relations strongly encourages students to participate in the UC Education Abroad Program. A maximum of five courses taken abroad may be applied toward the 12 upper division courses in the International Relations major. Courses are selected with the approval of an adviser for the International Relations program.

Preparatory Requirements. Before declaring a major in International Relations, students must complete the following courses with a combined GPA of at least 2.50 at the University of California or other four-year school (at least 3.00 for similar courses taken at community college). All courses must be taken for a letter grade.

Economics 1B .....4 units
Geography 10 .....3 units
History 4C or 10C.....4 units
International Relations 1 or Political Science 3 .....4 units
Statistics 13 or Sociology 46B..4 units

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**19-49**
Economics 1B	4
Geography 10	3
History 4C or 10C	4
International Relations 1 or Political Science 3	4
Statistics 13 or Sociology 46B	4
Note: Economics 1A, Mathematics 16A and 16B are prerequisites for some courses.	
Foreign language	0-30
One of the following series in a single language:	
Cantonese 1, 2, 3, 4, 5, and 6	24
Chinese 1, 2, 3, 4, 5, and 6	30
or Chinese 1CN, 2CN, 3CN	15
or Chinese 1BL, 2BL, 3BL	15
French 1, 2, 3, 21, 22	25
German 1, 2, 3, 20, 21	23
Italian 1, 2, 3, 4, 5	21
or Italian 1, 2, 3, 8A, 8B	21
Japanese 1, 2, 3, 4, 5, 6	30
or Japanese 8, 18, 28	15
Russian 1, 2, 3, 4, 5	23
Spanish 1, 2, 3, 21, 22	25
or Spanish 31, 32, 33	15
Note: The language curricula are subject to change; please check with an adviser for the major. *A language not listed above may be substituted only with prior written approval of the International Relations Program Committee.*	
Depth Subject Matter	**48-52**
Twelve upper division courses—choose one track below:	
Track I: World Trade and Development (Emphasizes contemporary economic relations of industrialized and developing countries)	
For Advanced Industrialized Focus:	
Economics 100 or 104; 101 or 105; 160A-160B, Political Science 123	20
Two courses selected from Group A	8
One course selected from Group B	4
Four courses to fulfill Area Studies Requirement	16
For Developing Countries Focus:	
Economics 115A-115B, 162	12
Political Science 123, 124	8
One course selected from Group A	4
Two courses selected from Group B	8
Four courses to fulfill Area Studies Requirement	16
Group A courses (Advanced Industrialized Countries): Anthropology 127, Community and Regional Development 118, 141, Economics 110B, 116, Geography 155, International Relations 104, Political Science 130, 140, Sociology 138, 139, 141, 183	

Group B courses (Developing Countries): Anthropology 122A, 122B, 123BN, 126A, 126B, 127, 135, Community and Regional Development 153, Geography 155, International Agricultural Development 103, International Relations 104, Political Science 124, 126, 178, Sociology 138, 141, 145A, 145B

Track II: Peace and Security
(Focuses on political and security relationships among states and non-state actors, examining questions of war, peace, alliances, and diplomacy)

Economics 162 4
Political Science 123, 130, 132 12
Political Science 120 or 121 4
Three additional courses from at least two departments selected from Anthropology 123B, Comparative Literature 157, Economics 116, Geography 143, History 145, 146A, 146B, Philosophy 118, Physics 137, Political Science 112, 124, 126, 131, 140, Sociology 100, 118, 157, Women's Studies 102 12
Four courses to fulfill Area Studies Requirement 16

Track III: Global Environment, Health, and Natural Resources
(Familiarizes students with new sources of global interdependence such as biodiversity, natural resource conflicts, population growth, and world health)

Note: Some courses shown below have additional prerequisites
Economics 162 4
Anthropology 101 4
Environmental Science and Policy 161 or Political Science 122 4
Political Science 123 4
Select two from Applied Biological Systems Technology 182, Anthropology 103, Agricultural and Resource Economics 147, 175, 176, Economics 115A, Environmental Science and Policy 164, Geography 161, Nature and Culture 120, Physics 160, Political Science 107, 175 7-8
Select two from the following groups 9-12
Atmospheric and marine environments: Atmospheric Science 116, 149, Environmental and Resource Sciences 121, 131, Geology 116, International Relations 131
Land use and energy supply: Agricultural Management and Rangeland Resources 101, 150, 160, Anthropology 104N, Community and Regional Development 142, Environmental and Resource Sciences 144, 173, Environmental Science and Policy 167, Geology 130, International Agricultural Development 104, Political Science 171
Health and human populations: Anthropology 102, Communication 160, Environmental Science and Policy 121, 126, Environmental Toxicology 101, Internal Medicine—Infectious Diseases 141, Nutrition 111, 118, 120B, Sociology 170; Epidemiology and Preventive Medicine 198 and 199 may be taken with the director's approval
Four courses to fulfill Area Studies Requirement 16

Track IV: Peoples and Nationalities
(Examines social and cultural foundations of national development and international relations)

Select two courses from Anthropology 130BN, International Relations 104, Political Science 124, Sociology 118 ... 8
Select one course from Anthropology 130A, 102 4
Select one course from Community and Regional Development 176, Political Science 126 4
Select four courses from at least two departments 16
Anthropology 122B, 123AN, 123BN, 124, 126A, 126B, 135, Comparative Literature 151, Human Development 103, Philosophy 105, Political Science 178, Religious Studies 168, 170, Sociology 145B, 146, 156, 175, Women's Studies 102, 182
Four courses to fulfill Area Studies Requirement 16

Area Studies Requirement
Four courses: three of the four must be selected within one region, and from at least two of three groups (History, Social Analysis, Culture and Literature); the fourth course may be selected from any region. Student who choose to take advantage of an Education Abroad experience may fulfill the Area Studies requirement by completing three courses approved by the International Relations program.

Africa and the Middle East
History: History 112B, 115A, 115B, 115C
Social Analysis: African American and African Studies 107C, 110, 111, 156, Anthropology 140A, 140B, 142, Native American Studies 120, 133, Political Science 134, 149, Women's Studies 184
Culture and Literature: African American and African Studies 157, 162, Art History 150, Dramatic Art 155A, French 124

East and South Asia
History: History 191E, 191F, 194C, 194D, 194E, 195B, 196B
Social Analysis: African American and African Studies 107C, Anthropology 143A, 143B, 147, 148A, 148B, 148C, 149B, Economics 171, Geography 126, Political Science 148A, 148B, 148C, Sociology 147, 188
Culture and Literature: Art History 153, 163C, Chinese 104, 105, 110, Dramatic Art 154, East Asian Studies 113, Japanese 103, 104, 106, 107, 131, 132, 133, 135, 136

Latin and South America
History: History 161B, 162, 163B, 164, 165, 166B, 167, 168
Social Analysis: African American and African Studies 107A, Anthropology 144, 146, Chicana/o Studies 130
Culture and Literature: African American and African Studies 163, Art History 151, Comparative Literature 152, Dramatic Art 155A, Spanish 149, 151N, 153, 154, 155, 156, 157, 170, 172

Russian and East/Central Europe
History: History 138B, 138C, 143
Social Analysis: Political Science 144
Culture and Literature: Russian 123, 129, 130, 131, 132, 143, 151

Western Europe
History: History 140, 141, 142A, 144B, 145, 146A, 146B, 147A, 147B, 147C, 151D
Social Analysis: African American and African Studies 107C, Geography 123, Political Science 137, 147, 161
Culture and Literature: French 107N, 108, 120, 121, 133, German 115, 118B, 118C, 118D, 118E, 120, 126, 141, 142C, 143, 168, 185, Humanities 177, Italian 108, 120A, 120B, Spanish 137N, 139, 140N, 141, 142, 148, 157, 170

Total units for the major 67-97

Major Adviser. J. Money *(Political Science).*

Courses in International Relations (IRE)

Lower Division Courses

1. Global Interdependence (4)
Lecture—3 hours; discussion—1 hour. Development of the concept of global interdependence along its political, economic, demographic, cultural, technological, and environmental dimensions. Focus on the ways societies and states interact. Course provides the foundation for upper division multidisciplinary work in international relations.—I, III. (I, III.) Nincic, Goldman

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

104. The Political Economy of International Migration (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing. Analysis of worldwide migration patterns, and social scientific theories of international and transnational migration. Focus in economical, political, and social impact of immigration and potential for international and regional cooperation. (Same course as Sociology 104.)—Kyle

131. Ocean Politics (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or Political Science 3; Political Science 123 recommended. The political, economic, security and environmental aspects of the world's oceans. Focus on the international dimensions of ocean economic resources, and on the means—both cooperative and conflictual—by which these resources have been, and are likely to be, managed.

190. Topics in International Relations (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Selected topics in international relations. Variable content. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

192. International Relations Internship (1-12)
Internship—3-36 hours (to be arranged). Prerequisite: upper division standing and consent of instructor. Work experience in international relations, with term paper summarizing the practical experience of the student. (P/NP grading only.)

194HA-194HB. Special Study for Honors Students (4-4)
Seminar—2 hours; term paper. Prerequisite: open only to majors of senior standing who qualify for honors program. Directed reading, research, and writing on topics selected by students and instructor culminating in preparation of a senior honors thesis under direction of a faculty adviser. (Deferred grading only, pending completion of sequence.)—I, II. (I, II.)

198. Directed Group Study (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Internship

See Internship Program; UC Davis Washington Center

Internship Program

Albert A. Harrison, Ph.D., Director

Jeanne B. Shelby, Associate Director

The Internship and Career Center 2nd and 3rd Floors, South Hall (530-752-2855), Buehler Alumni and Visitors Center

Program Areas

Linda R. Hughes, Program Manager *(Agricultural and Environmental Sciences, Engineering and Physical Sciences, Graduate Student and Postdoctoral Career Services, Health and Biological Sciences and Liberal Arts and Business)*

Internship Experience

The Internship and Career Center facilitates a campuswide internship program. All internships, both credit and non-credit, can be taken for Transcript Notation with completion of required evaluation reports. The notation briefly describes the nature and location of the internship experience. Questions pertaining to academic credit and Transcript Notation may be directed to The Internship and Career Center.

Course Credit. Internship courses (numbered 92 and 192) are available for credit on a variable-unit and Passed/Not Passed grading basis. A maximum of 12 units of 92 and/or 192 courses may be counted toward the 180-unit minimum needed for graduation. To qualify for the 192 course, students must have acquired 84 units of credit. All credited internships require approval and sponsorship by a faculty member from an appropriate discipline. Arrangements may be made through the department of the sponsoring faculty member and facilitated by The Internship and Career Center Staff.

Italian

(College of Letters and Science)

Julia Simon, Ph.D., Chairperson of the Department

Department Office, 522 Sproul Hall (530-752-1219)

http://italian.ucdavis.edu

Faculty

JoAnn Cannon, Ph.D., Professor
Dennis J. Dutschke, Ph.D., Professor
Gustavo Foscarini, M.A., Senior Lecturer
Margherita Heyer-Caput, Ph.D., Associate Professor
Juliana Schiesari, Ph.D., Professor *(Italian, Comparative Literature)*

Affiliated Faculty

Antonella Bassi, M.A., Lecturer

The Major Program

The major in Italian provides a solid language background which will enable the student to develop an appreciation for Italian language and culture.

The Program. The Italian program is small and geared to the individual needs of the student. The use of Italian is stressed on all levels and a knowledge of the language is required for literature courses that are taught only in Italian. The Italian program actively participates in the Education Abroad Program, the Short Term Program Abroad, the International Internships Program, and the Summer Sessions International (Rome), all of which offer opportunities for travel and study in Italy.

Career Alternatives. Specific career opportunities for those students who have a background in foreign languages are abundant. In addition to the Foreign Service, jobs are available in business and education, both overseas and in the U.S. For example, those wishing to live (for brief or longer periods of time) and work in Italy have a choice of cities: Milan for business, Rome for international concerns in agriculture and nutrition in the F.A.O., and Florence for retail commerce and the arts, just to name a few. In the U.S., foreign-owned companies or American companies with interests in the foreign market need qualified people who are also fluent in a foreign language.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 0-24
Italian 1, 2, 3, 4, 5, and 9 (or the equivalent) 0-24

Depth Subject Matter..... 36
Italian 101 and 105..... 8
Upper division courses in literature, taught in the language 28
Must include at least one course from two of the following literary periods: (a) Early Italian, (b) Renaissance and Baroque, (c) Eighteenth through Twentieth Centuries. Upper division General Education courses in Italian may fulfill this requirement with approval of the major adviser.

A total of 8 units in literature may be replaced by Italian 107 (highly recommended) and/or by courses in related fields such as history, art history, music, comparative literature, English, critical theory, classics, and linguistics.

Note: All upper division courses are to be chosen in consultation with the major adviser.

Total Units for the Major 36-60

Recommended
One year or one quarter of study abroad with the Education Abroad Program or college Latin or a Romance Language.

Major Adviser. M. Heyer-Caput.

Minor Program Requirements:

UNITS

Italian 20
Italian 101 and 105..... 8
Three upper division courses in literature chosen in consultation with major adviser 12
One course chosen from two of the following three areas: *(a)* Early Italian Literature, *(b)* Renaissance and Baroque, and *(c)* Eighteenth through Twentieth Centuries. (One of the above courses may be replaced by course 107 or by a course of literature in translation offered by the Italian Program).

Honors and Honors Program. The honors program comprises two quarters of study under course 194H (3 units) and course 195H (3 units), which will include a research paper and a comprehensive examination. See also the Academic Information chapter of this catalog.

Education Abroad Program. Applicable courses taken on EAP are accepted for credit in the major or the minor programs.

Teaching Credential Subject Representative. See Major Adviser above and also the section on the Teacher Education Program in this catalog.

Prerequisite Credit. Credit will not normally be given for a course if it is a prerequisite of a course already successfully completed. Exceptions can be made only by the Program Director.

Short Term Language and Culture Program. The Italian program offers an exciting study abroad program of Italian language and culture at the University for Foreigners in Perugia. The spring quarter program is directed and taught in part by a faculty member of the Italian program. All students in good standing at UC Davis are eligible to apply. There is no language requirement to participate. Language and culture instruction is offered at all levels, and students are able to earn up to 20 units of credit. The courses may be used for credit towards the Italian major or minor. For information, contact the director of the Italian program or the Education Abroad Center.

Courses in Italian (ITA)

Lower Division Courses

Students offering high school language preparation as a prerequisite must take a placement test.

1. Elementary Italian (5)
Discussion—5 hours; laboratory—1 hour. Introduction to Italian grammar and development of all language skills in a cultural context with special emphasis on communication. (Students who have successfully completed Italian 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.)—I, II. (I, II.)

1S. Elementary Italian (5)
Discussion/laboratory—5 hours. Introduction to Italian grammar and development of all language skills in a cultural context with special emphasis on communication. This course is taught abroad. Not open for credit to students who have completed course 1.—III.

2. Elementary Italian (5)
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 1. Continuation of course 1 in areas of grammar and basic language skills.—II, III. (II, III.)

2S. Elementary Italian (5)
Discussion/laboratory—5 hours. Prerequisite: course 1. Continuation of course 1 in the area of grammar and basic language skills. This course is taught abroad. Not open for credit to students who have completed course 2.—III.

3. Elementary Italian (5)
Lecture/discussion—5 hours. Prerequisite: course 2. Continuation of grammar sequence, and practice of all language skills through cultural texts.—I, II, III. (I, II, III.)

3S. Elementary Italian (5)
Lecture/discussion—5 hours. Prerequisite: course 2. Completion of grammar sequence and continuing practice of all language skills through cultural texts. This course is taught abroad. Not open for credit to students who have completed course 3.—III.

4. Intermediate Italian (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 3. Review of grammar and syntax through written exercises and short prose works. Intended to develop the linguistic foundations of students who have completed the first year language classes.—I, II, III. (I, II, III.)

4S. Intermediate Italian (3)
Lecture/discussion—3 hours. Prerequisite: course 3 or the equivalent. Review of grammar and syntax through written exercises and readings of short prose works. Intended to develop the linguistic foundations of students who have completed the first year language classes. This course is taught abroad. Not open for credit to students who have completed course 4.—III.

5. Intermediate Italian (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 4. Review and study of grammar and syntax, readings of short prose works, and written exercises. Intended to prepare students to read, understand, and discuss modern Italian.—I, II, III. (I, II, III.)

5S. Intermediate Italian (3)
Lecture/discussion—3 hours. Prerequisite: course 4. Preparation to read, understand, and discuss texts written in Italian. Transition between course 4 and 10. This course is taught abroad. Not open for credit to students who have completed course 5.—III.

8A. Italian Conversation (3)
Discussion—3 hours. Prerequisite: course 3 or the equivalent. Course designed to offer practice in speaking Italian. May be repeated once for credit. (P/NP grading only.)—I, III. (I, III.)

8AS. Italian Conversation (3)
Discussion—3 hours. Prerequisite: course 3 or the equivalent. Practice in the speaking of Italian. Course is taught abroad. May be repeated for up to 6 units of credit. Not open for credit to students who have completed course 8. (P/NP grading only.)—III.

8B. Italian Conversation (3)
Discussion—3 hours. Prerequisite: course 8A. Course designed to offer practice in speaking Italian. (P/NP grading only.)—II. (II.)

8BS. Italian Conversation (3)
Discussion—3 hours. Prerequisite: course 8A. Practice in the speaking of Italian. May be repeated for up to 6 units of credit. Not open for credit to students who have completed course 8B. (P/NP grading only.)—III.

9. Reading Italian (3)
Lecture/discussion—3 hours. Prerequisite: course 5. Reading and discussion of modern Italian prose, including selections from creative, scientific and journalistic writings. Introduction to contemporary Italian literature and culture, as well as a means of strengthening the student's command of the Italian language.—III. (III.)

9S. Reading Italian (3)
Lecture/discussion—3 hours. Prerequisite: course 5. Reading and discussion of modern Italian prose, including selections from creative, scientific and journalistic writings. Introduction to contemporary Italian literature and culture as well as strengthening the student's command of the Italian language. This course is taught abroad. Not open for credit to students who have completed course 9.—III.

50. Studies in Italian Cinema (4)
Lecture—2 hours; discussion—1 hour; term paper. Introduction to Italian cinema through its genres. Focus is on cinema as a reflection of and a comment on modern Italian history. Film will be studied as an artistic medium and as a form of mass communication. GE credit: ArtHum, Wrt.—II. (II.)

90X. Lower Division Seminar (1-2)
Seminar—1-2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Italian language or culture (such as Italian culture seen through film, Italian feminism, literature, or politics) through shared readings, discussions, written assignments, or special activities such as film screening or laboratory work.

98. Directed Group Study (1-5)
Primarily intended for lower division students. (P/NP grading only.)

Upper Division Courses

101. Advanced Conversation, Composition, and Grammar (4)
Lecture—3 hours; weekly essays. Prerequisite: course 9 or consent of instructor.—I. (I.) Heyer-Caput, Cannon

101S. Advanced Composition, Conversation and Grammar (4)
Lecture—3 hours; extensive writing. Prerequisite: course 9. Instruction and practice in expository writing in Italian, with emphasis on advanced grammar, organization, and vocabulary building. Course will be taught in Italy. Not open for credit to students who have completed course 101.—III.

104. Italian Translation and Style (4)
Lecture/discussion—3 hours; two research papers; term paper. Prerequisite: course 101 or consent of instructor. Practice in translation from Italian to English and English to Italian, using literary and non-literary texts of different styles. Analysis of linguistic problems and elements of style contained in the translation material.—III. (III.) Cannon

104S. Translation and Style (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101 or consent of instructor. Practice in translation from Italian to English and English to Italian, using literary and non-literary texts of different styles. Analysis of linguistic problems and elements of style contained in the translation material. Course will be taught abroad. Not open for credit to students who have completed course 104.—III.

105. Introduction to Italian Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101 or consent of instructor. Introduction to the study of the principal authors, works, and movements of the Medieval, Renaissance, and Early Modern periods in Italy. GE credit: ArtHum.—II. (II.) Schiesari

105S. Introduction to Italian Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101 or consent of instructor. Introduction to the study of the principal authors, works, and movements of the Medieval, Renaissance and Early Modern periods in Italy. This course is taught abroad. Not open for credit to students who have completed course 105. GE credit: ArtHum, Div, Wrt.—III.

107. Survey of Italian Culture and Institutions (4)
Lecture—3 hours; term paper. Assessment of the impact of regional autonomy on Italian cultural life from the Middle Ages to the present. Special emphasis will be placed upon achievements in literature, the arts, philosophy, and socio-political institutions. To be taught in English. GE credit: ArtHum.—III. (III.) Foscarini

107S. Survey of Italian Culture and Institutions (4)
Lecture/discussion—3 hours; term paper. Assessment of the impact of regional autonomy on Italian cultural life from the Middle Ages to the present. Special emphasis on achievements in literature, the arts, philosophy, and socio-political institutions. Taught in English. This course is taught abroad. Not open for credit to students who have completed course 107. GE credit: ArtHum.—III.

108. Contemporary Issues in Italian Culture and Society (4)
Lecture/discussion—3 hours; term paper. Analysis of cultural issues in contemporary Italy: Myth and reality of imagined Italies, Italian identities; immigration and race relations; the media and popular culture. Taught in English. GE credit: ArtHum, Div, Wrt.—I. (I.) Bassi

108S. Contemporary Issues in Italian Culture and Society (4)
Lecture/discussion—3 hours; term paper. Analysis of cultural issues in contemporary Italy; myth and reality of imagined Italies; Italian identities; immigration and race relations; the media and popular culture. Taught in English. This course is taught abroad. Not open for credit to students who have completed course 108. GE credit: ArtHum, Div, Wrt.—III.

112. Medieval and Renaissance Poetry: St. Francis to Petrarch (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Study of the origins of Italian religious and secular poetry of the 13th and 14th centuries. A diversified poetry is illustrated in works of St. Francis, Dante, Cavalcanti, Petrarch, the Sicilian School, the Sweet New Style Poets, and other authors. Offered in alternate years. GE credit: ArtHum.—(I.) Dutschke

113. Dante Alighieri, Divina Commedia (Inferno, Purgatorio, Paradiso) (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Study of Dante Alighieri's Divina Commedia, and its role in the development of Italian language and literature. Emphasis will be placed on reading the whole poem within the historical context of the Middle Ages. GE credit: ArtHum.—III. (III.) Dutschke

114. Boccaccio, Decameron, and the Renaissance Novella (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Study of the development of the short story in Italy, as exemplified in Giovanni Boccaccio's Decameron, in his predecessors and Renaissance followers. Offered in alternate years. GE credit: ArtHum.—II. Dutschke

115A. Studies in the Cinquecento (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Analysis of key texts from the high moment of the Italian Renaissance. The political and aesthetic legacy of humanism will be foregrounded in relation to authors such as Ficino, Ariosto, Machiavelli, Aretino, Castiglione, and Tasso. Offered in alternate years. GE credit: ArtHum.—(III.) Schiesari

115B. Italian Literature of the Renaissance and the Baroque: From Cellini to Marino (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 115A. Continued examination into the loss of an ideal. Emphasis on the conflicts in Michelangelo and Tasso leading to Marino, with an excursus on Galileo's role in the formation of a modern literary standard. GE credit: ArtHum.—III. (III.) Schiesari

115C. Italian Drama from Machiavelli to the Enlightenment (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Development of comic and tragic forms as critical representations of their societal and historical contexts, i.e. Machiavelli and the logic of power, Baroque dramatists in the service of counter-reformation Italy, Goldoni's comedies and bourgeois social consciousness. Offered in alternate years. GE credit: ArtHum.—I. Schiesari

115D. Early Modern Italian Lyric (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Examination of the poetic tradition influenced by Petrarch. Consideration of the relation between gender and genre in such poets as Petrarch, Bembo, della Casa, Tasso, Marino, Gaspara Stampa, Veronica Franco, Isabella di Morra. Offered in alternate years. GE credit: ArtHum.—I. Schiesari

118. Italian Literature of the Eighteenth Century (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Development of modern Italian literature. Emphasis on the work of Goldoni, Bettinelli, Baretti, Parini, Alfieri and Vico. GE credit: ArtHum.—I. (I.)

119. Italian Literature of the Nineteenth Century (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Romanticism in Italy, including Manzoni, Verga, and Verismo. GE credit: ArtHum.—II. (II.) Heyer-Caput

120A. Italian Literature of the Twentieth Century: The Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Development of the novel from Svevo to the present. Emphasis on the work of Svevo, Levi, Moravia, Pavese, and Vittorini. GE credit: ArtHum.—III. (III.) Cannon, Heyer-Caput

120B. Italian Literature of the Twentieth Century: Poetry and Drama (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Italian poetry with emphasis on Hermeticism; the theater of Luigi Pirandello and its role in the development of contemporary Italian drama. GE credit: ArtHum.—I. (I.) Cannon, Heyer-Caput

131. Autobiography in Italy (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. The development of representations of selfhood with particular attention to generic conditions, the confessional tradition and the problem of women's self-representation. Authors studied may included Petrarch, Tasso, Casanova, Alfieri, Zvevok, Sibilla Aleramo and Primo Levi. Offered in alternate years. GE credit: ArtHum.—III. Heyer-Caput, Schiesari

139B. Italian Literature in English: Boccaccio, Petrarch and the Renaissance (4)
Lecture/discussion—3 hours; term paper. Petrarch and Boccaccio and their relations to the Middle

Ages and the Renaissance; the Renaissance, with particular attention to the works of Lorenzo de' Medici, Leonardo da Vinci, Machiavelli, Ariosto, Michelangelo, and Tasso. GE credit: ArtHum.—II. (II.) Dutschke

140. Italian Literature in English Translation: Dante, Divine Comedy (4)
Lecture/discussion—3 hours; term paper. Prerequisite: any course from the GE Literature Preparation List. Reading of Dante Alighieri's Divine Comedy, through the otherworld realms of Inferno, Purgatory, and Paradise. GE credit: ArtHum, Wrt.—I. (I.) Dutschke

141. Culture, Gender and the Italian Renaissance (4)
Lecture/discussion—3 hours; term paper. Prerequisite: any course from the GE Literature Preparation List. Critical analysis of texts from the Italian Renaissance. Primary concern focuses on issues such as "the dignity of Man;" education and gender politics; "high" and "low" culture and its relation to literary practices. GE credit: ArtHum, Div, Wrt.—II. (II.) Schiesari

142. Masterpieces of Modern Italian Narrative (4)
Lecture—1.5 hours; discussion—1.5 hours; term paper. Prerequisite: either English 3, Comparative Literature 2, or History 4C. Analysis of major works of Italian narrative fiction from unification of Italy to present. Students will learn to use representative methods and concepts which guide literary scholarship. Consideration of works within European social and cultural context. Offered in alternate years. GE credit: ArtHum, Wrt.—III. Cannon

145. Special Topics in Italian Literature (4)
Lecture/discussion—4 hours. Prerequisite: course 9 or consent of instructor. Study of special topics and themes in Italian literature, such as comic literature, epic poetry, pre-twentieth century theater, fascism, futurism, women and literature, and the image of America, etc. May be repeated for credit when topic differs. GE credit: Wrt.—I, II, III. (I, II, III.)

145S. Special Topics in Italian Literature (4)
Lecture/discussion—4 hours. Prerequisite: course 9 or consent of instructor. Study of special topics and themes in Italian literature, such as comic literature, epic poetry, pre-twentieth-century theater, fascism, futurism, women and literature, the image of America, etc. This course is taught abroad. May be repeated for credit. Not open for credit to students who have completed course 145. GE credit: ArtHum, Wrt.—III.

150. Studies in Italian Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: Humanities 10 or consent of instructor. Introduction to Italian cinema through its genres. Focus on cinema as a reflection or a comment on modern Italian history. Film as an artistic medium and as a form of mass communication. GE credit: ArtHum, Div, Wrt.—II. (II.) Cannon

190X. Upper Division Seminar (1-2)
Seminar—1-2 hours. Prerequisite: upper division standing and consent of instructor. Examination of a special topic in Italian language or culture through shared readings, discussions, written assignments or special activities such as film screening or laboratory work. Limited enrollment. May not be repeated for credit.

192. Italian Internship (1-12)
Internship—3-36 hours. Prerequisite: upper division standing and consent of chairperson of Italian Department. Participation in government and business activities to gain work experience and to develop a better knowledge of Italian language and culture. (P/NP grading only.)

194H. Special Study for Honors Students (3)
Independent study—3 hours. Prerequisite: open only to majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Italian literature, civilization, or language studies. (P/NP grading only.)

195H. Honors Thesis (3)
Independent study—3 hours. Prerequisite: course 194H. Writing of an honors thesis on a topic in Italian literature, civilization, or language studies under the direction of a faculty member. (P/NP grading only.)

197T. Tutoring in Italian (1-4)
Seminar—1-2 hours; laboratory—1-2 hours. Prerequisite: upper division standing and consent of instructor. Tutoring in undergraduate courses, including leadership in small voluntary discussion groups affiliated with departmental courses. May be repeated for credit for a total of 6 units. (P/NP grading only.)

197TC. Community Tutoring in Italian (1-5)
Discussion—1-2 hours; laboratory—2-4 hours. Prerequisite: consent of instructor. Field experience as Italian tutors or teacher's aides. May be repeated for credit for a total of 10 units. (P/NP grading only.)—Foscarini

198. Directed Group Study (1-4)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

297. Individual Study (1-5)
Prerequisite: graduate standing or consent of instructor.

298. Group Study (1-5)
Prerequisite: graduate standing or consent of instructor.

299. Research (1-12)
Prerequisite: graduate standing or consent of instructor. (S/U grading only.)

299D. Dissertation Research (1-12)
Prerequisite: graduate standing or consent of instructor. (S/U grading only.)

Japanese

See East Asian Languages and Cultures

Jewish Studies

(College of Letters and Science)

David Biale, Ph.D., Program Director

Program Office, 2216 Social Sciences and Humanities Building

http://jewishstudies.ucdavis.edu

Committee in Charge

Samuel Armistead Ph.D. *(Spanish)*
Carlee Arnett, Ph.D. *(German)*
David Biale, Ph.D. *(History)*
William Hagen, Ph.D. *(History)*
Matthew Hoffman, Ph.D. *(Jewish Studies)*
Naomi Janowitz, Ph.D. *(Religious Studies)*
Lisa Materson, Ph.D. *(History)*
Diane Wolf, Ph.D. *(Sociology)*

The Program of Study

The Program in Jewish Studies offers students the opportunity to explore Jewish history, communities, literature, religion, and culture in a comparative perspective and multicultural framework. Courses include Hebrew language instruction (Hebrew 1, 2, 3) as well as the study of classical and modern Jewish texts in translation.

The interdisciplinary minor in Jewish Studies provides an introduction to the study of Jewish culture, thought, history, and literature. Students learn a broad range of methodologies and critical concepts in these areas and gain insight into the relation between Jewish identities, histories, and representations and those of the cultures in which Jews throughout the world have lived.

The Program in Jewish Studies will be of special interest to students in History, Religious Studies, Comparative Literature and Sociology as well as other fields in the Humanities and Social Sciences.

Minor Program Requirements

	UNITS
Jewish Studies	**20**
One course from Jewish Studies 10 or Religious Studies 23	4
4 upper division courses selected from the following list, with at least one course in each category	16
(a) Religion: English 171A; Religious Studies 122, 124, 125	
(b) Representations, Languages, and Identity: Comparative Literature 147; English 179; French 108; German 141; Hebrew 100, 101, 102; Jewish Studies 110, 111, 112, 120, 121; Russian 159; Sociology 130, 174	
(c) Histories: History 112A, 112B, 142A, 142B, 173	

Advising. Jewish Studies Program Office (530-754-5811)

Courses in Jewish Studies (JST)

Lower Division Courses

10. Introduction to Jewish Cultures (4)
Lecture—3 hours; term paper. Diverse Jewish cultures created over the past 2,000 years using examples from less-familiar communities such as India, China, and Ethiopia. Topics include the tensions between homeland/diaspora and questions of identity (race, nationality, culture, or religion). GE credit: SocSci, Div, Wrt.

Upper Division Courses

101. Topics in Jewish Thought (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 10 or Religious Studies 23 or consent of instructor. Selected themes in Jewish thought in historical and social perspective. This course traces the historical development of topics in Jewish thought such as Messianism, or focuses on one specific historical period, such as modern Jewish thought. May be repeated for credit when topic differs. GE credit: ArtHum, Div, Wrt.—II. (II.)

110. Selected Topics in Jewish Literature (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one lower division literature or Jewish Studies course or consent of instructor. Literature written about the Jewish experience, treated in its historical and social context. Examines literature written in one language, such as English, Hebrew, or Yiddish, or a theme, such as gender or modern identities, as expressed in different literary traditions. May be repeated for credit when topic differs. GE credit: ArtHum, Div, Wrt.—II. (II.)

111. Israeli Writing Since 1960 (4)
Lecture/laboratory—3 hours; extensive writing. Prerequisite: one course in American or European literature. Contemporary Hebrew literature, in translation, in relation to post-independence debates about religious, social, and political identity of the Jewish state; literary reflections of Israeli ethnic diversity and changing gender relations; modern Hebrew poetry and postmodern experiments in fiction. Not open for credit to students who have completed Humanities 119. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II.

112. Readings in Jewish Writing and Thought in German Culture (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Religious Studies 23 or consent of instructor. Historical tradition of Jewish thought in the German cultural context; unique contributions of Jewish writ-

ers to culture of the German speaking world; what it means to be "other" in the mainstream culture. May be repeated for credit twice when topic differs. Not open for credit to students who have completed Humanities 121. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I.

120. Cinema and the American Jewish Experience (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 10 recommended. Examination of American cinema to reveal how Jewish identity is expressed and submerged, tracing the relations between religion, identity, race, politics, and art. Not open for credit to students who have completed Humanities 122. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I.

121. Oral History and Jewish Life (4)
Lecture/discussion—3 hours; term paper. Oral history methodologies and application to an in-depth oral history interview about Jewish life. Topics include oral history practices and ethics, immigration, migration, religious practice, ethnic relations, and community organization structures. Not open for credit to students who have completed Humanities 123. GE credit: SocSci, Wrt.—III.

Land, Air and Water Resources

(College of Agricultural and Environmental Sciences)

Michael J. Singer, Ph.D., Chairperson of the Department

————, Vice Chairperson, Hydrology

James H. Richards, Ph.D., Vice Chairperson, Soils and Biogeochemistry

————, Vice Chairperson, Atmospheric Science

Department Office, 1110 Plant and Environmental Sciences Building (530-752-1406)

http://lawr.ucdavis.edu

Faculty—Soils and Biogeochemistry

Office: 1110 Plant and Environmental Sciences Building (530-752-1406)

Caroline S. Bledsoe, Ph.D., Professor *(Soil Science)*
William H. Casey, Ph.D., Professor *(Aqueous Geochemistry)*
Randy A. Dahlgren, Ph.D., Professor *(Soil Mineralogy)*
William R. Horwath, Ph.D. Professor *(Soil Biogeochemistry)*
André E. Läuchli, Ph.D., Professor *(Plant Nutrition)*
Alexandra Navrotsky, Ph.D., Professor *(Chemical Engineering and Materials Science)*
James H. Richards, Ph.D., Professor *(Plant Nutrition)*
Dennis E. Rolston, Ph.D., Professor *(Soil Science)*
Kate M. Scow, Ph.D., Professor *(Soil Science)*
Wendy Kuhn Silk, Ph.D., Professor *(Hydrologic Science)*
Michael J. Singer, Ph.D., Professor *(Soil Science)*
Randal J. Southard, Ph.D., Professor *(Soil Genesis/Morphology)*
Robert J. Zasoski, Ph.D., Professor (Soil Science)

Emeriti Faculty

Conrad J. Bahre, Ph.D., Professor Emeritus
Francis E. Broadbent, Ph.D., Professor Emeritus
Richard G. Burau, Ph.D., Professor Emeritus
Emanuel Epstein, Ph.D., Professor Emeritus
H. Michael Reisenauer, Ph.D., Professor Emeritus
Victor V. Rendig, Ph.D., Professor Emeritus
Harry O. Walker, Ed.D., Senior Lecturer Emeritus

Affiliated Faculty

Roland D. Meyer, Ph.D., Specialist in Cooperative Extension
A. Toby O'Geen, Ph.D. Assistant Specialist in Cooperative Extension
G. Stuart Pettygrove, Ph.D., Specialist in Cooperative Extension

Faculty—Atmospheric Science

Office: 141 Hoagland Hall, 1110 Plant and Environmental Sciences Building (530-752-1406)

Cort Anastasio, Ph.D., Assistant Professor *(Tropospheric Chemistry)*
Shu-hua Chen, Ph.D., Assistant Professor *(Regional Scale Meteorologist)*
Ian Faloona, Ph.D., Assistant Professor *(Atmospheric Science)*
Robert G. Flocchini, Ph.D., Professor *(Environmental and Resource Sciences)*
Richard D. Grotjahn, Ph.D., Professor *(Atmospheric Science)*
Terrence R. Nathan, Ph.D., Professor *(Atmospheric Science)*
Kyaw Tha Paw U, Ph.D., Professor *(Atmospheric Science)*
Ruth Reck, Ph.D., Professor *(Atmospheric Science)*
Bryan C. Weare, Ph.D., Professor *(Meteorology)*

Emeriti Faculty

Thomas A. Cahill, Ph.D., Professor Emeritus
John J. Carroll, III, Ph.D., Professor Emeritus
Roger H. Shaw, Ph.D., Professor Emeritus
Marilyn L. Shelton, Ph.D., Professor Emeritus
Su-Tzai Soong, Ph.D., Professor Emeritus

Affiliated Faculty

Richard L. Snyder, Ph.D., Lecturer *(Atmospheric Science)* and Specialist in Cooperative Extension

Faculty—Hydrology

Office: 1110 Plant and Environmental Sciences (530-752-1406)

Graham E. Fogg, Ph.D., Professor *(Hydrogeology)*
Mark E. Grismer, Ph.D., Professor *(Hydrologic Science, Biological and Agricultural Engineering)*
Peter J. Hernes, Ph.D., Assistant Professor *(Hydrologic Science)*
Jan W. Hopmans, Ph.D., Professor *(Water Management)*
Theodore C. Hsiao, Ph.D., Professor *(Hydrologic Science)*
Miguel A. Mariño, Ph.D., Professor *(Hydrologic Science, Civil and Environmental Engineering)*
Gregory B. Pasternack, Ph.D., Assistant Professor *(Watershed Hydrology)*
Carlos E. Puente, Ph.D., Professor *(Hydrology)*
Susan Ustin, Ph.D., Professor *(Environmental and Resource Sciences)*
Wesley W. Wallender, Ph.D., Professor *(Hydrologic Science, Biological and Agricultural Engineering)*

Emeriti Faculty

James W. Biggar, Ph.D., Professor Emeritus
Robert H. Burgy, M.S., Professor Emeritus
Donald W. Grimes, Ph.D., Lecturer Emeritus
Delbert W. Henderson, Ph.D., Professor Emeritus
Allen W. Knight, Ph.D., Professor Emeritus
Donald R. Nielsen, Ph.D., Professor Emeritus
William O. Pruitt, Jr., Ph.D., Lecturer Emeritus
Frank E. Robinson, Ph.D., Lecturer Emeritus
Verne H. Scott, Ph.D., Professor Emeritus
Kenneth K. Tanji, Sc.D., Professor Emeritus

Affiliated Faculty

David A. Goldhamer, Ph.D., Lecturer *(Hydrologic Science)* and Specialist in Cooperative Extension
Stephen Grattan, Ph.D., Lecturer *(Hydrologic Science)* and Specialist in Cooperative Extension
Blaine R. Hanson, Ph.D., Lecturer *(Hydrologic Science)* and Specialist in Cooperative Extension
Thomas Harter, Ph.D., Specialist in Cooperative Extension
Terry L. Prichard, M.S., Lecturer *(Hydrologic Science)* and Specialist in Cooperative Extension
Lawrence J. Schwankl, Ph.D., Lecturer *(Hydrologic Science)* and Specialist in Cooperative Extension

Land, Air and Water Resources is a multidisciplinary department with faculty who specialize in atmospheric, plant, environmental resources, soil and water science, hydrology, and water engineering. Teaching and research focus on both agricultural and environmental science. The faculty contribute to numerous other undergraduate and graduate programs in the Colleges of Letters and Science, Engineering, and Agricultural and Environmental Sciences.

Major Programs. Undergraduates in the department major in Atmospheric Science, Environmental and Resource Sciences, Hydrology, and Soil and Water Science.

Advising Center is located in 1152 Plant and Environmental Sciences Building (530-752-1669).

Graduate Study. Graduate work offered in the area of resource sciences is Atmospheric Science, Hydrologic Sciences, and Soil Science. Detailed information can be obtained from graduate advisers for these areas and the Graduate Announcement.

Courses. See courses listed under Atmospheric Science, Hydrologic Sciences, Hydrology, Environmental and Resource Sciences, and Soil Science.

Landscape Architecture

(College of Agricultural and Environmental Sciences)

Heath Schenker, M.A., Chairperson, Landscape Architecture Program

Department Office, 142 Walker Hall (530-752-3907)

http://lda.ucdavis.edu

Faculty

Nigel J. R. Allan, Ph.D., Professor
Mark Francis, M.L.A., Professor
Dean MacCannell, Ph.D., Professor
E. Byron McCulley, B.S.L.A., Lecturer
Edward S. McNiel, M.L.A., Lecturer
Patsy E. Owens, M.L.A., Associate Professor
Heath Schenker, M.A., Associate Professor

Emeriti Faculty

Robert L. Thayer, Jr., M.A., Professor Emeritus

The Major Program

Landscape architecture is the planning and design of land areas where human use requires adaptation or conservation of the environment. Students who study landscape architecture are concerned about the welfare of the environment and the people who use it. They are capable of solving physical problems and are able to visualize and "think" in terms of spaces and three-dimensional concepts. The program is fully accredited by the American Society of Landscape Architects, which is the only organization professionally sanctioned to grant landscape architectural accreditations in the United States. The program was last reviewed in 2001 and will next be reviewed in 2005.

The Program. The curriculum balances creativity and visual and spatial skills with technological expertise and a thorough background in physical, natural, and social sciences. Students develop proficiency at problem solving relating to design of parks, urban open spaces, energy-efficient neighborhoods, land reclamation projects, and landscape planning for wilderness and scenic regions, coastal and riparian environments, and other sensitive land areas. The program stresses a process-oriented approach to design and emphasizes environmental and community values.

Preparatory Requirements. Students are admitted to the landscape architecture major only after submit-

ting a portfolio for review and selection by the faculty. Contact the Environmental Design Advising Center or the Landscape Architecture major adviser for further information, 201 Walker Hall (530-754-8628).

Career Alternatives. Graduates may find jobs in private landscape architectural firms or public agencies and corporations employing landscape architects. The landscape architecture major provides the student with excellent preparation for graduate school or career development in a wide range of environmental and design-related fields.

B.S. Major Requirements:

UNITS

English Composition Requirement..... 8
English 1, 3, 18, 19, 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, or 104E..... 4
Communication 1 4

Preparatory Subject Matter 62-71
Biological Sciences 1A, 1C, or 10..... 4-5
Environmental Horticulture 6 4
One course from Mathematics 16A; Statistics 13; Computer Science 10 3-4
One course from Chemistry 2A, 10; Physics 1A, 10; Geology 1; Geography 1; or Soil Science 10 3-5
One course from Landscape Architecture 2, Geography 2, or 10..... 3-4
Two courses from Anthropology 2, 3, 20, Economics 1A, 1B, Psychology 1, Political Science 1, 2, 3, 4, 5, 7, Sociology 1, 2, 3, 4, 5, or 25 8-10
Two courses from Art Studio 2, 5, 16, 142, Design 125, any course from History, Music, Dramatic Art, Philosophy, Art History, language or literature 8-10
Landscape Architecture 1, 21, 23, 30, 50, 60, 70 28

Breadth/General Education 0-24
See General Education requirement

Depth Subject Matter..... 44-47
Landscape Architecture 160, 161, 170, 193A, 193B..... 20
Four studios from Landscape Architecture 180/181 or 191 17-20
Landscape Architecture 120 or equivalent .. 4
Landscape Architecture 190 (three quarters) 3
Internship (Landscape Architecture 192) recommended.

Restricted Electives 32
Psychology 155..... 4
Two courses from Environmental Horticulture 105, 133; Plant Biology 147; Plant Biology 102; Wildlife Fish, and Conservation Biology 156. (One course must be Environmental Horticulture 105 or Plant Biology 102.)..... 8
Select 20 units of upper division courses in consultation with adviser..... 20

Unrestricted Electives..... 0-32

Total Units for the Major 180

Major Adviser. P. Owens.

Advising Center is located in 152 Walker Hall (530-754-8628).

Graduate Study. Graduate-level landscape architecture courses are available to students pursuing graduate programs compatible with or directed toward landscape management, planning, and design issues. Department faculty are active members of various graduate groups: Community Development, Ecology, Geography, and Transportation Technology and Policy. Faculty members have expertise in many areas, including landscape history, social theory, practice of public space design, historic landscape preservation, community participation in urban landscape design, landscape ecology, resource management, bioregionalism, and regenerative landscape systems.

Courses in Landscape Architecture (LDA)

Lower Division Courses

1. Landscape Meaning (4)
Lecture—3 hours; discussion—1 hour. Overview of the meaning of landscapes as manifested in designed and natural landscapes, everyday and sacred environments, parks, plazas, community gardens and found spaces. Introduction to the profession of landscape architecture and methods used to design, plan and manage landscapes. Not open for credit to students who have taken course 40. GE credit: ArtHum or SocSci, Wrt.—I. (I.) Francis

2. Place, Culture and Community (4)
Lecture—4 hours. Introduction to the relationship of social and spatial arrangements. Basic social-science concepts such as class, status, role, kinship, ritual, myth, alienation, etc., introduced through site-specific case studies of both historical and contemporary communities. GE credit: SocSci, Wrt.—III. (III.) MacCannell

21. Landscape Drafting and Visualization (4)
Studio—8 hours; two all-day field trips. Prerequisite: course in free-hand drawing recommended. Development of idea expression through graphic media and the use of drawing techniques for visual representation, including plan, section, and axonometric drawing. Includes an introduction to computerized drafting and drawing.—I. (I.)

23. Computer Graphics for Landscape Architecture (4)
Studio—8 hours; two all-day field trips. Prerequisite: course 21. Landscape architectural communications explored through the computer. Includes computerized drafting, drawing, rendering, desktop publishing, and photorealistic simulation.—II, III. (II, III.)

30. History of Landscape Architecture (4)
Lecture—3 hours; discussion—1 hour. Introduction to the history of landscape architecture, emphasizing landscape design as a product of cultural, political, social, and environmental factors. Topics include the history of gardens, parks, community design and environmental planning. Not open for credit to students who have taken course 140. GE credit: ArtHum, Wrt.—II. (II.) Schenker, McNiel

50. Site Ecology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A or 10 or an introductory course in biology, botany, or plant science. Priority given to Landscape Architecture majors. Introduction to ecological concepts, including nutrient dynamics, population regulation, community structure, ecosystem function. Principles will be applied to human activities such as biological conservation, ecological restoration, landscape planning, and management. Weekly laboratory devoted to field exercises in local ecosystems. Not open for credit to students who have taken course 153. GE credit: SciEng.—III. (III.) Greco

60. Technology I: Grading and Drainage (4)
Studio—8 hours. Prerequisite: courses 21 and 23 or consent of instructor. Priority given to Landscape Architecture majors. Topographic and grading problems in landscape engineering: drainage plans, grading plans, spot elevations, road alignment, sections and profiles and cut and fill calculations. Not open for credit to students who have taken course 132.—III. (III.) McCulley

70. Basic Landscape Design Studio (4)
Studio—8 hours; field trips. Prerequisite: courses 1, 21, 30 or consent of instructor. Priority given to Landscape Architecture majors. Introduction to basic aesthetic, functional, social, and environmental considerations in landscape design. Provides a broad foundation in landscape design methodologies and skills necessary to create environmentally and socially responsible landscape designs. Not open for credit to students who have taken course 11.—II. (II.) Owens

Upper Division Courses

120. Advanced Computer Applications (4)
Studio—8 hours; two all-day field trips. Prerequisite: course 23; open to majors in Landscape Architecture only. Studio work using computer-aided design, geographic information systems, and other advanced computer programs.—(III.) McNiel

160. Technology II: Construction Materials and Detailing (4)
Studio—8 hours. Prerequisite: courses 21, 23, and 60. Priority given to Landscape Architecture majors. Introduction to materials and methods in landscape construction, including properties of common construction materials (stone, concrete and wood), detailing, preparation of cost estimates and specifications, design of drainage systems, fountains and roof decks. Not open for credit to students who have taken course 133.—II. (II.) McCulley

161. Technology 3: Professional Practice and Construction Documents (4)
Studio—8 hours. Prerequisite: courses 21, 23, 60 and 160. Legal and professional aspects of landscape architecture, including the development of construction documents (drawings and specifications), proposal writing, fee calculations, project management, cost estimation, and insurance.—I. (I.) McCulley

168. Mountain Landscapes and Life (3)
Lecture—3 hours. Prerequisite: an introductory course in cultural geography, cultural anthropology or landscape theory. Course provides knowledge of mountain landscapes, explains why different mountain societies exploit and reject resources available, examines myths about mountain landscapes that influence individual and collective behavior of residents and visitors. Examples from Himalayas, Andes, Alps, and Rockies. GE credit: ArtHum or SocSci, Wrt.—III. (III.) Allan

170. Field Studio in Landscape Architecture (5)
Lecture—2 hours; workshop—6 hours. Prerequisite: courses 1, 21, 23, 30, 50, 60 and 70 or consent of instructor. Field study and problem solving experience for juniors in the landscape architecture major. Analysis of complex landscape design and planning problems. Two all-day, weekend field trips required.—I. (I.)

180A. Special Topics in Landscape Architecture: Postmodern Landscapes (2)
Lecture—2 hours. Prerequisite: upper division standing. Basic principles of critical theory and postmodern modes of analysis. Application to interpretation and change of designed environment. Offered in alternate years. Not open for credit to students who have taken course 185.—III. (III.) MacCannell

180C. Special Topics in Landscape Architecture: Art of the Environment (2)
Lecture—2 hours. Prerequisite: courses 1 and 30. Priority given to Landscape Architecture and Design majors. Introduction to environmental art. Encouragement of critical thinking about the intersection of art, landscape and environmental issues. Offered in alternate years.—(III.) Schenker

180F. Special Topics in Landscape Architecture: Landscape Ecology (2)
Lecture—2 hours. Prerequisite: course 50 or introductory course in ecology. Theories, major concepts and research methods of landscape ecology. Spatial structure, function and dynamics of various landscape types. Biological conservation, ecological restoration, and landscape planning, design, and management. Offered in alternate years. Not open for credit to students who have taken course 183.—Greco

180G. Special Topics in Landscape Architecture: Regional Land Planning (2)
Lecture—2 hours. Prerequisite: upper division standing. Theories, methods and resources used in large scaled landscape analyses for orderly settlement, preservation or management of the land. Integration of natural, cultural and experiential data into decision making. Offered in alternate years.—(II.) McNiel

180H. Special Topics in Landscape Architecture: The Bioregional Landscape (2)
Lecture—2 hours. Prerequisite: courses 1 and 30. Priority given to Landscape Architecture majors. Emerging concepts of bioregionalism and community-based ecological regional landscape planning. Extensive examples from within the Sacramento Valley Bioregion. Offered in alternate years.—(I.)

180I. Special Topics in Landscape Architecture: Regenerative Landscape Systems (2)
Lecture—2 hours. Prerequisite: courses 1 and 30. Priority given to Landscape Architecture majors. Theories, basic techniques and applications for various systems by which landscapes regenerate and sustain life (both human and non-human) and culture over time. Offered in alternate years.—(III.)

180J. Special Topics in Landscape Architecture: Community Participation in Design (2)
Lecture—2 hours. Prerequisite: upper division standing. History and role of community participation in landscape design; methods of community involvement, including workshop techniques. Introduction to design processes, including public participation. Offered in alternate years.—III. Owens

180K. Special Topics in Landscape Architecture: Social Factors in Landscape Architecture (2)
Lecture—2 hours. Prerequisite: Psychology 144 and upper division standing. Concepts in environmental psychology as they relate to landscape architecture. Discussion of needs of various user groups of a land area. Introduction to post occupancy evaluations. Offered in alternate years.—(III.) Owens

180L. Special Topics in Landscape Architecture: Public Open Space (2)
Lecture—2 hours. Prerequisite: upper division standing. Intensive study of public open spaces, including parks, plazas, playgrounds, greenways and community gardens. Current issues associated with design and management of the public environment of cities. Offered in alternate years.—(II.) Francis

180M. Special Topics in Landscape Architecture: Urban and Community Design (2)
Lecture—2 hours. Prerequisite: upper division standing. Theories and methods of community and neighborhood design. Past and contemporary approaches including new urbanism, planned unit development, mixed use, pedestrian and transit-oriented development. Issues of open space and community form. Offered in alternate years.—Francis

180N. Special Topics in Landscape Architecture: Planting Design (2)
Lecture—2 hours. Prerequisite: upper division standing and Environmental Horticulture 6. Develop an understanding of the sensory, visual and functional importance of plants in the landscape. Visualization and design of planted landscapes. Development of planting plans. Offered in alternate years. Not open for credit to students who have taken course 156.—II.

180O. Special Topics in Landscape Architecture: Current Issues in Landscape Architecture (2)
Lecture—2 hours. Prerequisite: course 1 and 30. Priority will be given to Landscape Architecture and Design majors. Study of current issues in landscape architecture with emphasis on design and/or design history. Offered in alternate years.

181A. Postmodern Landscapes Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180A concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180A. Offered in alternate years.—III. MacCannell

181C. Art of the Environment Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180C concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180C. Offered in alternate years.—(III.) Schenker

181F. Landscape Ecology Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180F concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180F. Offered in alternate years. Not open for credit to students who have taken course 183.

181G. Special Topics in Landscape Architecture: Landscape and Regional Land Planning Studio (3)
Studio—6 hours. Prerequisite: course 170, course 181G concurrently. Applications of recent models and practices of urban planning and design to create livable and sustainable cities, towns, villages, rural, and natural landscapes. Testing of models by creating plans and designs for new communities, and for urban infill, restoration or redevelopment projects. Field trip required. Offered in alternate years.—I. McNiel, Loux

181H. The Bioregional Landscape Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180H concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180H. Offered in alternate years.—(I.)

181I. Regenerative Landscape Systems Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180I concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180I. Offered in alternate years.—(III.)

181J. Community Participation in Design: Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180J concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180J. Offered in alternate years.—III. Owens

181K. Social Factors in Landscape Architecture Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170 and Psychology 144; course 180K concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180K. Offered in alternate years.—(III.) Owens

181L. Public Open Space Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180L concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180L. Offered in alternate years.—(II.) Francis

181M. Urban and Community Design: Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180M concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180M. Offered in alternate years.—(II.) Francis

181N. Planting Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170 and Environmental Horticulture 6; course 180N concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180N. Offered in alternate years.—II.

181O. Current Issues Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180O concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180O. Offered in alternate years.

185. Concepts and Methods in Geographic Information Systems (4)
Lecture/laboratory—8 hours. Prerequisite: Applied Biological System Technology 180 or Agricultural Management and Rangeland Resources 180 or course 50 or consent of instructor. Major concepts and methods in representation and analysis of data in geographic information systems (GIS). Methods to create spatial data sets from analog and digital data sources such as aerial photography and maps; data structures, data management, database design, georeferencing, georectification, surface models, analysis, and visualization of spatial data. (Same course as Applied Biological System Technology 185.)—II. (II.) Greco, Plant

190. Proseminar in Landscape Architecture (1)
Seminar—1 hour. Lectures and discussion of critical issues in landscape architecture. May be repeated three times for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

191. Workshop in Landscape Architecture (2-12)
Seminar—1 hour; workshop—3 hours. Prerequisite: courses 1, 70, and 170 or consent of instructor. Priority to Landscape Architecture majors. Faculty initiated workshops featuring advanced studies and applications of original work in landscape architecture. May be repeated for up to 20 units of credit.—I, II, III.

192. Internship in Landscape Architecture (1-12)
Internship. Prerequisite: senior standing in Landscape Architecture. Professional field experience in landscape architecture. May be repeated for a total of 12 units. (P/NP grading only.)

193A. Senior Project in Landscape Architecture (3)
Studio—6 hours. Prerequisite: senior standing in Landscape Architecture. Projects will focus on a critical area of landscape architectural design, planning, analysis, communication, or research. Limited enrollment. Required of all Landscape Architecture majors. (P/NP grading only.)—II. (II.)

193B. Senior Project in Landscape Architecture (4)
Studio—8 hours. Prerequisite: course 193A and senior standing in Landscape Architecture. Projects will focus on a critical area of landscape architectural design, planning, analysis, communication, or research. Limited enrollment. Required of all Landscape Architecture majors. (P/NP grading only.)—III. (III.)

197T. Tutoring in Landscape Architecture (1-5)
Tutoring—3-15 hours. Prerequisite: consent of instructor. Tutoring in Landscape Architecture courses. (P/NP grading only.)

198. Directed Group Study in Landscape Architecture (1-5)
Prerequisite: consent of instructor. Directed group study. (P/NP grading only.)

199. Special Study for Advanced Undergraduates in Landscape Architecture (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

201. Theory and Philosophy of the Designed Environment (4)
Seminar—4 hours. Prerequisite: course 140 or the equivalent; graduate standing or consent of instructor. Examines the major theories of environmental design. Epistemology of design serves as framework to examine modern landscape architecture, architecture, urban design and planning. Normative theories of design are reviewed along with the social and environmental sciences. Offered in alternate years.—Francis

202. Methods in Design and Landscape Research (4)
Seminar—4 hours. Prerequisite: Statistics 102 or the equivalent; graduate standing or consent of instructor. Explores many of the research and advanced design and planning methods employed in landscape architecture. Exercises provide the student with a vehicle for designing independent landscape research and creative activities. Lectures provide an historical overview of research methodology. Offered in alternate years.—III. Owens

204. Case Studies in Landscape Design and Research (4)
Seminar—4 hours; field trip required. Prerequisite: graduate standing in Landscape Architecture, Ecology, Geography or Community Development or consent of instructor. Real-world designed environment situations where creative activity and/or basic research is the primary product. May be repeated for credit for a total of 12 units. Offered in alternate years.—(I, II, III.)

210. Advanced Landscape Architecture Studio (4)
Laboratory—8 hours. Prerequisite: course 113 or the equivalent; graduate standing or consent of instructor. Exposes students to real-world, designed-environment situations where creative activity and/or basic research is the primary product. Advanced landscape problems will be utilized at the site, urban or rural scale. Offered in alternate years.

220. Public Space and Culture (3)
Seminar—3 hours. Prerequisite: course 182 or the equivalent; graduate standing or consent of instructor. Explores the public environment of cities including their streets, parks, and squares. Public life and culture of American cities is examined and design responses to this culture evaluated. Typology is used to identify spaces. Offered in alternate years.—Francis

230. Landscape and Memory (4)
Seminar—4 hours; term paper. Prerequisite: graduate standing or consent of instructor. Theories of memory from other fields (critical theory, psychoanalysis, history) applied to landscape design, especially heritage and tourist sites. The relationships between place, memorial, and event. Offered in alternate years.—MacCannell

240. Historic, Cultural Landscapes: Concept, Perception, Preservation (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Historic cultural landscapes, as defined by the National Register of Historic Places. Identification and analysis of aerial extent, structured makeup, integrity, and historical significance using common and emerging methods and tools. Offered in alternate years.—McNiel

250. Life-Place: Bioregional Theory and Principles (4)
Seminar—3 hours; tutorial—1 hour. Prerequisite: graduate standing or consent of instructor. The emerging concept of bioregionalism as a hypothesis for environmental quality; theoretical structures and practical methods by which individuals and groups identify with naturally-bounded "life-places" or "bioregions" and strive to live respectfully and reciprocally within them. Offered in alternate years.—Thayer

260. Landscape and Power (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. How various representations of landscape have historically worked as agents of cultural power. Course framework is interdisciplinary, including studies of landscape representation in literature, art, photography, cartography, cinema, and landscape architecture.—Schenker

270. Environment and Behavior (4)
Seminar—3 hours; tutorial—1 hour. Prerequisite: graduate standing or consent of instructor; Psychology 144 recommended. Factors that influence human's interaction with their surroundings and the mechanisms used for recognizing and addressing general and specific human needs in community design and development decisions. Offered in alternate years.—Owens

280. Landscape Conservation (3)
Seminar—3 hours. Prerequisite: contact department for prerequisite courses; graduate standing or consent of instructor. Focus is on land planning, design, and management techniques to further the goal of resource preservation. Examines current critical theory in the establishment and management of conservation areas. Offered in alternate years.

290. Graduate Seminar in Landscape Architecture (2)
Seminar—2 hours. Prerequisite: graduate standing and consent of instructor. Seminar on selected topics in landscape architecture research, analysis, planning, design, communication, or education. May be repeated for credit. (S/U grading only.)

297. Practicum in Landscape Architecture (1-10)
Independent study—1-10 hours. Prerequisite: graduate standing and consent of instructor. Opportunity for students to work directly in the field with academics at other institutions or with professionals in an office setting. Gives experience beyond the confines of campus and allows direct interaction with the community. (S/U grading only.)

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

299. Directed Individual Research for Graduate Students (1-5)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Latin

See Classics

Landscape Restoration

(College of Agricultural and Environmental Sciences)

This minor is of particular interest to students majoring in Wildlife, Fish, and Conservation Biology, Environmental Biology and Management, Environmental and Resource Sciences, Landscape Architecture, Biological Sciences, Evolution and Ecology and Plant Biology. Biological Sciences 1C is a prerequisite to some courses in the minor. The minor is sponsored by the Department of Environmental Horticulture.

Landscape Restoration.....18-25
Select one of Environmental Horticulture 144/ Environmental and Resource Sciences 144/Plant Biology 144, Environmental Science and Policy 155, Evolution and Ecology 121, Evolution and Ecology 117/ Plant Biology 117, Plant Biology 102, 147 4-5
Select one of Environmental Horticulture 100, 130, 133, Plant Biology 119, 121, 176 3-4
Soil Science 10 or 100..... 3-5
Select two courses and a minimum of 5 units from Agricultural Management and Rangeland Resources 130, Environmental Horticulture 150, 160, Environmental Science and Policy 155L, Environmental Planning and Management 110, 134, Landscape Architecture 180H, 180I ...5-8
Environmental Horticulture 192 3

Minor adviser. T.P. Young.

Law, School of

Rex R. Perschbacher, J.D., Dean
Kevin Johnson, J.D., Associate Dean (Academic Affairs and Research)
Hollis L. Kulwin, J.D., Assistant Dean (Student Affairs)
Mary A. Grivna, B.A., Assistant Dean (Administration)
George S. Grossman, LL.B., M.S.L.S., Director (Law Library)
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Faculty

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Andrea K. Bjorklund, J.D., Acting Professor
Alan E. Brownstein, J.D., Professor
Jennifer M. Chacón, J.D., Acting Professor
Anupam Chander, J.D., Professor
Joel C. Dobris, LL.B., Professor
Holly G. Doremus, J.D., Professor
Christopher S. Elmendorf, J.D., Acting Professor
Floyd F. Feeney, LL.B., Professor
Arturo Gándara, J.D., Professor
Joan Gerbasi, M.D., Assistant Clinical Professor *(School of Medicine)*
George S. Grossman, LL.B., M.S.L.S., Professor
Robert W. Hillman, J.D., Professor
Bill Ong Hing, J.D., Professor
Edward J. Imwinkelried, J.D., Professor
Elizabeth E. Joh, J.D., Acting Professor
Margaret Z. Johns, J.D., Senior Lecturer
Kevin R. Johnson, J.D., Professor
Thomas W. Joo, J.D., Professor
Leslie A. Knight, J.D., Lecturer
Hollis L. Kulwin, J.D.
Leslie A. Kurtz, J.D., Professor
Evelyn A. Lewis, J.D., Professor
Carlton Larson, J.D., Acting Professor
Albert C. Lin, J.D., Acting Professor
Robert Merges, J.D., LL.M., J.S.D., Professor
Robert Mikos, J.D., Acting Professor
Millard Murphy, J.D., Lecturer
John B. Oakley, J.D., Professor
Angela I. Onwuachi-Willig, J.D., Acting Professor
Amagda Perez, J.D., Lecturer
Rex R. Perschbacher, J.D., Professor
John W. Poulos, J.D., Professor
Lisa R. Pruitt, J.D., Acting Professor
Cruz Reynoso, LL.B., Professor
Ben A. Rich, J.D., Ph.D., Professor
Charles L. Scott, M.D., Professor *(School of Medicine)*
Daniel L. Simmons, J.D., Professor
James F. Smith, J.D., Senior Lecturer
Madhavi Sunder, J.D., Professor
Jerrold Tannenbaum, J.D. Professor *(School of Veterinary Medicine)*
Martha S.West, J.D., Professor
Carter C. White, J.D., Lecturer
Tobias B. Wolff, J.D., Acting Professor
Bruce A. Wolk, J.D., Professor

Emeriti Faculty

John D. Ayer, J.D., LL.M., Professor Emeritus
Edward L. Barrett, Jr., J.D., Professor Emeritus
Florian Bartosic, B.C.L., LL.M., Professor Emeritus
Carol S. Bruch, J.D., Professor Emeritus
Harrison C. Dunning, LL.B., Professor Emeritus
Daniel Wm. Fessler, J.D., S.J.D., Professor Emeritus
Gary S. Goodpaster, J.D., Professor Emeritus
James E. Hogan, LL.B., Professor Emeritus
Raymond I. Parnas, J.D., LL.M., S.J.D., Professor Emeritus
Edward H. Rabin, LL.B., Professor Emeritus
Mortimer D. Schwartz, J.D., LL.M., Professor Emeritus
Richard C. Wydick, LL.B., Professor Emeritus

Courses of Instruction. The following courses for students enrolled in the School of Law are set up for the semester-system basis only. Instruction dates can be found at the end of the School of Law chapter of this catalog. For current schedule of classes, contact the School of Law.

Courses in Law (LAW)

Professional Curriculum

First Year Courses

200. Introduction to Law (1)
Discussion—1 hour. Introduction to basic concepts of the law, the historical roots of common law and equity, the precedent system in its practical operation, the modes of reasoning used by courts and attorneys, and the fundamentals of statutory interpretation. (S/U grading only.)

200A. Introduction to the Law of the United States (2)
Discussion—2 hours. History and fundamental principles of the United State's legal system. Important current legal issues, developments and trends. Required for LL.M. students who have not attended a U.S. law school. Fall semester only. (S/U grading only.)

201. Property (5)
Discussion—5 hours. Doctrines and concepts of property law with primary emphasis on real property. Topics include the estates in land system, the landlord-tenant relationship, conveyancing, and private and public land use control. (Same course as 201A-201B.)

201A-201B. Property (2-3)
Discussion—2-3 hours. Study of doctrines and concepts of property law with primary emphasis on real property. The estates in land system, the landlord-tenant relationship, conveyancing, and private and public land use control. (Deferred grading only, pending completion of sequence.)

202A-202B. Contracts (3-2)
Discussion—3-2 hours. Examines the sorts of promises that are enforced and the nature of protection given promissory obligations in both commercial and noncommercial transactions. Inquiry into the means by which traditional doctrine adjusts—or fails to adjust—to changing social demands. (Deferred grading only, pending completion of sequence.)

203. Civil Procedure (5)
Discussion—5 hours. Fundamental and recurrent problems in civil actions including the methods used by federal and state courts to resolve civil disputes. Topics include the relation between federal and state courts; the power of courts over persons, property, and subject matter (jurisdiction); the scope of litigation (joinder of claims and parties); preparation for trial through pleadings, discovery, and pretrial; devices for resolving actions and issues before and during trial, function of judge and jury; and the finality of the trial court's decision. (Same course as 203A-203B.)

203A-203B. Civil Procedure (3-2)
Discussion—3-2 hours. Study of the fundamental and recurrent problems in civil actions including the methods used by federal and state courts to resolve civil disputes. Topics covered include the relation between federal and state courts; the power of courts over persons, property, and subject matter (jurisdiction); the scope of litigation (joinder of claims and parties); preparation for trial through pleadings, discovery, and pretrial; devices for resolving actions and issues before and during trial; functions of judge and jury; and the finality of the trial court's disposition. (Deferred grading only, pending completion of sequence.)

204A-204B. Torts (3-2)
Discussion—3-2 hours. Legal concepts which apply to actions brought by litigants who seek relief for injury. Intentional and unintentional invasions of personality and property. Analysis of civil actions based upon wrongs such as assault, battery, false imprisonment, negligence, strict liability, defamation, invasion of privacy, and misrepresentation. (Deferred grading only, pending completion of sequence.)

205. Constitutional Law I (4)
Discussion—4 hours. The principles, doctrines, and controversies regarding the basic structure of, and division of powers in, American government. In particular, course treats judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immunities, and the separation of powers between branches of the federal government. It also begins an examination, continued in course 218, of procedural and substantive constitutional rights and the limits they place on governmental action. Economic substantive due process, procedural due process, and rights of privacy and personal autonomy will also be addressed.

206. Criminal Law (3)
Discussion—3 hours. Study of the bases and limits of criminal liability. Coverage of the constitutional, statutory, and case law rules which define, limit, and provide defenses to individual liability for the major criminal offenses.

207. Legal Research (1)
Discussion/laboratory—1 hour. Research related issues in the practice of law, including the use of sources of law and secondary authority, computer-assisted legal research, writing research memoranda, and basic citation form. Class discussions followed by research assignments.

208. Legal Writing (2)
Lecture—2 hours. Instruction in the form and substance of writing. A variety of law-related documents will be discussed and drafted. An experience in oral advocacy will be included. Graded on the basis of the writing and advocacy assignments. No final examination.

Second and Third Year Courses

The second- and third-year courses fall into subject areas as shown here

(a) Advanced Law: 273
(b) Business Law: 215, 215A, 228, 232, 236A, 236B, 242, 243, 253, 262, 266, 266A, 266B, 269A, 269B, 271, 271A, 271B, 284, 295
(c) Constitutional Law: 218, 288
(d) Criminal Law: 210, 213, 216, 227A, 227B, 245, 276
(e) Environmental Law: 230, 256, 264, 265, 282, 285, 285A, 287, 289, 289A, 294
(f) Estate Planning: 214, 221, 223
(g) Family Law: 225, 242, 272, 272A, 272B
(h) Health Law: 212, 241, 244, 286A, 286B
(i) Human Rights and Civil Liberties Law: 222, 222A, 226, 231, 231A, 233, 234, 248B, 267, 267A, 267B, 268, 277, 408, 408A
(j) Intellectual Property and Technology: 209, 209A, 217, 266A, 274, 274A, 274B, 274C, 296
(k) International, Comparative and Foreign Law: 210, 213, 224, 230, 242, 248, 248A, 248B, 248C, 248D, 248E, 249, 252, 268, 270, 274A, 290, 291, 292
(l) Labor and Employment Law: 251, 251A, 255, 260, 279
(m) Legal Theories and Ethics: 237, 250, 258, 258A, 259, 284
(n) Procedure and Jurisdiction: 242, 246, 275, 283
(o) Public Law and Policy: 235, 240, 254, 257, 279, 281, 281A, 293, 293A, 408A
(p) Skills and Litigation: 211, 219, 229, 239, 261, 263A, 263B, 267A, 278, 280, 297, 409, 410A, 410B, 410C, 412, 413, 414, 415
(q) Taxation: 214, 220, 238, 247A, 247B, 255, 271, 271A, 271B
(r) Clinical Programs: 420, 425, 430, 435, 440, 445, 450, 455, 460, 470, 480
(s) Individual and Group Study: 411, 416, 417, 418, 419, 495, 498, 499

209. The Internet and the Law (2)
Discussion—2 hours. Is the internet redefining the law as we know it, or reconfirming traditional 19th- and 20th-century legal principles? How should the law adapt, if it should, to the internet era? Essential background on the internet. Students conduct internet research. Brief review of forms of governance and law that have emerged on the internet, survey of the current state of the law of the internet, covering common law and statutory developments in the following areas: contracts and business transactions (including digital signatures and "clickable" licenses); securities and antitrust; jurisdiction, trademarks and domain names; copyright and trade secrets; electronic databases; defamation and libel; decency and free speech; privacy; and public records. Problems faced by actual or private sector clients posed and resolved.

209A. Patent Law (2)
Discussion—2 hours. United States patent law. What kinds of things may be patented, the requirements for a patent, and the many ways that patent rights may be lost. Rudiments of drafting a patent claim and how the patent system is responding to the acceleration of technological change. No engineering or science background required.

210. Criminal Justice Administration Seminar (2)
Seminar—2 hours. American criminal procedure compared with that of other countries, particularly the differing roles of the prosecutor, defense counsel, and the judge, and the differing systems of sentencing. Class paper can be used to satisfy advanced writing requirement. Limited enrollment.

211. Negotiation (2)
Discussion—2 hours. Strategies and tactics of negotiation in settling controversies between parties. Role-playing exercises and simulations to develop negotiating skills. Limited enrollment.

212. Law and the Mental Health System (3)
Discussion—3 hours. Mental illness, the regulation of mental health professionals, the patient-professional relationship, mental health professionals as expert witnesses, and deprivation of liberty and property based upon mental disorder. With the prior written approval of the instructor, the advanced legal writing requirement may be satisfied by the research paper required for this course.

213. International Criminal Law Seminar (2)
Seminar—2 hours. Prerequisite: courses 205 and 206. Issues that arise when crime acquires an international character; for example, when an offense occurs in or harms more than one nation or when a person accused in one nation is a citizen in another. Topics include the United States' role in investigating and prosecuting international offenses, and what law, domestic or international, U.S. courts should apply in such cases; the duty of a nation to extradite or prosecute persons accused of breaking the law of another nation; the prosecution of international war criminals in the post-World War II tribunals in Nuremberg and Tokyo and in the current Bosnia and Rwanda tribunals in the Hague; the Pinochet case; and the proposed permanent International Criminal Court. Students will be required to write a research paper that will satisfy the advanced legal writing requirement. Limited enrollment.

214. Estate and Gift Tax (3)
Discussion—3 hours. Prerequisite: course 220; course 221 recommended. Fundamentals of federal transfer taxation, including the estate tax, the gift tax, and the generation-skipping transfer tax. Introduction to the income taxation of trusts and estates.

215. Business Associations (4)
Discussion—4 hours. Legal rules and concepts applicable to business associations, both public and closely held. Corporate form of organization, partnerships and other associational forms. Topics include the planning of business transactions, the process of incorporation, the financing of corporations, and role of management and shareholders, the federal securities laws, and social responsibility.

215A. The Law of Corporate Governance Seminar (2)
Seminar—2 hours. Prerequisite: course 215. Advanced issues in the governance of publicly held corporations. Separation of ownership and control and how the law has addressed this issue at the theoretical level and in the context of topics such as the duties of corporate directors, shareholder vot-

ing rights, and competition among states to attract corporate charters.

216A. Law and Religion (2)
Discussion—2 hours. Federal constitutional law relating to religion. Interpretation and application of the Free Exercise Clause and the Establishment Clause of the First Amendment. State constitutional law. Federal and state statutes relating to religion.

217. Telecommunications Law (3)
Discussion—3 hours. Economic and administrative regulation of telephony, radio and television broadcasting, and video technologies such as cable and direct broadcast satellites. Emphasis on the recently enacted Telecommunications Reform Act and the role of the Federal Communications Commission, as well as other sources of regulation such as related antitrust law and state public utility regulation.

218. Constitutional Law II (4)
Discussion—4 hours. The First Amendment and the Equal Protection Clause. Examination of freedom of speech and assembly, focusing on the various kinds of speech the courts have identified and their constitutional significance: political speech, commercial speech, offensive speech, obscenity, fighting words, and speech constituting a clear and present danger. Issues involving the forum in which speech occurs, prior restraint, overbreadth, and vagueness doctrine, and the protection provided symbolic expression. Suspect class doctrine, including discrimination on the basis of race, gender, alienage and other characteristics, affirmative action, and the problem of "invidious motive," as well as state action and the extent to which the equal protection clause prevents government from burdening the exercise of fundamental rights. The Establishment Clause and the Free Exercise Clause.

219. Evidence (4)
Discussion—4 hours. The rules regarding the admissibility of testimonial and documentary proof during the trial of civil and criminal cases, including the concept of relevancy, the hearsay rule, the examination and impeachment of witnesses, the opinion rule, constitutional and statutory privileges.

220. Federal Income Taxation (4)
Discussion—4 hours. Introduction to basic principles of federal income taxation. Topics include identification of income subject to tax, gains and losses from property transactions, deductions from income, the timing of income and deductions (tax accounting), and the identity of persons subject to tax on particular items of income.

221. Trusts, Wills and Decedent's Estates (3)
Discussion—3 hours. The law of decedent's estates, wills and trusts. Topics include intestate succession; family protection and limits on the power of testation; execution, revocation and revival of wills; will substitutes; intervivos and testamentary private trusts. Topics may include contracts to make wills; class gifts; powers of appointment; the Rule against Perpetuities; and introduction to the administration of estates and trusts, including powers, duties, rights, and liabilities of fiduciaries and the management of assets.

222. Critical Race Theory Seminar (3)
Discussion—3 hours. Race relations and racial discrimination in America through the perspectives of proponents of the Critical Race Theory movement ("CRT"), a collection of legal scholars who challenge both conservative and liberal political orthodoxies.

222A. Latinos and Latinas and the Law (2)
Seminar—2 hours. Legal issues of particular relevance to the Latino community in the United States, including racial identity, immigration, language regulation, national and transnational identity issues, affirmative action, and civil rights. Research in the social sciences and the humanities as well as legal sources. Limited enrollment.

223. Estate Planning Seminar (2)
Seminar—2 hours. Prerequisite: course 221. Selected topics in the estates and trusts area. Content varies with instructor. Satisfies the advanced legal writing requirement. Limited enrollment.

224. Animal Law Seminar (2)
Seminar—2 hours. An introduction to legal principles affecting animals and their use.

225. Marital Property (2)
Discussion—2 hours. The California community property system, including the rights of marital and domestic partners during the ongoing relationship, and upon the end of the relationship by death or divorce.

225A. Marital Property (3)
Discussion—3 hours. California community property system, including the rights of spouses and the treatment of their property during marriage, and the characterization, valuation, and division of property upon divorce. Topics may include creditor's rights, premarital agreements, non-marital relationships, and division of property upon death.

226. Disability Rights (2)
Discussion—2 hours. The Americans with Disabilities Act (A.D.A.) as it applies to employment, higher education, public accommodations, and government services and programs. Emphasis on the statutory definition of disability, entities subject to the A.D.A., the "otherwise qualified" requirement, forms of discrimination, reasonable accommodation, and defenses.

227A. Criminal Procedure (3)
Discussion—3 hours. Federal constitutional limits on government authority to gather evidence and investigate crime. Topics include Fourth Amendment limits on search, seizure, and arrest; the Fifth Amendment privilege against self-incrimination; and the Sixth Amendment right to counsel.

227B. Advanced Criminal Procedure Seminar (2)
Seminar—2 hours. Prerequisite: course 227A (may be taken concurrently). An overview of bail, prosecutorial discretion, plea bargaining, trial by jury, and sentencing as well as other selected areas. Attendance and participation required. Oral presentation and research paper required. Advanced writing requirement for second-year students only.

228. Business Planning and Drafting (3)
Discussion—3 hours. Prerequisite: course 215, 220. Transactions frequently encountered by lawyers representing business clients and individuals of moderate or large wealth, emphasizing the tax aspects of such transactions. Covers business and tax strategies, techniques and issues relative to formation of business entities, and common business and personal transactions such as real estate acquisitions, licensing agreements, construction contracts.

229. Scientific Evidence (3)
Discussion—3 hours. Prerequisite: course 219. Examines evidence law governing the admission of scientific testimony, and considers trial advocacy in presenting and attacking such testimony. Each student is required to both make an oral class presentation and prepare a research paper dealing with a particular forensic technique. Limited enrollment.

230. International Environmental Law Seminar (2)
Seminar—2 hours. International law norms applicable to the protection of the global environment, including air and water resources, flora and fauna, and historical and cultural treasures of international interest. The institutions that make and enforce the norms. Special emphasis on implementation and compliance by the United States. Required seminar paper will satisfy the advanced legal writing requirement. Limited enrollment.

231. Sex Based Discrimination (3)
Discussion—3 hours. Issues raised by legal and social distinctions between men and women. Explores potential remedies for discrimination drawn from constitutional law, statutory enactments, and common law developments. Subject matter areas include sex-based discrimination in constitutional law, family law, reproductive rights, educational opportunity, criminal law, and employment.

231A. Sexual Orientation and the Law (2)
Discussion—2 hours. Legal and social regulation of sexual orientation, emphasizing both the legal subordination of lesbians and gay men and the ongoing struggles to end that subordination. Sexual orientation issues in criminal, employment, constitutional, and family law. Substantial research paper may meet the Advanced Writing Requirement at the discretion of the professor.

232. Real Estate Finance (3)
Discussion—3 hours. Examination of the problems involved in the acquisition, financing, and development of real estate, and of lender remedies and debtor protections in the event of debtor default. Stresses the practical application of California legal doctrines.

233. Refugee Law Seminar (2)
Seminar—2 hours. Prerequisite: course 292 recommended. Focus on the law concerning the admission of refugees into the United States. Detailed study of the Refugee Act of 1980, which is the major piece of legislation dealing with refugee admission, the international law that fueled the passage of the Act, and the various regulations promulgated by the Attorney General implementing the law. Analysis of the implementation of the Refugee Act and examination of some criticisms of the immigration bureaucracy's implementation of the law. Some topical issues of refugee law, such as gender-based persecution, persecution based on the exercise of reproductive rights, and the persecution of lesbians and gay men. The advanced legal writing requirement may be satisfied at the discretion of the instructor. Limited enrollment.

234N. Seminar on Violence Against Women (2)
Seminar—2 hours. Issues of violence against women have gained increasing attention both in the United States and internationally in the past fifteen years, largely because of feminist efforts to address gender-based violence against females. The passage of the Federal Violence Against Women Act in 1994, the growth in international law targeting gender-based violence and trafficking in women, and the recent international prosecutions for rape as a war crime in the former Bosnia. Survey of issues raised by violence against women, and topics such as battering, rape, sexual harassment, prostitution, and pornography. Students will be required to do a research paper and to make in-class presentations. The paper will satisfy the advanced legal writing requirement.

235. Administrative Law (3)
Discussion—3 hours. Examination of how the U.S. Constitution and the federal Administrative Procedure Act constrain and regulate decision making by government agencies and officials. Topics include administrative due process, separation of powers, delegation of authority to agencies, procedural requirements for agency adjudication and rulemaking, and the extent and limits of judicial review. Course highly recommended for anyone intending to practice in any public law area or at the intersection of public/private law.

236A. Securities Regulation I (2)
Discussion—4 hours. Prerequisite: course 215 or consent of instructor. Legal rules and concepts applicable to business associations, both public and closely held. Corporate form of organization, partnerships and other associational forms. Topics include the planning of business transactions, the process of incorporation, the financing of corporations, and role of management and shareholders, the federal securities laws, and social responsibility.

236B. Securities Regulation II (2)
Discussion—2 hours. Prerequisite: course 215 or consent of instructor; course 236A recommended. Securities Exchange Act of 1934 and the regulation of securities markets. Topics covered include regulation of securities markets and securities professionals, responsibilities of securities lawyers, continuous reporting, transnational securities fraud, and enforcement of the securities acts.

237. American Legal History (2)
Seminar—2 hours. A chronological overview of the legal ramifications of the major events of American history from the colonial era to the late Twentieth

Century. The functioning of American legal institutions—courts, legislatures, executive and administrative agencies—in the context of the nation's social values.

238. Tax Strategies of Business (2)
Discussion—2 hours. Framework for analyzing how income taxes affect business decisions and company strategy. Applications include the role of taxes in management compensation, multinational decision-making, corporate restructuring transactions, and succession planning. Tax planning concepts and their application. Intended to develop broad understanding of how taxes affect business decisions. Simple algebra to describe generic tax issues and work with computer spreadsheets.

239. Mediation: Theory and Practice (3)
Discussion—3 hours. Prerequisite: course 211, 297. The basic, practical knowledge necessary to begin a mediation practice. Detailed understanding of the mediation process to counsel clients knowledgeably about the mediation option and represent clients ably in mediation. Communication skills, development of the ability to analyze disputes to understand why negotiations succeed or fail, and understanding of the advantages and limitations of mediation as a method of resolving disputes. The stages of a mediation: contracting (establishing contact with the parties and explaining the process), developing the issues, working the conflict, resolving the conflict, and closure.

240. Elections and Political Campaigns (2)
Discussion—2 hours. Constitutional and statutory aspects of federal and state elections, including laws relating to campaign finance, initiatives, term limits and reapportionment. Satisfies legal writing requirement. Limited enrollment.

241. Law and Psychiatry (2)
Seminar—2 hours. Prerequisite: course 212. Open to medical students who are participating in the program offered by the Forensic Center of Excellence at the UC Davis School of Medicine, and to law students at the UC Davis School of Law. Focus on forensic psychiatry for medical and legal professionals. Psychiatric trainees and forensic fellows are paired with law students to work in tandem as a forensic team. Each team is assigned to actual cases that have been adjudicated, although the teams will approach each client as if adjudication has not yet taken place. Each case is assessed from a psychiatric and a legal perspective so that both team members will confront the legal and psychiatric issues presented. Students prepare cases to provide a broad array of legal/psychiatric problems and raise specific critical issues around which psychiatrists and lawyers interact and at times collide. Course is graded on the basis of the students' participation in the seminar sessions and on the instructor's evaluation of the written assessment of the cases prepared by the team to which the student belongs.

242. Conflict of Laws (3)
Discussion—3 hours. How law operates across state and national borders. The topics covered include choice of applicable law in transactions involving multiple jurisdictions, recognition of judgments, jurisdiction, and such advanced applications as choice of law in class actions or other complex litigation. Problems practitioners frequently encounter in a wide variety of fields, from commercial law to personal injury and family law.

243. Commercial and Bankruptcy Law (4)
Discussion—4 hours. The business debtor who doesn't have enough money (or is unwilling) to pay his debts. Remedies available to creditors to force payment, along with devices that creditors may use to give themselves priority against limited assets. Examination of the role of bankruptcy. Bankruptcy both as a means for providing funds for creditors, and as a device for maximizing asset value.

245. White Collar Crime (3)
Discussion—3 hours. The law of conspiracy, mail and wire fraud, RICO, money laundering and other business and environmental crimes and associated defenses.

246. Federal Jurisdiction (3)
Discussion—3 hours. The subject-matter jurisdiction of federal courts. The constitutional and statutory authority of federal courts to adjudicate civil actions arising under federal law or between parties of diverse citizenship in contemporary detail, and from the perspective of history and the Constitution. Federal appellate jurisdiction, federal writs in the nature of habeas corpus, abstention, justiciability, and miscellaneous matters affecting attorneys' decisions to seek a federal forum. Careful study of the fine points of relevant legislation in light of its history and the constitutional themes of separation of powers and federalism as guides to understanding the Supreme Court's leading opinions on the scope of federal jurisdiction.

247. Taxation of Partnerships (3)
Discussion—3 hours. Prerequisite: course 220. Most business that is not publicly traded is organized (or should be) under the partnership tax regime. Course examines the federal income taxation of business entities whose owners are taxed on the income, deductions and losses of the entity on a pass-through basis. This includes partnerships, limited liability companies and S corporations. Explores choice of entity issues, identification of entities eligible for pass-through tax treatment and the income tax impact of formation, operation and dissolution of pass-through business entities.

247B. Corporate Tax (4)
Discussion—4 hours. Examines federal income tax relationship between corporations and federal income tax relationship between corporations' owners. Transfer of funds into a corporation on formation and the re-transfer of money and property from the corporation to shareholders. Taxable and non-taxable corporate restructuring in the form of sales, mergers, acquisitions, and divisions of corporations. Subchapter S corporations.

248. International Law (3)
Discussion—3 hours. Basic international law concepts, such as statehood and recognition; treaty law and customary international law; use of force; human rights and war crimes; expropriation; the relationships between international law and national law; and the jurisprudence of international law. Topics vary.

248B. International Human Rights (2)
Discussion—3 hours. Prerequisite: course 205. Laws, theories, and institutions relating to international human rights. The origins of the idea of human rights and the acceptance of that idea in the second half of the twentieth century; the debate between universalists and cultural relativists about the nature of rights; how international human rights are treated in national systems, with particular attention to the United States; the United Nations and other bodies that promote human rights; and how various systems treat civil and political rights, such as the right to speak freely, and economic and social rights, such as the right to education.

248D. Globalization, Citizenship, and the Nation-State Seminar (2)
Seminar—2 hours. The globalization of people, capital, and information is transforming the world and our relationship to it. How are we to live in such a globalized world? What duties do we owe to our community and to the world at large? Can we still think of ourselves as citizens of a nation-state or must we reconstruct ourselves as citizens of the world? Can we reconcile globalization with our desire for a sense of rootedness. The basic elements in international law theory-the citizen, the nation, and the world. The rise of the nation-state, the conception of citizenship and an exploration of our contemporary situation. Satisfies advanced legal writing requirement.

248F. Labor and Global Economy Seminar (2)
Law, labor studies, and the social sciences to examine the problem of whether and how core labor standards are developed in the global economy, and to assess the application of the standards in current or proposed national, international and private sector settings.

248G. Spanish for Lawyers (2)
Seminar—2 hours; conference. Prerequisite: basic proficiency in everyday Spanish. Language course in a legal context, designed to acquaint students with the rudiments of the Spanish language and with Spanish legal vocabulary sufficient to permit an American attorney to communicate effectively with Spanish-speaking clients.

249. Comparative Law (3)
Discussion—3 hours. The uses of comparative method, principal differences between common law and civil law and the styles of legal reasoning that prevail in these two great legal cultures. Topics include the evolution of the civil law, the phenomenon of codification, the structure of European civil codes and the interpretation of their provisions, the respective roles of counsel, judges and law teachers, civil law procedure, and the analysis of selected areas of substantive law.

250. Jurisprudence Seminar (2)
Seminar—2 hours. The question of how judges should decide "hard cases," where the content of the law is in doubt and competent arguments have or could be offered for mutually inconsistent decisions in favor of either party. Examination of the broader question of the relationship between justice and law, and hence of the still broader questions of the nature of "justice" and "law." To what extent should a judge's personal convictions about justice affect decisions about the legal rights of the parties to a lawsuit? Does it matter if the judge is dealing with a case in which the controversy concerns the proper interpretation of precedent rather than legislation? Is it any more appropriate for a judge to resolve doubtful cases by appeal to "the public interest" than by appeal to the judge's personal sense of right and wrong? Virtually every case in which the Supreme Court of the United States grants review on a question of constitutional law is a "hard case." Introductory readings of a general and synthetic nature followed by a study of the work of several leading philosophers of law and adjudication, with particular emphasis on the work of Ronald Dworkin. Previous study of philosophy is neither required nor discouraged. Limited enrollment.

251. Labor Law (2)
Discussion—2 hours. Survey of the legislative, administrative, and judicial regulation of labor relations under federal law. Historical development of labor law, the scope of national legislation, union organization and recognition, the legality of strikes, picketing, and the negotiation of collective bargaining agreements.

252. International Litigation and Arbitration (3)
Discussion—3 hours. Current developments in international law, conflict of laws, civil procedure, arbitration, and comparative law in the context of transactions and disputes that cut across national boundaries.

253. Products Liability (3)
Discussion—3 hours. Civil action for harm to the consumer resulting from defective products. Includes manufacturing defects, warning defects and design defects.

254. Housing Law (2)
Discussion—2 hours. Covers legal issues related to developing, protecting and preserving affordable, safe and accessible housing and sustaining viable, diverse communities.

255. Pension and Employee Benefit Law (3)
Discussion—3 hours. The federal regulation and taxation of private pensions and employee benefits. The Employee Retirement Income Security Act (ERISA), including such topics as coverage, forfeitures, spousal rights, creditor access, fiduciary duties, preemption of state law, remedies, and other litigation issues. Internal Revenue Code issues such as discrimination in favor of the highly compensated, limitations on contributions and benefits, rollovers, IRAs, early distribution penalties, and minimum distribution rules. Problems surrounding plan terminations and mergers and acquisitions.

256. Land Use (2)
Discussion—2 hours. Local agencies, developers, environmental interest groups, and others who regularly deal with the administrative and legislative applications of land use planning and development laws. Topics include zoning, general plans, local government land use regulation, and related areas of litigation. The expanding role of the California Environmental Quality Act.

257. Legislative Process (2)
Discussion—2 hours. Fundamental elements of the legislative process, including legislative procedure; the legislature as an institution; lobbying; statutory interpretation, legislative-executive relations; and the legislature's constitutional powers and limitations.

257A. Legislative Intent Seminar (2)
Seminar—2 hours. Theories and principles of statutory and constitutional interpretation. Original intent vs. living constitution; permissible kinds of evidence for determining legislative intent; canons of construction; extent to which initiatives should be interpreted similarly to legislative enactments.

258. Professional Responsibility (2)
Discussion—2 hours. The American Bar Association's Model Rules of Professional Conduct and the Code of Judicial Conduct, which are tested on the Multistate Professional Responsibility Examination, and the California Rules of Professional Conduct, which are tested on the California Bar Examination. Issues affecting the legal profession, including lawyers' ethical duties and responsibilities to clients, the courts, third parties, and the legal system.

258A. Professional Responsibility (1)
Discussion—1 hour. Study of ethical duties and responsibilities under the American Bar Association Code of Professional Responsibility, the Model Rules of Professional Conduct, and the Code of Judicial Conduct and the law of California. Required of all students for graduation. (S/U grading only.)

258B. Professional Responsibility (2)
Discussion—2 hours. The American Bar Association's Model Rules of Professional Conduct and the Code of Judicial Conduct, which are tested on the Multistate Professional Responsibility Examination, and the California Rules of Professional Conduct, which are tested on the California Bar Examination. Current issues affecting the legal profession, including lawyer's ethical duties and responsibilities to clients, the courts, third parties, and the legal system.

259. Feminist Legal Theory (3)
Discussion—3 hours. Women's legal history and feminist theory, including liberal, radical, cultural, anti-essentialist, and post-modern feminism. Consideration of the relationship between theory and practice by looking at a number of issues that arise when the law intersects with women's lives, e.g., pornography, prostitution, rape, sexual harassment, and women in the legal profession.

260. Employment Discrimination (3)
Discussion—3 hours. Examination of federal law prohibiting employment discrimination based upon race, color, religion, sex, national origin, age, and sexual orientation. Focus is on Title VII of the Civil Rights Act of 1964 and includes brief discussion of §1981, §1983, the Equal Pay and Age Discrimination Acts. California fair employment laws are also covered.

261. Judicial Process Seminar (2)
Seminar—2 hours. Prerequisite: must be taken before or concurrently with the judicial externship (offered fall only). Required for all full-time judicial externs and recommended for part-time judicial externs. Examines a variety of issues concerning the judicial process. The judge's role in the legal process, the administration of justice, ethical issues, decision making, bias, and critical examination of the strengths and weaknesses in our current judicial system.

262. Antitrust (3)
Discussion—3 hours. Study of the federal antitrust laws including price fixing, limits on distribution, tying arrangements, monopolization, and mergers.

263A. Trial Practice (3)
Discussion—2 hours; laboratory—1 hour. Prerequisite: course 219 (may be taken concurrently). Introduction to the preparation and trial of cases, featuring lectures, videotapes, demonstrations, assigned readings and forensic drills. Limited enrollment. (S/U grading only.)

263B. Advanced Trial Practice (2)
Discussion—2 hours. Prerequisite: course 219 (may be taken concurrently). An advanced trial practice and litigation skills course featuring student preparation of and participation in mock trials with occasional class sessions. Limited enrollment. (S/U grading only.)

264. Water Law (3)
Discussion—3 hours. Property rights in surface waters, including riparianism, prior appropriation and federal reserved rights; water administration institutions, including the federal reclamation program; the law of interstate waters and property rights in ground water. Emphasis on California water law and policy.

266A. Law of E-Commerce (3)
Discussion—3 hours. The legal issues that are emerging as crucial to the conduct of business in cyberspace. Discussion of the evolution and current administration of the Internet and the World Wide Web. Brief foray into early claims that cyberspace should not be regulated at all and examination of how cyberspace is in fact regulated. A variety of issues relevant to business engaged in e-commerce, including jurisdiction, the domain name system, electronic contracting and signatures, intellectual property, privacy, taxation, and antitrust. Recent state and federal legislation dealing specifically with e-commerce, state law and secondary materials. Understanding of how to approach cyberspace issues.

267. Civil Rights Law
Discussion—4 hours. Civil remedies for civil rights violations under the primary United States civil rights statute. Specifically, covers actions for constitutional and statutory violations under 42 USC §1983, affirmative defenses, and abstention doctrines. The history of civil rights movement.

267B. Civil Rights Seminar (2)
Seminar—2 hours. The social, political, legal and historical factors which led to the creation of the United States Commission on Civil Rights (USCCR) in 1957. The United States Commission on Civil Rights is a bipartisan, independent agency established by the Civil Rights Act. It is directed to investigate complaints alleging deprivations of the right to vote, and voter fraud; to study and collect information relating to discrimination and the denial of equal protection of the laws under the Constitution on the basis of race, color, religion, sex, age, disability, or national origin; and submit reports, findings and recommendations to the President and to Congress. The role that the USCCR has played and continues to play in American politics, legislative enactments and the national dialogue on equality, fairness and justice in the context of civil and human rights. Satisfies Advanced Legal Writing Requirement.

268. Jewish Law Seminar (2)
Seminar—2 hours. The term "Jewish Law" refers to those subjects that would normally be taught in an American law school as they have been approached by the Jewish legal system. This system is based primarily on the Talmud and on the commentaries and decisions that are derived from it. Jewish law is of interest to American law students not for its immediate practical value, but because it is a foreign legal system that is one of the oldest in the world, and one that has faced many of the problems now facing American law. Specifically, although Jewish law is purportedly based on immutable religious law, changing conditions over the centuries have encouraged methods of adaptation that are reminiscent of American constitutional law. Each student will be required to prepare and present a paper that would fulfill the advanced legal writing requirement. Neither a knowledge of foreign languages nor a previous exposure to Jewish law is necessary. Limited enrollment.

269A. Basic Finance (3)
Discussion—3 hours. Prerequisite: non-law finance course or consent of instructor. The basic techniques of valuation that are part of the standard inventory in a good business school. Understanding and advising of clients and understanding of other business-related courses in the law school. May be taken in second or third year, but especially helpful to students just beginning their second year.

269C. Corporate Finance (3)
Discussion—3 hours. How corporations raise money, i.e., stocks and bonds, IPOs, how deals are structured (or restructured, under Chapter 11 of the Bankruptcy Code). Intended for those who intend to practice in a firm where clients raise money in securities markets or invest in deals.

270. International Business Transactions (2)
Discussion—2 hours. Select legal problems arising from international business transactions. Topics include the international sales contract, letters of credit, transfers of technology, regulation of bribery, development of joint ventures, repatriation of profits, and foreign exchange problems.

271. Nonprofit Organizations (3)
Discussion—3 hours. Prerequisite: course 215 (may be taken concurrently) or consent of instructor. The legal rules and concepts applicable to nonprofit organizations. Nonprofits from the state law perspective, covering organization, operation and dissolution of nonprofit corporations, charitable trusts and associations, including internal governance rules, fiduciary obligations of officers and directors, rights of members, regulation of charitable solicitation, and enforcement powers of the attorney general. Examination of the extensive federal tax laws applicable to nonprofits, including requirements for attaining tax-exempt status, the increment and private benefit concepts, intermediate sanctions, limitations on lobbying and political activities, special rules applicable to foundations versus public charities, the unrelated business income tax, and charitable deductions. Nonprofit accounting issues, local property tax and other local tax exemptions, and public/private partnerships.

271A. Nonprofit Organizations: State and Local Governance Issues (2)
Discussion—2 hours. Prerequisite: course 215 (may be taken concurrently) or consent of instructor. State and local laws applicable to nonprofit organizations, i.e., public interest, cultural, religious, educational, and other not-for-profit entities. Federal tax exemptions of nonprofits, state and local laws impacting nonprofits with respect to incorporation or charitable trust formation, operation and governance, dissolution, fiduciary obligations of trustees and officers and directors, management and investment obligations vis-à-vis trust assets, cy pres, rights of members of social clubs, trade associations and labor unions, enforcement of obligations and rights by the attorney general and others, and regulation of charitable solicitation. Topics may include local property tax and other tax exemptions, nonprofit accounting issues public/private partnerships and Federal antitrust and constitutional constraints.

271B. Nonprofit Organizations: Tax Exemptions and Taxation Focus (2)
Discussion—2 hours. Prerequisite: course 215 or consent of instructor; course 220 recommended. Conceptual basis and substantive law criteria for the federal and state income tax exemption of nonprofit organizations and those particular circumstances and activities which will result in income taxation or financial sanction, including qualifications for exempt status, the nondistribution constraint, the inurement and private benefit concepts, limitations on campaign activities, permissible lobbying expenditures, the unrelated business income tax, the deduction for charitable contributions, intermediate sanctions, the differences between private foundations and public charities, special excise taxes, the exemption application process and reporting and disclosure requirements. Topics may include nonprofit accounting issues, local property tax and other local tax exemptions, and public/private partnerships.

272. Family Law (3)
Discussion—3 hours. Legal, social and emotional aspects of parent-child relationships, including issues concerning familial privacy, state intervention on behalf of endangered children, foster care, termination of parental rights, adoption, artificial insemination, surrogacy, paternity, emancipation of minors, child support and child custody. How attorneys, mental health professionals and the judicial process do and should deal with these issue (e.g., interviewing, counseling and medication).

272B. Elder Law (2)
Discussion—2 hours. The legal practice and policy relating to aging individuals and an older society. Examination of the roots of legal ethics and the role of the lawyer as professional problem solver and advisor, and the uses of law in relationships between people over life's course. The traditional divisions of tort, contract and property and examination of issues such as age discrimination in employment, eligibility for public benefits, long-term care, housing options of the elderly, health care, guardianship, health care decision making for the incapacitated client, disability law issues, property management, euthanasia, elder abuse, neglect and crime, generational justice, the conflicting values of autonomy versus protections, and a host of other matters. Student-led discussions of interdisciplinary assigned readings and guest lecturers.

273N. Advanced Torts (3)
Discussion—3 hours. Torts not covered in the first-year torts course. Defamation, privacy, misrepresentation, misuse of legal procedure, and business torts. Nuisance and related environmental torts. The intersection between statutory remedies and common law torts.

274. Intellectual Property (3)
Discussion—3 hours. Broad survey of the field of intellectual property, including trademarks, unfair competition, copyright, and patents.

274A. International Intellectual Property (2)
Discussion—2 hours. Prerequisite: course 274 or 296 or 209A or consent of instructor. International aspects of copyright, patent and trademark law, including a look at basic international instruments such as the Paris Convention, the Berne Convention, and Trade Related Aspects of Intellectual Property Rights of the World Trade Organization. Topics include approaches to patent protection for pharmaceuticals and agricultural products in developing nations, and copyright protection in a digital world.

274B. Intellectual Property Rights in Culture (3)
Discussion—3 hours. Examines effects of a burgeoning intellectual property regime on cultural conflict and formation. Topics include the expansion of intellectual property rights and a comparison of economic and identity-based justifications for intellectual property rights; how culture is conceived; how intellectual property and cultural property may protect cultural groups against cultural appropriation; and the social and political implications of developing intellectual property rights in culture.

274C. Intellectual Property in Cyberspace Seminar (2)
Seminar—2 hours. Prerequisite: course 274. The recent expansion of IP laws emerging to meet the growth of Internet and digital technologies that enhance human abilities to access, copy, store, manipulate, and transmit vast amounts of information.

274D. Intellectual Property in Historical Context Seminar (2)
Seminar—2 hours. How the legal system has adapted to earlier periods of rapid change by creating, delimiting, and expanding intellectual property rights (IPRs). Required paper satisfies advanced writing requirement.

275. Complex Litigation (2)
Discussion—2 hours. Issues that frequently arise in large complex litigation involving multiple parties and multiple claims. In depth topics introduced in the first-year civil procedure course, with an emphasis on cutting edge issues currently the topic of litigation. Class actions under Federal Rule 23, and current issues arising from mass tort (including asbestos and tobacco litigation), employment discrimination, and securities fraud class actions.

277. Native American Law (2)
Seminar—2 hours. Legal relations between Native American tribes and the federal and state governments. Topics include the basic jurisdictional conflicts, which dominate this area of law and cover specific areas such as land rights, hunting and fishing rights, water rights, domestic relations law, and environmental protection. Religious freedom, repatriation. Issues regarding terminated and non-recognized tribes are also addressed.

278. Pretrial Skills (2)
Discussion—2 hours. Role-playing exercises, videotaped simulations, and related projects to introduce students to lawyering skills basic to the practice of law, including client interviewing and counseling, fact investigation, and discovery. Limited enrollment.

279. Public Sector Labor Law (2)
Seminar—2 hours. Prerequisite: course 251 or consent of instructor. Application of private sector labor law doctrines to the public sector. Emphasis on the four California public sector statutes and the impact of constitutional law on public employees. Class presentation and seminar paper required. Satisfies advanced writing requirement. Limited enrollment.

280. Advanced Legal Writing Seminar (2)
Seminar—2 hours. How to write a variety of legal documents in plain English. Writing exercises and outside readings will be assigned weekly. Each student completes an individual writing project in lieu of final examination. The writing project will satisfy the law school's advanced legal writing requirements. Limited enrollment. (S/U grading only.)

281A. Voting Rights and the Law of the Political Process (3)
Discussion—3 hours. Regulation of the right to vote and to participate in the political process afforded under the First and Fourteenth Amendments. Legislative apportionment, access to the ballot, the Voting Rights Act, and campaign finance jurisprudence.

282. Energy Law Seminar (2)
Seminar—2 hours. The history, law, and public policy of energy regulation in the United States with an emphasis on economic and environmental regulation. Competitive restructuring of the natural gas and electric utility industries emphasized. The basic regulatory schemes for other energy sources such as hydroelectric power, coal, oil, and nuclear power explored. Recommended to anyone who has an interest in the energy sector, various models of economic regulation, or regulated industries.

283. Remedies (3)
Discussion—3 hours Survey of modern American civil remedies law in both private and public law contexts. Topics addressed include equitable remedies, equitable defenses, contempt power, injunctive relief, restitution, and money damages in torts and contracts.

284. Law and Economics (3)
Discussion—3 hours. Introduction to the economic analysis of law. Economic methods and concepts, including rational choice theory, behavioral economics, and utilitarianism. Illumination and critique of familiar areas of law, including property, contracts, torts, criminal law, and civil procedure.

284A. Law and Economic Development (2)
Discussion—2 hours. The relationship between law and economic development in transition economies. Western assumptions about whether the role of law and legal institutions in economic development hold true for the non-Western developing nations of Asia and Africa.

285. Environmental Law (3)
Discussion—3 hours. An introduction to federal and state environmental law, including coverage of historical development of environmental law; the role of courts, the legislature and the executive branch in the development and implementation of environmental policy; allocation of authority among different levels of government; the role of market forces in environmental decisions; the major regulatory strategies that have been applied to control environmental harm, and enforcement of environmental law. Major statutes considered include the National Environmental Policy Act, Endangered Species Act, Clean Air Act and Clean Water Act.

285A. Environmental Justice Law (2)
Discussion—2 hours. Introduction to the scope of current environmental justice work; who is affected by environmental hazards, what legal and political tools are available to address the problems, and the strategic issues confronting groups organizing for change. The role of lawyers and methods of lawyering in the environmental justice context.

285B. Environmental Enforcement (3)
Discussion—3 hours. Prerequisite: course 285 is recommended. Underlying theory and practice in enforcing major environmental laws. Basic principles of enforcement and important current issues arising in civil, criminal, and citizen enforcement.

285C. Environmental Law Seminar (2)
Prerequisite: course 235 or one course in environmental law. In-depth coverage of a specific issue in environmental law. Topic varies.

286. Public Health Law (2)
Seminar—2 hours. Public health law as the government's power and responsibility to ensure the conditions for the population's health. The use of this power and the individual's interests in liberty and property.

286A. Health Law (2)
Seminar—2 hours. SARS and the public health response to it; identification, reporting, and responding to medical error; medico-legal aspects of the tobacco litigation; under treated pain as a basis of medical liability for elder abuse; informed consent and disclosure of risk in human subjects research; advance directives and their role in directing care at the end of life; genetic screening and testing and their clinical and legal implications.

286B. Advanced Health Law Seminar (2)
Seminar—2 hours. Prerequisite: course 286A or consent of instructor. Specific seminar topic will be drawn from those covered in course 286A. Reading and discussion of book on seminar topic and/or a set of selected readings. Students will select research project related to seminar topic and will facilitate the discussion of that topic. Written paper analyzing legal issue related to chosen research project.

287. Public Land Law (3)
Discussion—3 hours. Legal aspects of federal land management, including the history of public land law, authority over federal lands and specialized law dealing with particular natural resources and uses found on federal lands (minerals, timber, range, wildlife, recreation and preservation).

287A. Public Benefits Law (2)
Seminar—2 hours. Theory and practice of law pertaining to enactment and administration of public benefits programs for poor and other disadvantaged persons. Examination of history and philosophy underpinning social/legal concepts of "welfare" and "entitlement." Specific examples of significant legislative programs in these areas.

288. Advanced Constitutional Law Seminar (2)
Seminar—2 hours. Prerequisite: course 218A. In-depth selected topics or problems in constitutional law and theory. Initial topics may include the regulation of hate speech, the interpretation of the Establishment Clause, or the development of Takings Clause doctrine.

288A. Comparative Constitutional Law Seminar (2)
Seminar—2 hours. Prerequisite: course 205. Understanding of constitutionalism and of the Constitution of the United States. Constitutional protection of individual rights and the structure of constitutions.

289. Toxics Law and Policy (3)
Discussion—3 hours. Examination of the range of regulatory approaches dealing with toxic substances and hazardous wastes, including the federal Super-

fund, the federal hazardous waste management law, and other statutes controlling toxics in pesticides, the workplace, and other settings. The class will also cover risk assessment and risk management issues, alternatives to traditional regulation such as California's Proposition 65, and toxic torts.

289A. Biotechnology Law and Policy (2)
Seminar—2 hours. Topics may include regulating research, including restrictions on cloning and fetal stem cell research; regulating the products of biotechnology, including restrictions on use or distribution of genetically modified organisms; access to the natural resources that provide the starting materials for biotechnology; the availability and scope of intellectual property protection for biotechnology products; and commercialization of academic research. Students will play an active role in selection of reading materials and will lead class discussions. Enough background will be provided on the science and law that anyone with an interest in the topic should be comfortable in the class. A paper will be required, which with approval of the instructor may satisfy the writing requirement.

290. International Trade Dispute Seminar (2)
Seminar—2 hours. The economic, political, and legal theories underlying the establishment of NAFTA and WTO.

290A. Nuclear Technology and the Law (2)
Seminar—2 hours. Examination of the international law governing the uses of nuclear technology: weapons, energy production, and other applications. Verification of non-proliferation obligations as well as legal aspects of nuclear safety, transport, waste disposal, terrorism and sabotage, liability for nuclear damage and establishment of an adequate legal infrastructure at the national level.

291A. International Finance (3)
Discussion—3 hours. How a framework of national and international laws and institutions regulates and fails to regulate the flow of money around the world.

292. Immigration Law and Procedure (3)
Discussion—3 hours. Survey of a brief history of U.S. immigration and policy; federal agency interrelationship (Justice and State Department); entry of nonimmigrant (temporary) visitors and immigrants into the United States; the worldwide quota and preference systems; family and employment relationship critical to securing favored immigrant status; deportation procedures; discretionary relief available to persons otherwise subject to deportation; available defenses to deportation and exclusion proceedings; immigration consequences of criminal conviction; refugee and asylum law; administrative appeals; federal and state judicial relief; citizenship and naturalization.

293. Public Interest Law Seminar (2)
Seminar—2 hours. Examines the problems associated with providing legal services to those people and interests in American society traditionally unable to afford those services. The class will discuss selected readings that review various theoretical issues and specific problems facing public interest lawyers. May satisfy advanced legal writing requirement. Limited enrollment.

293A. Comparative Public Service Strategies (1)
Discussion—1 hour. Prerequisite: course 460 concurrently. Classroom component to course 460, however it is open to all second and third-year students. Forum for students to critically discuss the strategies that various public service programs engage in to address similar issues. For example, how might attorneys working for legal services programs and government attorneys address issues related to low-income housing or the environment? How might the strategies differ or be similar? What allies might attorneys from different perspectives have available? While the class provides a special opportunity for externship programs to discuss their placements in a group setting, other students will have the opportunity to participate from a critical or research perspective.

294. Sports Law (2)
Discussion—2 hours. Contemporary issues involving college and professional sports and their relationships with the legal system. Collective bargaining and the relationship among player, agent, team and league; college sports and the student-athlete. Evaluation of the impact of sports on the legal system, particularly with respect to the labor and antitrust issues.

295A. Trademark and Unfair Competition Law (2)
Discussion—2 hours. Prerequisite: course 274 or consent of instructor. Intensive look at selected issues in Trademark law, including the concepts of trademarks and unfair completion, acquisition and loss of trademark rights, infringement, authors and performers rights, trademarks as speech, and international aspects of trademark protection.

296. Copyright (3)
Discussion—3 hours. Thorough examination of the law of copyright, including its application to literature, music, films, television, art, computer programs, and the Internet. Issues addressed include copyright protection, the copyright owner's rights, the term of protection, copyright ownership and transfer, infringement, and defenses to infringement.

296A. Advanced Copyright and Related Doctrines (2)
Discussion/laboratory—2 hours. Prerequisite: course 296 or 274 or consent of instructor. Intensive look at selected issues in copyright, including the fair use doctrine, the application of copyright principles in the context of the Internet and digital technology, and international aspects of copyright law. Examination of some doctrines related to copyright, as well as to entertainment law, including protection for fictional characters and titles, and the right of publicity.

297. Alternative Dispute Resolution (2)
Discussion—2 hours. Introduction to alternative dispute resolution processes, including negotiation, mediation, arbitration, restorative justice and related skills. Designed to familiarize students to varying conflict resolution methods as well as techniques in assessing personal communication and conflict styles.

298. Sociology of the Legal Profession (2)
Seminar—2 hours. Comprehensive look at the organization, operation, and ideology of the legal profession. The U.S. legal profession, and comparative analysis with the legal professions in other countries.

Additional Professional Courses

408. Community Education Seminar (3)
Seminar/clinic—3 hours. Trains students to educate the community about basic legal rights and responsibilities. Students attend an initial four-hour orientation, followed by weekly seminars that will prepare students to teach in a local high school at least two times per week. Paper or journal required, to be determined by instructor. Limited enrollment. (S/U grading only.)

408A. Educational Policy and Law Seminar (2)
Seminar—2 hours. Examination of the interaction between policy and the law of various educational themes such as the "right" to an education, schooling and race, legalizing the curriculum, language and education, financial equalization, merit and testing, privatization of education, and educational access. Inquiry into the possibilities and limits of a model of social and economic regulation that can reduce or cement inequalities. Limited enrollment

409. Environmental Law Moot Court Competition (1)
During the first eight weeks of fall semester, students research and submit briefs as appellants, respondents, or third parties on a problem of environmental law that is prepared by the National Environmental Law Moot Court Board. Students attend four to six classes (including guest lectures) on aspects of appellate advocacy, legal writing, and environmental law. Members of the spring environmental law moot court team will be selected on the basis of performance in class. (S/U grading only.)

410A. Moot Court (2)
Discussion/laboratory. Basic appellate practice and procedure. Beginning instruction in oral advocacy skills and an opportunity to practice these skills in front of a moot court. Students compete in two rounds of oral arguments which, combined with the second semester of the program, determine the rankings for selecting participants in the annual Neumiller Competition and other interschool competition teams. Both courses 410A and 410B must be taken in order to qualify for most interschool competitions. (S/U grading only.)

410B. Appellate Advocacy (Moot Court) (2)
Continuation of Course 410A. Focus on the development of effective appellate brief writing skills and the refinement of oral advocacy skills. Participants research and write two appellate briefs and argue the cases before a moot court. The first appellate brief and arguments will be judged for selection of interschool competition teams and participants in the annual Neumiller Competition. The second appellate brief, requiring independent individual research, is revised and edited under the supervision of the professor, and may satisfy the writing requirement. Limited enrollment. (S/U grading only.)

410C. Appellate Advocacy Seminar (2)
Seminar—2 hours. Appellate advocacy before state and federal courts, including writs and appeals in civil and criminal matters. The role, structure, and practices of appellate course. Students will participate in projects. Required papers will satisfy the Advanced Legal Writing Requirement.

411A. Journal of International Law and Policy (1)
The Editor-in-Chief of the Journal receives one credit for each semester of service. Only one person may receive this credit in any one semester. (S/U grading only.)

411B. Journal of Juvenile Law and Policy (1)
The Editor-in-Chief of the Journal of Juvenile Law and Policy receives one credit for each semester of service. Only one person may receive this credit in any one semester. (S/U grading only.)

412. Carr Intraschool Trial Advocacy Competition (1)
Competition—1 hour. Named after the late Justice Frances Carr, this competition is open to second- and third-year students. A preliminary round is followed by quarter-finals, semi-finals, and a final round. Students participate in mock trials presided over by judges and critiqued by experienced litigators. Limited enrollment. (S/U grading only.)

413. Interschool Competition (1-3)
Prerequisite: consent of appropriate faculty adviser. Participation in interschool moot court and lawyering skills competitions. Enrollment is limited to students actually representing the School in the interschool competitions. Competition must be authorized by the appropriate faculty adviser. The faculty adviser may condition the award of academic credit for any particular competition on the performance of such additional work as may be reasonable to justify the credit. May satisfy advanced legal writing requirement. (S/U grading only.)

414. Moot Court Board (1)
Prerequisite: courses 410A-410B. Members of Moot Court Board may receive one credit for each semester of service on the board, up to maximum of two. Credit awarded only after certification by Moot Court Board and approval of the faculty advisers to Moot Court Board. Limited enrollment. (S/U grading only.)

415. Trial Practice Honors Board (1)
Members of the Trial Practice Honors Board administer the Frances Carr competition. Members are nominated by their individual Trial Practice I adjuncts. Students receive one credit for serving on the Board, awarded upon approval of the faculty adviser. (S/U grading only.)

416. *Law Review* Writer (1-2)
Writing of an editorship quality law review article under the editorial supervision of editors of the Law Review. Minimum of 40 hours contribution to the Review's publication is also required. Credit may be

obtained only upon achieving status as a member of the *Law Review,* which requires that the student have made substantial progress toward completing an editorship article. Credit is awarded only after certification by the Editor-in-Chief of the *Law Review* and approval of the faculty advisers to the Law Review. One unit of credit is earned the first semester. Two units are earned the second semester upon completing an editorship draft. One unit is earned second semester if only a membership draft is completed. (S/U grading only.)

417. *Law Review* Editor (1-2)
Editors must have completed an editorship article and must perform editorial duties requiring a substantial time commitment. Credit awarded only after certification by the Editor-in-Chief of the *Law Review* and approval of the faculty advisers to the *Law Review.* Students may receive four credits over two semesters for service as an editor. [In exceptional cases, students may petition to participate for one semester only and receive two credits.] (S/U grading only. Deferred grading pending only, pending completion of sequence.)

418. *Environs* Editor (1)
The Editor-In-Chief of *Environs* receives one credit for each semester of service. Only one person may receive this credit in any one semester. (S/U grading only.)

419. Advanced Writing Project (1-4)
Completion of a writing project under the active and regular supervision of a faculty member in satisfaction of the legal writing requirement. Writing project must be an individually authored work of rigorous intellectual effort of at least 20 typewritten, double-spaced pages, excluding footnotes. Project may take any of several forms, for example, a paper, a brief, a memorandum of law, a proposed statute, a statutory scheme or set of administrative regulations (with explanatory comments), or a will or agreement (with explanatory comments). Advanced writing project may also be undertaken in connection with another course or seminar to satisfy the legal writing requirement. Number of units for the writing project shall be approved by the faculty supervisor and will depend upon the scope of the writing effort. (Grading may be on S/U or letter-grade basis at the faculty supervisor's discretion.)

420. Civil Rights Clinical Program (2-6)
Clinical program. Prerequisite: prior or concurrent enrollment in course 267 and 219. Provides practical experience in providing legal services to indigent clients who have filed civil rights actions in the United States District Court for the Eastern District of California. Students will work on clinic cases under the supervision of the clinic director and supervising attorney. Limited enrollment. (S/U grading only.)

425. Judicial Clinical (2 to 6 or 12)
Clinical program. Prerequisite: course 261 required for full-time clinical students and recommended for part-time clinical students. Students may arrange judicial clerkship clinical programs with an approved list of state and federal judges through the Clinical Office and under the sponsorship of the faculty member in charge. All students must complete weekly time records and bi-weekly journals. Full-time clinical students must complete an evaluative final paper of approximately 10 pages. (S/U grading only.)

430. Clinical Program in Federal Taxation (2-6)
Clinical program. Prerequisite: course 220. Students will have the opportunity to work with the Internal Revenue Service or other governmental tax agency. Journals and attendance at group meetings are required. (S/U grading only.)

435. Family Protection Clinic (4)
Clinical activity. Prerequisite: course 219 (may be taken concurrently). Representation of low-income persons in family law and related matters arising out of situations involving family violence. Students are supervised by the staff attorney at the clinic's office located in Woodland at the Sexual Assault and Domestic Violence Center of Yolo County. (S/U grading only.)

440. Immigration Law Clinical (2 to 6 or 12)
Clinical program. Students may represent clients in administrative law hearings in San Francisco. Minimum units for the course are 4 and maximum is 12. Each unit assumes four hours work per week, including participation in the seminar, conference, and case research and development. Students who have completed course 292 may take the clinic for a minimum of 2 units. Limited enrollment. (S/U grading only.)

445. Legislative Process Externship (2-5)
Clinical activity. Prerequisite: course 240 (may be taken concurrently) or consent of instructor. Practical experience in the operation of the office of a legislator or a legislative committee. The major thrust of the program is to enable students to become familiar with the give and take realities of making laws, as contracted with their interpretation and enforcement. Journals are required. (S/U grading only.)

450. Environmental Law Externship (2-6)
Clinical activity—2-6 hours. Prerequisite: course 285 or consent of instructor. Practical experience in environmental law. Students will work in an approved government, non-profit or private law office engaged in some form of environmental law work for a minimum of 8 hours per week. Students must prepare a journal describing and reflecting upon their clinical experience, and meet periodically with the instructor.

455. Employment Relations Externship (2-6)
Clinical activity. Prerequisite: course 251 or 260 (may be taken concurrently). Practical experience in employment relations, including employment discrimination and public sector labor law. Work under the direct supervision of a government lawyer. Opportunity to participate in a range of with emphasis on observation and participation in actual investigation, interviewing, drafting pleadings, and attendance at hearings. (S/U grading only.)

460. Public Interest Law Clinical (2-6)
Clinical program. Prerequisite: prior or concurrent enrollment in course 293 recommended. Students work with a public interest practitioner in a nonprofit organization. Journals and attendance at two group meetings are required. Clinical students must complete an evaluative final paper of approximately 8 pages. Hours completed in public interest setting may be applied toward the practicum requirement for the Public Interest Law Program. (S/U grading only.)

465. Clinical Program in Administrative Law (2-6)
Clinical program. Prerequisite: course 235 (may be taken concurrently) or consent of instructor. For students interested in a work experience in an administrative law setting. Students will work under the direct supervision of an administrative law judge, hearing officer, or government attorney. Placement assistance will be provided by the instructor. A goal of this clinical will be a breadth of experience in the areas of formal adjudication, informal adjudication, rulemaking, and judicial review. Students will be required to meet monthly as a group to share experiences and maintain observational journals. (S/U grading only.)

470. Administration of Criminal Justice Externship (2-6 or 12)
Clinical activity—2-12 hours. Prerequisite: course 206, courses 219 and 227 (may be taken concurrently); course 236A recommended. Students wishing to practice must qualify for certification by the relevant state or federal jurisdiction. Opportunity to gain practical experience working full- or part-time in a District Attorney's or Public Defender's office in one of several surrounding counties or in a Federal Public Defender or U.S. Attorney's office. Activities associated with their specific office with emphasis on observation and participation in factual investigation, interviewing, counseling, negotiating, motion practice, and trials under State Bar rules. Limited enrollment. (S/U grading only.)

480. Clinical Program in Prison Law (2-6)
Clinical program. Provides practical experience in providing legal services to real clients who have various problems related to their incarceration in state prison. The services require analysis and application of Constitutional Law, state statutory law, agency regulations, and the rules of professional responsibility. Students will work under the direct supervision of the Prison Law clinical director and will be assigned a portion of the director's caseload. Students will be required to follow the law office procedure of the clinic and employ skills such as interviewing, research, writing, negotiating, and possibly, the preparation of legal documents to be filed in court. (S/U grading only.)

495. Instruction in Legal Research and Legal Writing Skills (1-2)
Participants will assist in instructing legal research and writing for first-year students under the direction of the legal research and writing instructors. Approval of the research and writing instructors is required for enrollment. Participants may assist once in the legal research program and once in the legal writing program. One unit will be given in the fall semester for legal research instruction and two units in the spring for legal writing instruction. (S/U grading only.)

498. Group Study (1-4)
Groups of students (not fewer than 4 or more than 10) with common interest in studying a stated legal problem may plan and conduct their own research and seminar program, subject to the following regulations: (1) the program may extend over no more than two semesters; (2) the plan for the program and the list of members of the group must be submitted to Dean's Office at least 4 weeks prior to opening of the semester in which the program is to begin; (3) a three-member faculty board will be appointed for each group proposed and will have authority to approve or disapprove the program and the amount of credit sought; (4) changes in the program or in membership of the group must be approved by the faculty board and normally will be approved only prior to the semester involved; (5) group members must conduct a weekly seminar session to be arranged by them; (6) each member of the group must submit an individual paper or an approved alternative growing out of the seminar subject to the faculty board; (7) S/U grading only unless the entire group requests letter grades in advance.

499. Research in Legal Problems (1-4)
Students may receive credit for individual research projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each project will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member in advance of the semester in which it is to be undertaken; (4) normally, no faculty member will be permitted to supervise more than five students working on individual programs during any semester; (5) each student must submit an individual paper or approved alternative to the supervising faculty member. (S/U grading only.) In exceptional cases, with prior approval of a professor and an associate dean, students may arrange for directed research in foreign and/or international legal problems by working abroad under the supervision of a UC Davis Law School faculty member and an attorney or faculty member at a foreign or international government agency or educational institution (4 up to 12 units). S/U grading only unless letter grading requested in advance.

Linguistics

(College of Letters and Science)

Lenora A. Timm, Ph.D., Chairperson of the Department

Department Office, 108 Sproul Hall (530-752-9933)

http://linguistics.ucdavis.edu

Faculty

Raúl Aranovich, Ph.D., Assistant Professor
Wilbur A. Benware, Ph.D., Professor
Patrick Farrell, Ph.D., Associate Professor
Maria I. Manoliu, Ph.D., Professor (French)
Almerindo E. Ojeda, Ph.D., Professor
C. Orhan Orgun, Ph.D., Assistant Professor
Vai Ramanathan, Ph.D., Associate Professor
Mary Schleppegrell, Ph.D., Associate Professor
Lenora A. Timm, Ph.D., Professor

Emeriti Faculty

David L. Olmsted, Ph.D., Professor Emeritus
Benjamin E. Wallacker, Ph.D., Professor Emeritus
Gwendolyn Schwabe, M.A., Senior Lecturer Emerita
Maximo Torreblanca, Ph.D., Professor Emeritus

Affiliated Faculty

Nina Dronkers, Ph.D., Adjunct Professor
Janet Lane, M.A., Lecturer
Ellen Lange, M.A., Lecturer
John Samsel, M.A., Lecturer
Kathleen Ward, Ph.D., Lecturer

The Major Program

Linguistics is the systematic study of human language. It focuses on theories of language structure, variation, and use, description of contemporary languages, and the examination of language change through time. Because of the pervasive influence of language in our everyday lives, work in linguistics interacts in important ways with studies carried out in many other fields, including psychology, anthropology, neuroscience, philosophy, computer science, sociology, literature, language teaching, communication and education.

The Program. An introductory lower division course provides students with basic concepts and some of the methods needed to analyze language in a systematic way. Upper division courses probe more deeply into specific aspects of language structure, language use, and the relationship of language to other realms of human activity.

Career Alternatives. Majors in linguistics find practical outlets for their linguistic training in a variety of fields: the computer science industry (software development); teaching English as a second language; foreign language teaching; elementary and secondary level bilingual-bicultural programs; language-oriented missionary work; bilingual-bicultural curriculum development (e.g., for publishing houses); legal work; speech therapy; lexicography (preparation of dictionaries). All these types of employment share an interest in persons skilled in the analysis of language, spoken and/or written—linguistics equips students with just such skills.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 4-24
Linguistics 1 4
Foreign language, one course beyond the 15-unit requirement of the College of Letters and Science in the same language used to fulfill the college requirement 0-20

Depth Subject Matter..... 44
Linguistics 103A, 103B, 111, 112, 121, 131, 141, 151, 152 36
At least eight upper division units from the following courses 8
Any other Linguistics course not included in the 36-unit requirement above, African American and African Studies 156, Anthropology 112, 113, 117, 119, 120, Communication 105, Education 151, English 105, French 160, 161, German 105, 106, 108, Human Development 101, Native American Studies 107, Philosophy 137, Psychology 132, Spanish 111N, 112N, 113, 114N.

The student should note that a number of these courses have prerequisites. Since it is usual to select some emphasis within the Linguistics major (e.g., anthropology, a foreign language, etc.) such prerequisites should be completed as a matter of course.

Total Units for the Major 48-68

Major Adviser. W. Benware

Minor Program Requirements:

Linguistics offers two minor programs: (1) general linguistics, which provides the student with basic knowledge of language structure and linguistic analysis; (2) linguistics for language teachers, which especially complements the major in English with the Teaching Area of emphasis; it is also of relevance to students interested in teaching foreign languages.

UNITS

General Linguistics 24
Linguistics 1, 103A, 103B..... 12
One course from Linguistics 111, 112, 121, 131, 141, 151, 152 4
Additional units selected from upper division Linguistics courses, Spanish 115, 116, 117, or 118, chosen in consultation with an adviser..... 8

UNITS

Linguistics for Language Teachers..... 24
Linguistics 1, 106, 165 12
English 105..... 4
Linguistics 160 or 163 4
Linguistics 173 or Education 151 4

Minor Adviser. Same as Major adviser.

Grading Recommendation. Though not required, it is recommended that all courses offered in satisfaction of the Linguistics major be taken for a letter grade.

Honors and Honors Program. The honors program consists of six units of 194H credit normally taken in the fall and winter quarters of the senior year. Completion of the program is a prerequisite for High or Highest Honors at graduation. Specific eligibility criteria may be obtained from the major adviser. For general information regarding graduation with honors and Dean's Honors Lists, please refer to the Academic Information section of this catalog.

Graduate Study. The Linguistics Graduate Group offers study and research leading to the M.A. and Ph.D. degrees. Please see Linguistics (A Graduate Group); more detailed information may be obtained from the Graduate Adviser or from the Chairperson of the Linguistics Group.

Graduate Adviser. A.E. Ojeda.

Courses in Linguistics (LIN)

Lower Division Courses

1. Introduction to Linguistics (4)
Lecture—3 hours; discussion—1 hour. Introduction to the study of language; its nature, diversity, and structure. GE credit: ArtHum or SocSci, Wrt.—I, II, III. (I, II, III.)

4. Linguistics for Students of Literature (4)
Lecture—3 hours; term paper. Prerequisite: course 1 recommended. Introduction to basic linguistic concepts and models needed for the interpretation of literary texts. Topics include meaning in texts, lexical meaning, linguistic variation in texts, sound systems and poetry.—Manoliu

20. Oral English for Undergraduate ESL Students (3)
Lecture/discussion—3 hours. Prerequisite: consent of instructor; limited primarily to students who have fulfilled their Subject A requirement or have completed course 23. Intensive practice in oral English for undergraduate ESL students. Students will learn to identify and modify features of their pronunciation which limit their ability to communicate clearly. Students will also learn and practice strategies for effective participation in academic tasks. May be repeated once for credit with consent of coordinator. (P/NP grading only.)

21. Introduction to Reading and Composition for Non-Native Speakers (5)
Lecture/discussion—5 hours. Prerequisite: admission by placement examination only. Provides undergraduate students whose native language is not English with intensive work in reading and in writing organized, coherent, and grammatically correct paragraphs and short academic essays. (P/NP grading only.)—I. (I.)

22. Intermediate Reading and Writing for Non-Native Speakers (4)
Lecture/discussion—4 hours. Prerequisite: admission by placement examination, by successful completion of course 21, or by consent of instructor. Provides undergraduate students whose native language is not English with experience in writing essays in recognized rhetorical modes. Students will also read to develop fluency and critical thinking and will study grammar needed for academic writing. (P/NP grading only.)—I, II, III. (I, II, III.)

23. Advanced Reading and Composition for Non-Native Speakers (4)
Lecture/discussion—4 hours. Prerequisite: admission by placement examination, by successful completion of course 22, or by consent of instructor. Provides undergraduate students whose native language is not English with experience writing persuasive essays related to reading passages. Students will also read for tone, style, context, and assumptions and will study advanced grammar needed for persuasive essays. (P/NP grading only.)—I, II, III. (I, II, III.)

25. English for International/ESL Graduate Students (4)
Lecture/discussion—4 hours. Prerequisite: admission by placement examination or consent of instructor. Open to international and ESL graduate students and limited status international undergraduates (Education Abroad Program participants). A multi-skills ESL course designed to help international/ESL students improve their English language skills for successful academic study. Emphasis on writing, speaking, listening, reading, and academic culture. (P/NP grading only.)—I. Lane

26. Writing for International Graduate Students (3)
Lecture—3 hours. Prerequisite: satisfactory completion of course 25 if held for it, or consent of instructor. Admission limited to international graduate students. Focuses on writing needed for academic work, including summaries, critiques, research and grant proposals, memos, resumes, and research papers. Includes a review of grammar needed for writing and some focus on reading skills and American vocabulary and idioms. (P/NP grading only.)

27. Academic Writing for ESL Students (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. Writing skills necessary for upper division courses, including skills crucial to writing lab and project reports, summaries, critiques, abstracts, and responses to exam questions. Includes practice with the syntax, grammar, and vocabulary characteristic of academic writing. (P/NP grading only.)

28. Reading in Scientific and Technical Subjects for ESL Students (4)
Lecture/discussion—4 hours. Instruction and practice in reading scientific and technical texts. Techniques for comprehending and analyzing grammatical and organizational patterns. Notetaking

skills, summarizing, vocabulary enrichment. (P/NP grading only.)

96. Directed Group Study in English as a Second Language (1-5)
Variable—1-5. Prerequisite: consent of instructor. Directed group study of topic in English as a Second Language (ESL). May be repeated for credit by consent of the ESL coordinator. (P/NP grading only.)—I, II, III. (I, II, III.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Intended for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. Intended for lower division students. (P/NP grading only.)

Upper Division Courses

103A. Linguistic Analysis I: Phonetics, Phonology, Morphology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Introduction to fundamental methods and concepts used in linguistic analysis, focusing on phonetic, phonological, and morphological phenomena. Emphasizes development of analytical skills and appreciation of structural regularities and differences among languages. Not open for credit to students who have completed course 139.—II. Benware

103B. Linguistic Analysis II: Morphology, Syntax, Semantics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Introduction to fundamental methods and concepts used in linguistic analysis, focusing on morphological, syntactic, and semantic phenomena. Emphasizes development of analytical skills and appreciation of structural regularities and differences among languages. Not open for credit to students who have completed course 140.—II. Orgun

105. Topics in Language and Linguistics (4)
Lecture—3 hours; term paper. Prerequisite: course 1 and consent of instructor. Detailed examination of a major contemporary linguistic theory, a major contemporary issue or related set of issues in linguistics, or the structure of a particular language or language family. May be repeated for credit when topic differs. Offered in alternate years.—Timm

106. English Grammar (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: English 1 or 3 or course 1 or consent of instructor. Survey of present day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation across dialects, styles, and registers, their development, and their usefulness in describing the conventions of English. (Same course as English 106.) Not open for credit to students who have completed course 104. GE credit: ArtHum.—I. Ward

111. Introduction to Phonological Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 103A, 103B. Introduction to contemporary phonological theory, with emphasis on autosegmental, metrical, and lexical theory.—III. Orgun

112. Phonetics (4)
Lecture—3 hours; term paper. Prerequisite: courses 103A, 103B. Detailed examination of articulatory and acoustic phonetics. Not open for credit to students who have completed course 109.—I. Orgun

121. Morphology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 103A, 103B. Introduction to the analysis of word structure and the relation of word structure to the lexicon and other grammatical components.—III. Aranovich

131. Introduction to Syntactic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 103A, 103B. Introduction to syntactic theory, primarily through the examination of a major theory of syntax, emphasizing theoretical reasoning, argumentation, and problems of theory building in syntax.—I.

141. Semantics (4)
Lecture—3 hours; term paper. Prerequisite: courses 103A, 103B. Introduction to the linguistic study of the meanings of words and phrases. Survey of the meanings expressed by lexical items and derivational and inflectional morphology, as well as the contribution of argument structure, quantification, and coordination to meaning. GE credit: Wrt.—I. Ojeda

150. Languages of the World (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Anthropology 4. Survey of the world's languages, their geographical distribution and classification, both genetic and typological. Illustrative descriptions of several major languages from different geographical areas; pidgins and creoles, lingua francas and other languages of widespread use. Not open for credit to students who have completed course 50. GE credit: ArtHum or SocSci, Wrt.—III. Benware

151. Historical Linguistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 103A, 103B. Description and methods of the historical study of language, including the comparative method and internal reconstruction; sound change, morphological change, syntactic change, semantic change.—II. Benware

152. Language Universals and Typology (4)
Lecture—3 hours; term paper. Prerequisite: courses 103A, 103B. Investigation into common features of all human languages and the classification of languages in terms of their structural features; theories of universal grammar; detailed discussion of non-Indo-European languages and comparison with English. GE credit: Wrt.—III.

160. American Voices (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Anthropology 4 or upper division standing recommended. Explores the forms of American English; traditional notions of regional dialects and increasingly important social dialects, reflecting age, class, gender, race, ethnicity, and sexual orientation. The influence of language attitudes on perception of dialect speakers; dialect in media, education, and literature. GE credit: SocSci, Div, Wrt.—III. Schleppegrell

163. Language, Gender, and Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Anthropology 4. Investigation of real and putative (stereotyped) gender-linked differences in language structure and usage, with a consideration of some social and psychological consequences of such differences. Focus is on English, but other languages are also discussed. GE credit: SocSci, Div, Wrt.—II. Timm

165. Introduction to Applied Linguistics (4)
Lecture—3 hours; discussion—1 hour. Applications of linguistic principles and the analysis of language-related issues in the world. Exploration of a range of language-related problems including issues related to language learning and teaching to issues concerning language and gender, race, class and the media.—Ramanathan

166. The Spanish Language in the United States (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or Spanish 111N; and Spanish 23 or the equivalent. Linguistic features of the varieties of the Spanish language spoken throughout the United States; phonology, morphology, syntax, vocabulary. Focus on the relationship between United States Spanish and other world varieties of Spanish, within a historical framework. GE credit: Div, Wrt.

171. Introduction to Psycholinguistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1; courses 103A, 103B recommended. Introduction to psychological issues relating to the implementation of language and linguistic structure during speech production and comprehension and to the implications of research in psychology and related fields for linguistic theory. Offered in alternate years. GE credit: SocSci.

173. Language Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor; courses 103A, 103B recommended. Theory and research on children's acquisition of their native language, including the sound system, grammatical systems, and basic semantic categories. GE credit: SocSci.

175. Biological Basis of Language (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. Overview of issues in the field of neurolinguistics and techniques used to explore representation of language in the human brain. GE credit: SciEng.—I.

177. Computational Linguistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. Understanding the nature of language through computer modeling of linguistic abilities. Relationships between human cognition and computer representations of cognitive processing. Not open for credit to students who have completed course 7. GE credit: SocSci.—II. Ojeda

192. Internship in Linguistics (1-12)
Internship—3-36 hours; two written reports. Prerequisite: course 1 or the equivalent. Internship applying linguistic-related skills to a fieldwork project in areas such as media, law, or industry, in approved organizations or institutions. Maximum of 4 units applicable toward major. (P/NP grading only.)

194H. Special Study for Honors Students (1-5)
Independent study—1-5 hours. Prerequisite: open only to linguistics majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis. May be repeated for credit for up to 6 units. (P/NP grading only.)

197T. Tutoring in Linguistics (1-4)
Discussion—1-4 hours. Prerequisite: upper division standing, consent of instructor, and consent of department chairperson. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

200A. Foundations of Linguistics I (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Survey of fundamental issues raised by pre-generative linguistics in the twentieth century, with emphasis on issues crucial to applications of linguistics. Not open for credit to students who have completed course 203A.

200B. Foundations of Linguistics II (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Survey of fundamental issues raised by orthodox generative linguistics, with emphasis on issues crucial to applications of linguistics. Not open for credit to students who have completed course 203B.

200C. Foundations of Linguistics III (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Survey of fundamental issues raised by contemporary linguistic theories lying outside the generative grammar orthodoxy, with emphasis on issues crucial to applications of linguistics.

205A-205B-205C-205D. Topics in Linguistic Theory and Methods (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Advanced study of current problems in linguistic theory and methodology. May be repeated for credit when topic differs.—I, II. Manoliu, Ramanthan

211. Advanced Phonological Theory and Analysis (4)
Lecture—3 hours; term paper. Prerequisite: course 111. Critical examination of current phonological theories. Offered in alternate years.

212. Advanced Phonetics (4)
Lecture—3 hours; term paper. Prerequisite: course 112. Advanced investigation of the physiological basis of speech articulation and acoustic phonetics. Offered in alternate years.—II.

231. Advanced Syntactic Theory and Analysis (4)
Lecture—3 hours; term paper . Prerequisite: course 131. Critical survey of contemporary theories of syntax. Offered in alternate years.—III. Aranovich

241. Advanced Semantic Theory and Analysis (4)
Lecture—3 hours; term paper. Prerequisite: course 141 or consent of instructor. Advanced critical exploration of contemporary theories of linguistic semantics. Offered in alternate years.—II. Ojeda

251. Principles of Historical Linguistics (4)
Lecture—3 hours; term paper. Prerequisite: course 151. Advanced analysis of the theory and methods of historical linguistics. Offered in alternate years.—III. Benware

252. Romance Linguistics (4)
Lecture—3 hours; term paper. Prerequisite: course 151. Examination of the development of the Romance languages from Proto-Romance to the modern era. Application and critical examination of methods of historical and comparative linguistics in particular areas of structural change in Romance. Offered in alternate years.—III. Manoliu

260. Variation in Speech Communities (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 281 or consent of instructor. Linguistic variability in time, space, and society. Theoretical issues related to social and linguistic constraints in variation; issues and methods in the quantitative analysis of variation. Speech community, quantitative analytic methods, and the scope of sociolinguistic competence.

263. Discourse Analysis: Text in Context (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Introduction to and application of leading theoretical approaches to the analysis of discourse. Approaches to the analysis of (spoken and written) text in context, tools for analyzing different types of texts (narration, conversation, etc.). Theme/rheme, given/new, anaphora, discourse markers, and other lexical/grammatical features.—II. Schleppegrell

265. Language, Performance, and Power (4)
Seminar—3 hours; term paper. Exploration of the intersection between linguistic and social theories in the language-state relation and the performance of identity. Ideological sources of language differentiation; nation-building and linguistic difference. Political economic, sociolinguistic, and ethnographic approaches to understanding linguistic inequality. (Same course as Anthropology 265.) Offered in alternate years.—III. Smith

280. Theories of Second Language Acquisition (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Covers theoretical perspectives that direct or have directed research in second language acquisition; explores the relationship between linguistics and language teaching and deals with the individual variables that influence second language learning.—I. Ramanathan

281. Research Methods in TESOL/SLD (4)
Lecture—3 hours; term paper. Prerequisite: course 280. Research methods in second language research; evaluation of research designs and methods of analyses, formulation of research questions and hypotheses and design of study with thought to various kinds of data.—II.

282. Individual and Social Aspects of Bilingualism (4)
Lecture—3 hours; term paper. Broad overview of bi- and multilingualism, with focus on theoretical and descriptive research; topics covered range from language processing in bilinguals to code-switching to language as political issue in multilingual states.—III. Timm

283. Politics of Bi and Multilingual Literacies (4)
Lecture/discussion—3 hours; term paper. Anthropological, psycho-social, political, and educational perspectives on bi and multilingualism. Power, colonialism, "native/non-native" speakers, and varieties and the unequal distribution of social goods. Analysis of how competing factors keep peoples disenfranchised.

289. Pedagogical Applications of Second Language Acquisition Theory (4)
Seminar—3 hours; term paper. Prerequisite: course 280. Pedagogical implications of various theories of second language acquisition, facilitation of language acquisition in classroom settings, and techniques for conducting classroom-based research in language learning.—III. Schleppegrell

297T. English as a Second Language Teaching/Tutoring (1-4)
Tutoring—1-4 hours. Prerequisite: course 300, 301, or 302 (may be taken concurrently). Teaching classes for ESL graduate students. Aiding the ESL undergraduate composition classes; tutoring foreign graduate student Teaching Assistants in pronunciation. Does not fulfill requirement toward the M.A. degree. May be repeated for credit. (S/U grading only.)

298. Directed Group Study (1-5)
Prerequisite: graduate standing. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Courses

300. The Teaching of English as a Foreign Language (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: English 105A or course 109 or consent of instructor. Methods of teaching English to nonnative speakers, stressing particularly recent linguistic methodology and techniques.—I.

301. Materials of TESOL (4)
Lecture—4 hours. Prerequisite: course 300 or consent of instructor. Designing and evaluating ESL curricula and proficiency assessment instruments in all areas of language acquisition (pronunciation, reading, listening comprehension, etc.). Developing lessons, teaching and tutoring in selected language acquisition areas in the UCD ESL clinic. Evaluating (and adapting) published ESL materials.—II.

302. Recent Research and Special Projects in TESOL (4)
Lecture—4 hours. Prerequisite: courses 300 and 301. Review of recent research in second language acquisition and the teaching of English to speakers of other languages. Continued teaching and tutoring in the UCD ESL clinic. Each student also designs and reports on a classroom research project.

391. Oral English for ESL Students (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: open only to non-native speakers of English with priority enrollment to international student teaching assistants; completion of any required ESL courses or consent of instructor. Course gives non-native English-speaking students, particularly international student teaching assistants, intensive work in oral English to increase fluency, accuracy, and use of appropriate discourse strategies in academic settings (e.g., seminar, discussion, laboratory). Course may be repeated for credit with consent of coordinator. (S/U grading only.)—II, III.

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III.

Linguistics (A Graduate Group)

Lenora A. Timm, Ph.D., Chairperson of the Group
Group Office, 108 Sproul Hall (530-752-9933)

Faculty

Moradewun Adejunmobi, Ph.D., Assistant Professor *(African American and African Studies)*
Raul Aranovich, Ph.D., Assistant Professor *(Linguistics)*
Carlee Arnett, Ph.D., Assistant Professor *(German)*
Wilbur A. Benware, Ph.D., Professor *(Linguistics)*
Robert Blake, Ph.D., Professor *(Spanish)*
Travis Bradley, Ph.D., Assistant Professor *(Spanish)*
Cecilia Colombi, Ph.D., Associate Professor *(Spanish)*
Patrick Farrell, Ph.D., Associate Professor *(Linguistics)*
Jeffrey King, Ph.D., Professor *(Philosophy)*
Debra L. Long, Ph.D., Associate Professor *(Psychology)*
Martha Macri, Ph.D., Professor *(Anthropology, Native American Studies)*
Maria I. Manoliu, Ph.D., Professor *(French)*
Barbara Merino, Ph.D., Professor *(Education)*
Almerindo E. Ojeda, Ph.D., Professor *(Linguistics)*
C. Orhan Orgun, Ph.D., Assistant Professor *(Linguistics)*
Vai Ramanathan, Ph.D., Associate Professor *(Linguistics)*
Winfried Schleiner, Ph.D., Professor *(English)*
Mary Schleppegrell, Ph.D., Associate Professor *(Linguistics)*
Janet S. Smith, Ph.D., Professor *(Anthropology)*
Lenora A. Timm, Ph.D., Professor *(Linguistics)*
Karen A. Watson-Gegeo, Ph.D., Professor *(Education)*
Aram Yengoyan, Ph.D., Professor *(Anthropology)*

Emeriti Faculty

David L. Omsted, Ph.D. Professor Emeritus
Benjamin E. Wallacker, Ph.D., Professor Emeritus
Gwendolyn Schwabe, M.A., Senior Lecturer Emerita
Máximo Torreblanca, Ph.D., Professor Emeritus

Affiliated Faculty

Brian Carpenter, M.A., Lecturer
Nina F. Dronkers, Ph.D., Associate Adjunct Professor
Janet Lane, M.A., Lecturer
Ellen Lange, M.A., Lecturer
Mary Lowry, M.A., Lecturer
John Samsel, M.A., Lecturer
Kathleen Ward, Ph.D., Lecturer

Graduate Study. The Graduate Group in Linguistics offers a program of study leading to the M.A. degree. There are two tracks within the program, one concentrating on applied linguistics and TESOL, and the other on general linguistics. Within the general linguistics track, the following areas are emphasized: (a) grammatical analysis and theory in syntax, morphology, semantics, and phonology, (b) sociolinguistics, (c) psycholinguistics and neurolinguistics, and (d) linguistic description (contemporary or historical) of a particular language or group of languages.

In general, the M.A. in Linguistics at UC Davis serves as preparation for advanced graduate work at the Ph.D. level, as a supplement to studies in related fields—especially anthropology, psychology, philosophy, the various languages—or as a major component in the training for a professional career (such as TESOL, speech therapy, and foreign language teaching). The program places considerable emphasis on interdisciplinary studies, thereby increasing the breadth of the candidate's knowledge, and providing a wider and more flexible variety of options to pursue thereafter.

Preparation. Applicants to the M.A. program who do not have a bachelor's degree in Linguistics must complete certain courses in Linguistics from the undergraduate program. Applicants to the Applied Track must complete 103A and 103B (introduction

to linguistic analysis I and II), 141 (semantics), and 151 (historical linguistics). Applicants to the General Track must complete all of the above four courses, plus 111 (introduction to phonological theory), 112 (phonetics), and 131 (introduction to syntactic theory).

Requirements. The requirements for the two tracks differ. The track in general linguistics falls under the Plan I set of requirements. 38 units of upper division and graduate course work above and beyond the prerequisite courses listed under Preparation (above) must be completed, and a thesis is required. The track in applied linguistics and TESOL operates under either Plan I or Plan II. The Plan I requirements are the same as those listed above. Under Plan II, 42 units of upper division and graduate course work above and beyond the prerequisite courses are required, and at the end of the course work a student must pass a written comprehensive examination. Students in both tracks must pass a foreign language reading examination.

Graduate Adviser. A.E. Ojeda *(Linguistics).*

Literature in Translation

The following courses are open to students throughout the campus. The readings can be in English. Refer to departmental listing for the course description.

Chinese

10. Modern Chinese Literature (in English)
11. Great Books of China (in English)
50. Introduction to the Literature of China and Japan (in English)
104. Twentieth-Century Chinese Fiction (in English)
105. Western Influences on Twentieth-Century Chinese Literature (in English)
106. Chinese Poetry (in English)
107. Traditional Chinese Fiction (in English)
108. Poetry of China and Japan (in English)
109A-I. Topics in Chinese Literature (in English)
110. Great Writers of China: Texts and Context (in English)

Classics

140. Homer and Ancient Epic
141. Greek and Roman Comedy
142. Greek and Roman Novel
143. Greek Tragedy

Comparative Literature

1. Great Books of Western Culture: The Ancient World
2. Great Books of Western Culture: From the Middle Ages to the Enlightenment
3. Great Books of Western Culture: The Modern Crisis
4. Major Books of the Contemporary World
5. Fairy Tales, Fables and Parables
6. Myths and Legends
7. Literature of Fantasy and the Supernatural
8. Utopias and their Transformations
9. The Short Story and Novella
10A-N. Master Authors of World Literature
12. Introduction to Women Writers
13. Dramatic Literature
14. Introduction to Poetry
20. Man and the Natural World
25. Ethnic Minority Writers in World Literature
53A. Literature of China and Japan
53B. Literature of India and Southeast Asia
120. Writing Nature: 1750 to the Present
135. Women Writers
138. Gender and Interpretation
139. Shakespeare and the Classical World
140. Thematic and Structural Study of Literature
141. Introduction to Critical Theoretical Approaches to Literature and Culture
142. Critical Reading and Analysis
144. The Grotesque
145. Representations of the City
146. Myth in Literature
147. Modern Jewish Writers
151. Colonial and Postcolonial Experience in Literature
152. Literature of the Americas
153. The Forms of Asian Literature
154. African Literature
157. War and Peace in Literature
158. The Detective Story as Literature
159. Women in Literature
160A. The Modern Novel
160B. The Modern Drama
161A. Tragedy
161B. Comedy
163. Biography and Autobiography
164A. The Middle Ages
164B. The Renaissance
164C. Baroque and Neoclassicism
164D. The Enlightenment
166A. The Epic
166B. The Novel
167. Comparative Study of Major Authors
168A. Romanticism
168B. Realism and Naturalism
169. The Avant-Garde
170. The Contemporary Novel
180. Selected Topics in Comparative Literature
194H. Special Sudy for Honors Students
195. Seminar in Comparative Literature

Dramatic Art

20. Introduction to Dramatic Art
156A. History of Theatre and Dance: Ancient to 1650
156B. History of Theatre and Dance: 1650-1900
156C. History of Theatre and Dance: The Twentieth Century
159. Contemporary Experimental Theatre and Drama

French

50. French Film
51. Major Works of French
52. France and the French-Speaking World

German

48. Myth and Saga in the Germanic Cultures
49. Freshman Colloquium
112 Topics in German Literature
113. Goethe's Faust
115 German Literature since 1945
118A. Fin-de-siècle Vienna (The Swan Song of the Habsburg Empire)
118B. Weimar Culture: Defeat, the Roaring Twenties, the Rise of Nazism
118C. Germany under the Third Reich
118D. Germany between 1949 and 1989: Division and Restoration
119. From German Fiction to German Film
130. Modernity and its Discontents: The Tradition of German Cultural Critique
141. The Holocaust and its Literary Representation
142 New German Cinema: From Oberhausen to the Present

Italian

50. Studies in Italian Cinema
107. Survey of Italian Culture and Institutions
108. Contemporary Issues in Italian Culture and Society
139B. Boccaccio, Petrarch and the Renaissance
140. Italian Literature in English Translation: Dante, Divine Comedy
141. Culture, Gender and the Italian Renaissance
142. Masterpieces of Modern Italian Narrative
150. Studies in Italian Cinema

Japanese

10. Masterworks of Japanese Literature (in English)
15. Introduction to Traditional Japanese Culture
50. Introduction to the Literature of China and Japan
101. Japanese Literature in Translation: The Early Period
102. Japanese Literature in Translation: The Middle Period
103. Japanese Literature in Translation: The Modern Period
104. Modern Japanese Literature: War and Revolution
105. Modern Japanese Literature: Hero and Anti-Hero
106. Japanese Culture through Films
107. Modern Japanese Autobiographics (in English)
108. Poetry of China and Japan

Native American Studies

181A. Native American Literature (the novel and fiction)
181B. Native American Literature (non-fiction works by Native authors)
181C. Native American Literature (traditional and contemporary poetry)
184. Contemporary Indigenous Literature of Mexico
188. Special Topics in Native American Literary Studies

Russian

41. Survey of Nineteenth-Century Russian Literature
42. Survey of Twentieth-Century Russian Literature
44. Children's Literature in Russia
121. Nineteenth-Century Russian Prose
123. Twentieth-Century Russian Prose
126. The Russian Theater
130. Contemporary Soviet Culture
131. Literature of Revolution
132. Nature and Culture in the Soviet Union
140. Dostoevsky
141. Tolstoy
150. Russian Culture
151. Soviet Writers and Censorship
154. Russian Folklore
166. Representations of Sexuality in Russian Literature

Spanish

149. Latin-American Literature in Translation

Management, Graduate School of

Nicole W. Biggart, Ph.D., Dean
Paul A. Griffin, Ph.D., Associate Dean
James Stevens, M.B.A., Assistant Dean
School Office, 106 AOB IV (530-752-7399)

Faculty

Brad M. Barber, Ph.D., Professor
Beth Bechky, Ph.D., Assistant Professor
Hemant Bhargava, Ph.D., Professor
Eyal Biyalogorsky, Ph.D., Assistant Professor
David S. Bunch, Ph.D., Professor
Richard P. Castanias, II, Ph.D., Associate Professor
Katrina Ellis, Ph.D., Assistant Professor
Kimberly D. Elsbach, Ph.D., Associate Professor
Eitan Gerstner, Ph.D., Professor
Michael R. Hagerty, Ph.D., Associate Professor
Andrew Hargadon, Ph.D., Associate Professor
Michael Maher, Ph.D., Professor
Prasad Naik, Ph.D., Associate Professor
Donald A. Palmer, Ph.D., Professor
Benjamin Segal, Ph.D., Assistant Professor
Robert H. Smiley, Ph.D., Professor
Anand Swaminathan, Ph.D., Professor
Chih-Ling Tsai, Ph.D., Professor
David Woodruff, Ph.D., Professor

Michelle Yetman, Ph.D., Assistant Professor
Robert Yetman, Ph.D., Assistant Professor
Ning Zhu, Ph.D., Assistant Professor

Emeriti Faculty

Richard C. Dorf, Ph.D., Professor Emeritus
Peter K. Clark, Ph.D., Professor Emeritus
Jerome J. Suran, B.S., Ph.D. (hon.), Senior Lecturer Emeritus

The Graduate School of Management offers a minor in Technology Management to undergraduate students with majors in engineering, biological and physical sciences. This minor complements students' undergraduate studies with courses in the ways in which engineering and science-based industrial enterprises manage and use knowledge from science, engineering and technology. The minor also provides students with business and management skills that should enable them to use their engineering and science education more effectively in a technology environment.

Due to limited enrollment, students need to apply to the program. The primary admission process will be conducted in the spring quarter before student registration for fall courses. Subsequent admissions processes will be held as needed for students to enter the minor in winter and spring quarters.

Minor Prerequisites

Students must take these courses for a letter grade.

Management 11A.....4 units
Mathematics 16A-16B, 17A-17B or 21A-21B .....6–8 units
Statistics 100, 102, 103, 108 or the equivalent.....4 units

Minor Program Requirements:

Technology Management..... 20
Choose five courses from Management 120, 140, 150, 160, 170, 180 20

Courses in Management (MGT, MGP)

Lower Division Courses

11A. Elementary Accounting (4)
Lecture—3 hours; discussion—1 hour. Basic concepts of accounting; interpreting and using financial statements; understanding accounting principles.—I, II. (I, II.)

11B. Elementary Accounting (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A. Product costing; using accounting information for decision making; planning and performance evaluation.—III. (III.)

Upper Division Courses

100. Introduction to Financial Accounting (3)
Lecture—3 hours. Course is open to all upper division undergraduate and graduate students, except those in the Graduate School of Management. Introduction to the concepts, methods, and uses of accounting and financial reporting. Preparation of financial statements, including balance sheet and statements of income and cash flow, as well as their analysis by investors and managers.

120. Managing and Using Information Technology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A, Mathematics 16B, 17B, or 21B, Statistics 100, 102, 103, or 108. Introduction to computer hardware, systems software, and information systems. Management of information technology and the impact of information systems on modern management.—III. Bhargava

140. Marketing for the Technology-Based Enterprise (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A, Mathematics 16B, 17B, or 21B, Statistics 100, 102, 103, or 108. Marketing in technology-based companies, with emphasis on how scientists, engineers, and business people interact to develop and market products and services.—II. Hagerty

150. Technology Management (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A, Mathematics 16B, 17B, or 21B, Statistics 100, 102, 103, or 108. Management of firms in high technology industries such as software development and biotechnology research. Motivating and managing workers, organizing for innovation, and making decisions.—III.

160. Financing New Business Ventures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A, Mathematics 16B, 17B, or 21B, Statistics 100, 102, 103, or 108. Concepts and methods used to structure and finance new business ventures. Topics include the evaluation of new investment projects, raising venture capital, the role of the venture capitalist, and the choice of organizational structure in new ventures.—II. Castanias

170. Managing Costs and Quality (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A, Mathematics 16B, 17B, or 21B, Statistics 100, 102, 103, or 108. Designing cost systems in high technology organizations and managing operations to maximize quality and minimize costs. Topics include activity based costing and management, managing quality and time to create value, ethical issues in cost assignment, and differential costing for decision making.—I. Maher

180. Supply Chain Planning and Management (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A, Mathematics 16B, 17B, or 21B, Statistics 100, 102, 103, or 108. Quantitative techniques for analysis and management of modern supply chains for the production and delivery of goods and services.—I. Woodruff

Graduate Courses

(Core Courses)

200A. Financial Accounting (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Introduction to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, consideration of the usefulness of financial statements in the analysis of a corporation's operations.—I. (I.) Rangan

200B. Managerial Accounting (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Information managers should know to be effective, including: product costing, motivating people, and differential analysis for decision making. Includes team projects and written and oral presentations.—II. (II.) Maher

201A. The Individual and Group Dynamics (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Examines basic psychological and social psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building.—I. (I.) Palmer

201B. Organizational Structure and Strategy (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Analysis of structural properties of organization including differentiation and vertical and horizontal integration. Alternative structural arrangements including functional, divisionalized, matrix, and hybrid structures. Relationship between environment, structure, and strategic objectives. Organization life cycle and changes.—II. (II.) Biggart, Swaminathan

202A. Markets and the Firm (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied.—I. (I.)

202B. Business, Government, and the International Economy (3)
Lecture—3 hours. Prerequisite: course 202A. Examines the influence of government and international factors on business. Topics include distribution of income, business cycles, inflation and interest rates, the federal debt, monetary policy and international trade and finance.—II. (II.) Clark

203A. Data Analysis for Managers (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management MBA program or consent of instructor. Introduction to statistics and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.—I. (I.) Tsai

203B. Forecasting and Managerial Research Methods (3)
Lecture—3 hours. Prerequisite: course 203A. Practical statistical methods for managerial decision making covers regression analysis, time series analysis and forecasting, design and analysis of experiments in managerial research and contingency table analysis. Application of these methods to marketing, finance, accounting, production, operations, and public policy.—II. (II.) Tsai

204. Marketing Management (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales.—III. (III.) Hagerty

205. Financial Theory and Policy (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management and hedging.—III. (III.) Barber

206. Decision Making and Management Science (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management MBA program or consent of instructor. Develops decision-making and problem-solving skills in conjunction with a quantitative model-building approach. Emphasizes how structured modeling techniques, probability forecasts, simulations, and computer optimization models are used in the overall process of making decisions in an uncertain environment.—II. (II.) Topkis

207. Management Information Systems (3)
Lecture—3 hours. Prerequisite: graduate student or consent of instructor. Introduction to computer programming and data handling skills. Use of computer in organizations, emphasis on managerial aspects of computing. Standard and nonstandard uses of data files, centralization versus decentralization of computing, office automation, computer security.—II. (II.) Woodruff

(Elective Courses)

Students must complete the Management core course requirement before enrolling in any of the following courses, or petition with consent of the instructor.

215. Business Law (3)
Lecture—3 hours. Prerequisite: completion of Administration core requirements or petition with consent of instructor. Introduction to law and legal process in the United States. Sources of law. Structure and

operation of courts, federal-state relationships, fundamentals of administrative law, fundamentals of business law.

216. Managing Professionals, Budgets, Controls and Ethics (3)
Lecture—3 hours. Prerequisite: graduate standing. Performance measures, budgetary controls and ethical pressures which occur at middle management levels in service-type operations. Addresses such organizations as engineering, medical groups, law offices, management consultants.—I. (I.) Suran

220. Management of Social Networks (3)
Lecture/discussion—3 hours. Prerequisite: course 201A. Principles and applications of social network theory: coordinating divergent interests to create value for individuals and organizations. Emphasis on conceptual models, web-based diagnostic tools, and practical applications.—I. (I.) Swaminathan

223. Power and Influence in Management (3)
Seminar—3 hours. Prerequisite: consent of instructor. Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of resources (including information), social psychological processes (including commitment), the construction of meaning, and ethics.—Palmer

224. Human Resources Management (3)
Lecture—3 hours. Problems of recruiting, training, motivating, compensating, and separating workers in contemporary organizations. Topics include design of incentive systems, career management, professionalization, alienation, worker burnout, organizational deviance, and current issues such as affirmative action and the unionization of public employees.

240. Management Policy and Strategy (3)
Lecture—3 hours. Prerequisite: first-year core courses of M.B.A. program. Examines the scope of missions, objectives strategies, policies, structures, measurements and incentives which bear on the management of an organization. Real "client" organizations, in the private and public sectors, are assigned to student teams as the subjects of study.—I. (I.) Suran, Hagerty

241. New Product Development (3)
Lecture/discussion—3 hours. Prerequisite: course 249 or consent of instructor. Open to students in the Graduate School of Management. State of the art concepts and methods to enhance the effectiveness of new product development activities. Focus on the understanding of managerial issues and acquiring the ability to solve problems.—III. Naik

242. Marketing Communications (3)
Lecture—3 hours. Issues in designing a marketing communications strategy. Topics include mass and direct communications, institutional aspects of advertising consumer behavior, evaluating ad effectiveness, determining ad budget, creative strategy, and use and abuse of promotions.—Naik

244. New and Small Business Ventures (3)
Lecture—3 hours. Emphasizes starting a new business venture or managing a small, ongoing business during its formative stages. The business plan. Legal forms, financial considerations, the management team. The entrepreneur. Students develop a detailed business plan.—Dorf

246. Negotiation and Team Building (3)
Lecture—3 hours. Prerequisite: courses 202, 205. Teaches basic theory of negotiation; applies theory to process of building teams to achieve business purposes. Covers integrative and distributive strategies of claiming value, how to recognize bargaining tricks, uncovering hidden agendas, brainstorming to extend Pareto frontier.—III. (III.) Elsbach

247. Customer Service as a Marketing Tool (3)
Lecture—3 hours. Understanding the distinct features of services, how to create value through service, methods of building strong relationships with customers, methods of measuring and building customer satisfaction, and measuring the financial impact of service improvement.—I. (I.) Gerstner

248. Marketing Strategies (3)
Lecture—3 hours. Examines process by which organizations develop strategic marketing plans. Includes definition of activities and products, marketing audits, appraising market opportunities, design of new activities and products, and organizing marketing planning function. Applications to problems in private and public sector marketing.—Gerstner

249. Marketing Research (3)
Lecture—3 hours. Course addresses the managerial issues and problems of systematically gathering and analyzing information for making private and public marketing decisions. Covers the cost and value of information, research design, information collection, measuring instruments, data analysis, and marketing research applications.—Hagerty

250. Technology Management (3)
Lecture—3 hours. Management of the engineering and technology activity. Functions of design, planning, production, marketing, sales, and maintenance. Technological product life cycle. Research and development activity. Project planning and organization. Manufacturing issues. Case studies.

251. Management of Innovation (3)
Lecture—3 hours. Managing innovative enterprise in changing and uncertain environments. Covers technology forecasting and assessment, program selection and control, financial management, regulation, and ethics.—Biggert

252. Production and Operations Management (3)
Lecture—3 hours. Explores methods of increasing operational efficiency in production and service organizations through planning and scheduling, materials management, inventory control, quality control, and distribution. Methodologies employed include such techniques as programming, simulation, systems analysis, queuing, and network models.—Woodruff

260. Financial Management (3)
Lecture—3 hours. Focuses on planning, acquiring, and managing a company's financial resources. Includes discussion of financial aspects of mergers and other forms of reorganization; analysis of investment, financial, and dividend policy; and theories of optimal capital structure.—Castanais

261. Investment Analysis (3)
Lecture—3 hours. Examines asset pricing theories and relevant evidence, including the investment performance of stocks and bonds. Topics include the efficiency of markets, domestic and international portfolio diversification, factors influencing the value of stocks and other investments, and portfolio management and performance.—Odean

262. Money and Security Markets (3)
Lecture—3 hours. Examines how money and securities markets are organized; how public agencies, businesses, others obtain and invest funds in those markets. Relationship between interest rates, monetary policy, government's role in improving capital markets, approaches to assessing changes in regulation of specific markets.

263. Derivative Securities (3)
Lecture/discussion—3 hours. The behavior of options, futures, and other derivative securities markets and how public agencies, business and others use those markets. Trading strategies involving options, swaps, and financial futures contracts. Pricing of derivative securities, primarily by arbitrage methods.—III. Clark

264. Business Taxation (3)
Lecture—3 hours. Analysis of the impact of business taxation on investment, production, and finance decisions. Discussion of the relationship between business organization and tax liability. Course is not intended for tax specialists.—Griffin

266. International Finance (3)
Lecture—3 hours. Prerequisite: course 207 or the equivalent. Open economy macroeconomics, balance of payments theory, and financial decision making in multinational firms.—Castanias

268. Management Communications (3)
Lecture—3 hours. The theories, strategies, and skills necessary for effective communication in management. Students will learn to improve their business writing, and will deliver business presentations orally.—Kennedy

270. Corporate Financial Reporting (3)
Lecture—3 hours. Analyzes and evaluates contemporary issues in financial reporting and develops implications of those issues for business decision makers, investment managers, and accounting policymakers.—Griffin

271. Incentives and Controls (3)
Lecture/discussion—3 hours. Prerequisite: course 200B. Concepts and techniques of accounting and budgeting for management decision making in the private sector. Topics include strategy, organizational structure, market-based incentives, performance evaluation and ethical issues.—I. Maher

272. Evaluation of Financial Information (3)
Lecture—3 hours. Studies how investors, creditors, others use accounting and other information in making rational investment, lending decisions. Emphasis is placed on the analysis of financial information in a variety of contexts. Where applicable, recent research in finance and economics is discussed.—Griffin

273. Accounting and Reporting for Government Nonprofit Entities (3)
Lecture—3 hours. Concepts, methods, and uses of accounting and financial reporting by governmental and nonprofit entities. Introduction to budgeting and performance evaluation, and accounting for entities such as hospitals, universities, and welfare agencies.

274. Auditing, Internal Control, and Public Accounting (3)
Lecture—3 hours. Concentrates on role of the independent public accountant as auditor and consultant, from the perspective of an enterprise manager. Auditing standards, auditing procedures, and auditing control techniques are discussed. Emphasis is also given to current issues confronting the accounting profession.

276. Real Estate, Finance and Development (3)
Lecture—3 hours. Prerequisite: course 201A and 207. Focus on single family, attached, detached, multi-family, and light commercial development. Students will study factors which make up successful real estate developments. Course will consider financial aspects involved in land acquisition, land development, construction, and project lending.

281. Systems Analysis and Design (3)
Lecture—3 hours. Design and specification of computer-based information systems. Applications systems development life cycle, use requirements and feasibility assessment, logical and physical design, program development and testing, conversion and implementation.

284. Applied Linear Models for Management (3)
Lecture—3 hours. Covers regression, analysis of variance, and multivariate analysis. Topics will focus on applications to management and policy problems.—Tsai

285. Time Series Analysis and Forecasting (3)
Lecture—3 hours. Considers application of time series methods to evaluation and forecasting problems. Covers univariate and multivariate ARIMA models and transfer function models. Applications will be in such areas as economics, finance, budgeting, program evaluation, and industrial process control.—Tsai

286. Telecommunications and Computer Networks (3)
Lecture—3 hours. Prerequisite: course 280. Communication system components; common carrier services; design and control of communications net-works; network management and distributed environment; local area networks; data security in computer networks.—Topkis

287. Database Systems (3)
Lecture—3 hours. Prerequisite: course 280. Hierarchical, network, and relational models for database

systems. Design and implementation of models. Performance evaluation and benchmarking. Query structures and languages. Data security and integrity. Application to managerial decision making and decision support systems.

288. Special Topics in Management of Information Systems (3)
Lecture—3 hours. Managerial aspects of information systems. Topics stressing applications in organizations chosen from: economics of computers and information systems, decision support systems, management of computer-based information systems, office automation.—Topkis

291. Topics in Organizational Behavior (3)
Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Advanced topics in social psychology and sociology of organizations. Varied topics to cover more extensively issues discussed in courses 201A and 201B, or current business interest topics in fields of organization design, strategy, development, or workplace processes. May be repeated for credit.—I. (I.)

292. Topics in Finance (3)
Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Contemporary and emerging issues in finance. Application of modern techniques of finance to business problems. Use of appropriate electronic database and research techniques. May be repeated for credit.—I. (I.)

293. Topics in Marketing (3)
Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Advanced topics in marketing, which may include marketing research, new product development, brand management, pricing, distribution management, service marketing, hi-tech marketing, advertising, sales promotions, marketing through the Web. May be repeated for credit.—I. (I.)

294. Topics in Accounting (3)
Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Contemporary and emerging issues in financial management accounting. Application of modern techniques of evaluation and analysis of financial information. Use of appropriate electronic database and research techniques. May be repeated for credit.—I. (I.)

295. Topics in Information Technology (3)
Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Applications of information technology to management and management of information technology. Adaptation to the dynamic nature of the field. May be repeated for credit.—I. (I.)

296. Topics in Technology Management (3)
Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Cyclical nature of innovation and technological change, features of innovative firms and industries, national innovation systems, and impact of information technologies on innovation processes. May be repeated for credit.—I. (I.)

297. Topics in International Management (3)
Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. The broader environment in which U.S. firms and their foreign competitors operate. Integration of material from other topics courses (marketing, strategy, finance, accounting, information technology, technology management) into the international setting. May be repeated for credit.—I. (I.)

298. Directed Group Study (1-5)
Prerequisite: consent of instructor.

299. Individual Study (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Managerial Economics

(College of Agricultural and Environmental Sciences)

The Major Program

The major in managerial economics (formerly agricultural and managerial economics) teaches students to apply economics and quantitative principles to problems in agricultural production, management, marketing, finance, trade, futures and options, environment and development.

The Program. Each student must specialize in at least one of three options: agricultural economics, which focuses on topics related to the production and marketing of foods and fibers; environmental and resource economics, which focuses on issues related to use of resources and environmental quality; or managerial economics, which focuses on topics related to evaluating, financing, and managing business activities.

Internships and Career Alternatives. Students in managerial economics have opportunities to gain additional career information and preparation through internships in a variety of private business and governmental agencies. Graduates qualify for supervisory and management training positions in farm and ranch production, food and agricultural processing, agricultural sales and service, banking, finance, commodity and stock brokerages in the private sector, and a variety of agency career positions in local, state, and federal government. Students who desire additional training are well qualified to enter graduate programs in agricultural and resource economics, economics, business administration, or law.

Major Entrance Requirements. Students may enter the Pre-Managerial Economics major while completing the major preparatory requirements.

Acceptance into the pre-major does not guarantee automatic admission into the major. Before declaring a major in Managerial Economics, a student must complete the following courses with a combined grade point average (GPA) of at least 2.80. All of these courses must be taken for a letter grade. In determining admission to major status, the Department of Agricultural and Resource Economics counts only the first repeat of any pre-major course.

Economics 1A and 1B.....10 units
Statistics 13.....4 units
Mathematics 16A and 16B or 21A and 21B.....6-8 units

B.S. Major Requirements:

UNITS

English Composition Requirement.....4-12
At least 8 units from the following list:
English 1, 3, 18, 19, 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A,104F
Remaining 4 units from above list or from Comparative Literature 1, 2, 3, 4, Native American Studies 5, Communication 1

Preparatory Subject Matter 75-78
Management 11A-11B 8
Agricultural Management and Rangeland Resources 21, Computer Science Engineering 10, 15 or 30..... 3-4
Economics 1A-1B..... 10
Mathematics 16A-16B or 21A-21B..... 6-8
Statistics 13, 103..... 8
Social Science, Natural Science, Agricultural Science 40
(See Major Breadth Requirement Handout in Department Advising Office or the http://www.agecon.ucdavis.edu for a complete list of courses.)

Breadth/General Education 6-24
Note: Approved General Education courses may be used to simultaneously satisfy Social, Natural, and Agricultural Science courses as defined in the Preparatory Subject Matter for the major and the campus General Education requirement.

Depth Subject Matter.....20-21
Students graduating with this major are required to attain at least a C average (2.0) in all upper division courses taken at the University in the depth subject matter.
Agricultural and Resource Economics 100A, 100B, 106, 155..... 16
Economics 101 or 105..... 4-5

Restricted Electives 32
Choose at least one of the options below:

Agricultural Economics option
Choose at least 15 units from Agricultural and Resource Economics 120, 130, 132, 138, 139, 140, 145, 150. Select the remaining 17 units from the aforementioned courses, Agricultural and Resource Economics 18, or upper division courses in Agricultural and Resource Economics and/or Economics

Environmental and Resource Economics option
Agricultural and Resource Economics 175, 176 8
Choose at least 18 units from Agricultural and Resource Economics 15, 120, 138, 145, 146, 150, 156, Economics 123, 125, 130, Environmental Science and Policy 168A, 168B, 178. Select the remaining 6 units from the aforementioned courses or upper division courses in Agricultural and Resource Economics and/or Economics, Environmental Science and Policy 160, 161, 163, 165, 166, 167, 171, 172, 173, Environmental Toxicology 138

Managerial Economics option
Agricultural and Resource Economics 18.. 4
Choose at least 12 units from Agricultural and Resource Economics 112, 118, 136, 157, 171A, 171B. Select the remaining 16 units from the aforementioned courses or from Agricultural and Resource Economics 115A, 120, 130, 132, 138, 139, 140, 143, 144, 145, 146, 150, 156, 175, 176, 194HA-194HB, Economics 115A, 121A, 121B, 151A, 151B, 160A, 160B

Unrestricted Electives.....37-48

Total Units for the Degree.....180

Advising Center for the major is in 1176 Social Sciences and Humanities Building (530-752-4932 or 530-752-8096).

Major Adviser. H. Carman *(Agricultural and Resource Economics).*

Minor Program Requirements:

The Department of Agricultural and Resource Economics offers four minor emphases open to students majoring in other disciplines who wish to complement their study programs with a minor in Managerial Economics. Each emphasis requires Agricultural and Resource Economics 100A, which has prerequisites of Economics 1A-1B and Mathematics 16A-16B. For some courses, Statistics 13 and 103 may be required. Variable-unit courses and lower division courses are not accepted for any emphasis.

UNITS

Managerial Economics.....18

General emphasis
Agricultural and Resource Economics 100A or the equivalent..... 4
Additional upper division courses in Agricultural and Resource Economics..... 14

Agricultural Economics emphasis
Agricultural and Resource Economics 100A or the equivalent..... 4

Additional upper division courses in Agricultural and Resource Economics 14
Select 9 or more units from Agricultural and Resource Economics 120, 130, 132, 138, 139, 140, 145, 150.
Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

Environmental and Natural Resource Economics emphasis
Agricultural and Resource Economics 100A or the equivalent..... 4
Additional upper division courses in Agricultural and Resource Economics 14
Select 9 or more units from Agricultural and Resource Economics 175 and 176, and either 100B or 120.
Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

Managerial Economics emphasis
Agricultural and Resource Economics 100A or the equivalent..... 4
Additional upper division courses in Agricultural and Resource Economics 14
Select 9 or more units from Agricultural and Resource Economics 112, 118, 136, 157, 171A, 171B.
Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

Graduate Study. See the Graduate Studies section in this catalog.

Master of Education (M.Ed.) (A Graduate Group)

James Grieshop, Ph.D., Chairperson of the Group
Group Office, 1303 Hart Hall (530-752-1926)

Faculty

Curt Acredolo, Ph.D., Adjunct Associate Professor *(Human and Community Development)*
Rina Alcalay, Ph.D., Associate Professor *(Communication)*
Robert A. Bell, Ph.D., Professor *(Communication)*
Marc Braverman, Ph.D., 4-H Cooperative Extension Specialist *(Human and Community Development)*
Isao Fujimoto, M.A., Sr. Lecturer Emeritus
Barbara G. Goldman, Ph.D., Lecturer *(Education, Human and Community Development)*
James I. Grieshop, Ph.D., Lecturer *(Human and Community Development)*
Glenn Hawkes, Ph.D., Professor Emeritus
Susan B. Kaiser, Ph.D., Professor *(Textiles and Clothing)*
George C. Longfish, M.F.A., Professor *(Native American Studies)*
E. Dean MacCannell, Ph.D., Professor *(Environmental Design)*
Martha J. Macri, Ph.D., Associate Professor *(Native American Studies)*
Margaret H. Rucker, Ph.D., Professor *(Textiles and Clothing)*
Robert Sommer, Ph.D., Professor *(Psychology)*
Orville E. Thompson, Ph.D., Professor Emeritus
Karen A. Watson-Gegeo, Ph.D., Professor *(Education)*
Joan Wright, Ph.D., Lecturer *(Human and Community Development)*
Frank Zalom, Ph.D., Lecturer *(Entomology)*

Graduate Study. The Master of Education Graduate Group is housed in the Department of Human and Community Development. Master of Education (M.Ed.) degree students are preparing for leadership and professional roles in community and development education related to planning, organizational change, and evaluation. Areas of study include health education planning; community services planning and program management; community and non-formal education; international development education; program design and evaluation; organizational decisionmaking; leadership development, communication and change; extension education; environmental education; agricultural development education; and consumer behavior.

Requirements. The M.Ed. degree requires 36 units minimum of upper division and graduate courses. A minimum of 18 of these units must be graduate level courses; and at least eight units must be related to research methods and/or statistics. Students submit a required Program of Study Plan in the area of intended specialization by the end of the first quarter of graduate study. A research-based field project and comprehensive oral examination are required for completion of this degree.

Graduate Adviser. Contact Group office.

Mathematical and Physical Sciences

(College of Letters and Science)
Louise Kellogg, Ph.D. *(Geology)*, Program Director
Program Office, 1201 Social Sciences and Humanities Building

Committee in Charge

Andy Albrecht, Ph.D. *(Physics)*
Rudolph Beran, Ph.D. *(Statistics)*
Shirley Chiang, Ph.D. *(Physics)*
John Hunter, Ph.D. *(Mathematics)*
William M. Jackson, Ph.D. *(Chemistry)*
Mark Kurth, Ph.D. *(Chemistry)*
Isabel Montanez, Ph.D. *(Geology)*
Bruno Nachtergaele, Ph.D. *(Mathematics)*
Robert Shumway, Ph.D. *(Statistics)*

The Program of Study

The Division of Mathematical and Physical Sciences teaches students to use experimental studies and theoretical analyses to find solutions to real world problems. Students learn to address issues such as cleaning up the environment, preserving natural resources and creating innovative materials for the future. From the study of atoms to the examination of distant galaxies, from abstract number theory to the development of new chemical compounds, the division provides students with the skills to build the world of tomorrow.

The program in Mathematical and Physical Sciences provides an organizational structure within the College of Letters and Science for facilitating the development of innovative curricular initiatives across the mathematical and physical sciences, including offering broadly conceived, integrative undergraduate- and graduate-level courses. The program also may house resident faculty pursuing interdepartmental research and teaching in this area of inquiry.

Courses in Mathematical and Physical Sciences (MPS)

Lower Division Course

1. General Science: Science in the News (4)
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: lower division standing. Basic principles in science including numeracy, scale, energy, and time; the scientific method; good and bad science. Emphasis on science topics recently in the news. GE credit: SciEng.—III. Rustad

11A-11B. Mathematical and Physical Sciences Seminar (2–2)
Lecture—2 hours. Prerequisite: mentorship for undergraduate research participants in the physical and mathematical sciences. Research and writing in the mathematical and physical sciences. Presentations by various science faculty members.—I-II. (I-II.)

Mathematics

See Mathematics; Applied Mathematics (A Graduate Group)

Mathematics

(College of Letters and Science)
————, Chairperson
Department Office, 564 Kerr Hall (530-752-0827)
http://math.ucdavis.edu

Faculty

Craig Benham, Ph.D., Professor
Angela Y. Cheer, Ph.D., Professor
Jesús De Loera, Ph.D., Associate Professor
C. Albert Fannjiang, Ph.D., Professor
Dmitry B. Fuchs, Ph.D., Professor
Janko Gravner, Ph.D., Professor
Joel Hass, Ph.D., Professor
John K. Hunter, Ph.D., Professor
Michael Kapovich, Ph.D., Professor
Mikhail Khovanov, Ph.D., Assistant Professor
Arthur J. Krener, Ph.D., Professor
Gregory J. Kuperberg, Ph.D., Professor
E. O. Milton, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Alexander I. Mogilner, Ph.D., Professor
Motohico Mulase, Ph.D., Professor
Bruno L. Nachtergaele, Ph.D., Professor
E. Gerry Puckett, Ph.D., Professor
Eric Rains, Ph.D., Professor
Naoki Saito, Ph.D., Professor
G. Thomas Sallee, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Anne Schilling, Ph.D., Assistant Professor
Jennifer Schultens, Ph.D., Associate Professor
Albert Schwarz, Ph.D., Professor
Steven Shkoller, Ph.D., Professor
Evelyn M. Silvia, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Alexander Soshnikov, Ph.D., Associate Professor
Thomas Strohmer, Ph.D., Associate Professor
J. Blake Temple, Ph.D., Professor
Abigail Thompson, Ph.D., Professor
Craig A. Tracy, Ph.D., Professor
Monica Vazirani, Ph.D., Assistant Professor
Roman Vershynin, Ph.D., Assistant Professor
Andrew Waldron, Ph.D., Assistant Professor
Hong Xiao, Ph.D., Assistant Professor

Emeriti Faculty

Carlos R. Borges, Ph.D., Professor Emeritus
David Barnette, Ph.D., Professor Emeritus
Donald C. Benson, Ph.D., Professor Emeritus
Robert J. Buck, Professor Emeritus
Gulbank D. Chakerian, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
Doyle O. Cutler, Ph.D., Professor Emeritus
James R. Diederich, Ph.D., Professor Emeritus
Allan L. Edelson, Ph.D., Professor Emeritus
Robert D. Glauz, Ph.D., Professor Emeritus
Shirley A. Goldman, M.S., Lecturer Emerita
Charles A. Hayes, Jr., Ph.D., Professor Emeritus
Kurt Kreith, Ph.D., Professor Emeritus
Melven R. Krom, Ph.D., Professor Emeritus
Gary J. Kurowski, Ph.D., Professor Emeritus
David G. Mead, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*

Donald A. Norton, Ph.D., Professor Emeritus
Washek F. Pfeffer, Ph.D., Professor Emeritus
Sherman K. Stein, Litt.D. (hon.), Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
Robert W. Stringall, Ph.D., Professor Emeritus
Takayuki Tamura, D.Sc., Professor Emeritus
Howard J. Weiner, Ph.D., Professor Emeritus
Roger J-B. Wets, Ph.D., Professor Emeritus

Affiliated Faculty

John Chuchel, Ph.D., Lecturer
Daniel Coutand, Ph.D., Visiting Research Assistant Professor
Ali Dad-Del, Ph.D., Lecturer
Robin Endelman, Ph.D., Visiting Research Assistant Professor
Boumediene Hamzi, Ph.D., Visiting Research Assistant Professor
Duane Kouba, Ph.D., Lecturer
Jianfeng Liang, Ph.D., Visiting Research Assistant Professor
Lawrence Marx, Ph.D., Lecturer

The Major Programs

Mathematics is the study of abstract structures, space, change, and the interrelations of these concepts. It also is the language of the exact sciences.

The Program. Students majoring in mathematics may follow a program leading to either the Bachelor of Arts or the Bachelor of Science degree. After completing basic introductory courses such as calculus, students plan an upper division program in consultation with a faculty adviser. This individualized program can lead to graduate study in pure or applied mathematics, to elementary or secondary level teaching, or to other professional goals. It can also reflect a special interest such as computational and applied mathematics, computer science, or statistics, or may be combined with a major in some other field.

Career Alternatives. A degree in mathematics provides entry to many careers in addition to teaching. For instance, operations research, systems analysis, computing, actuarial work, insurance, and financial services are only a few such careers. Mathematics is also a sound basis for graduate work in a variety of fields, such as law, engineering, and economics.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 38-41
Mathematics 12 (or high school equivalent) 0-3
Mathematics 21A, 21B, 21C, 21D, 22A, 22B 22
Computer Science Engineering 30 or Engineering 6 4
Additional non-Mathematics courses chosen from natural sciences 12

Depth Subject Matter 38
Mathematics 108 4
Mathematics 127A, 127B 8
Mathematics 149A, 149B; or 150A, 150B .. 8
Choose one Plan from the following two (up to 4 of these 18 units may be approved upper division applied courses outside of mathematics) 18

Plan 1: Secondary Teaching
Mathematics 111 4
Mathematics 115A 4
Mathematics 141 4
Additional upper division mathematics units selected in consultation with and subject to approval of an adviser 6
Note: Students who wish to satisfy the single subject matter waiver for the teaching credential should see an adviser as early as possible.

Plan 2: General Mathematics
Additional upper division units selected in consultation with and subject to approval of an adviser 18

Total Units for the Major 76-79

Applied Mathematics

B.S. Major Requirements

UNITS

Preparatory Subject Matter 33-39
Mathematics 12 (or high school equivalent) 0-3
Mathematics 21A, 21B, 21C, 21D, 22A, 22B 22
Computer Science Engineering 30 4
One two-quarter sequence from Physics 9A-9B; Biological Sciences 1A-1B; Chemistry 2A-2B; Economics 1A-1B; Statistics 32, 102; or other approved applied preparatory courses 7-10

Depth Subject Matter 48
Mathematics 108, 127A, 127B 12
Two courses from Mathematics 128A, 128B, 128C, 165 8
Mathematics 167 4
Two courses from Mathematics 118A, 118B, 118C, 119A, 119B, 131, 132A, 145, 149A, 149B, 150A, 150B, 168 8
Additional upper division mathematics units selected in consultation with and subject to the approval of your adviser 8
Two approved upper division courses outside the Mathematics Department with extensive use of mathematics 8

Total Units for the Major 81-87

Mathematics

B.S. Major Requirements

UNITS

Preparatory Subject Matter 29-33
Mathematics 12 (or high school equivalent) 0-3
Mathematics 21A, 21B, 21C, 21D, 22A, 22B 22
Computer Science Engineering 30 or Engineering 6 4
Physics 9A. (Plans 2 and 3 can substitute Physics 9A with
one of the following: Physics 7A, Statistics 13, 32, 100, 102) 3-4

Depth Subject Matter 48
Mathematics 108, 127A, 127B 12
Choose one Plan from the following three 36
Up to 4 of these 36 units may be approved upper division applied courses outside of mathematics.

Plan 1: Preparation for Graduate Study in Mathematics
Mathematics 127C 4
Mathematics 150A, 150B, 150C 12
One course from Mathematics 131, 147, 167, 185A 4
Additional upper division mathematics units selected in consultation with and subject to the approval of your adviser 16

Plan 2: Mathematics for Secondary Teaching
Mathematics 149A-149B or 150A-150B 8
Mathematics 111, 115A, 141 12
One two-quarter sequence/set from Mathematics 131, 132A; Statistics 130A-130B; Statistics 131A-131B 8
Additional upper division mathematics units selected in consultation with and subject to the approval of your adviser, including courses required to satisfy the single subject matter waiver for the teaching credential 8

Plan 3: General Mathematics
Mathematics 149A-149B or 150A-150B 8
Additional upper division mathematics units selected in consultation with and subject to the approval of your adviser 28

Total Units for the Major 77-81

Mathematical and Scientific Computation

B.S. Major Requirements

UNITS

Preparatory Subject Matter 30-33
Mathematics 12 (or high school equivalent) 0-3
Mathematics 21A, 21B, 21C, 21D, 22A, 22B 22
Computer Science Engineering 30, 40 8

Depth Subject Matter 48
Mathematics 108, 127A, 127B, 165 16
Choose one Emphasis from the following two 32

Computational and Mathematical Biology Emphasis
Mathematics 128A or 128B 4
Mathematics 128C 4
Mathematics 124 4
One approved upper division course in Statistics 4
One approved upper division course in Biology 4
Additional upper division mathematics units selected in consultation with and subject to the approval of your adviser. Four of these twelve units may be additional approved upper division course work in biology 12

Computational and Mathematics Emphasis
Mathematics 128A, 128B, 128C 12
Mathematics 167 4
Two approved upper division courses involving extensive computation or theory of computation 8
Additional upper division mathematics units selected in consultation with and subject to the approval of your adviser 8

Total Units for the Major 78-81

Recommended Language Preparation. Bachelor of Science degree candidates are advised, but not required, to satisfy the same language requirement as that for a Bachelor of Arts degree candidate, and to fulfill it in French, German, or Russian.

Major Advisers. A. Dad-Del, E.O. Milton, G. T. Sallee, E.M. Silvia. Contact Undergraduate Office for updated list.

Depth Subject Matter Requirements. Certain mathematically oriented courses given by other departments are admissible in partial satisfaction of the depth subject matter requirements with prior departmental approval. For Mathematics 189 and 190-level courses, (1) a maximum of one unit may be counted in partial satisfaction of the depth subject matter requirements excluding Mathematics 194; (2) up to 3 units of Mathematics 194 may be counted in partial satisfaction of the depth subject matter requirements. No combination of (1) and (2) is allowed.

Statement of Objectives. As early as possible, but no later than the last quarter of the sophomore year or no later than the beginning of the first quarter of the junior year for transfer students, each prospective mathematics major, in consultation with an adviser, should file a formal program of study in

one of the majors offered in mathematics. Forms to be used for this are available from the department. Failure to file a formal program could lead to a delay in graduation.

Information for Undergraduates. Assistance in planning an undergraduate major program in mathematics should be obtained from a major adviser. In addition, students seeking information pertaining to the application of mathematics to the biological or social sciences or computer science may contact the appropriate special area adviser.

Mathematics Placement Requirement. Students who wish to enroll in Mathematics 12, 16A, 21A, 21AH, and 36 must satisfy the mathematics placement requirement. See the Department of Mathematics Web page for details well in advance of enrolling. Students who do not satisfy the requirement will be administratively dropped from these courses. Dates and times for qualifying exams, one of the ways to meet this requirement, are posted on the Web site (http://www.math.ucdavis.edu/students/undergrad/math-placement).

Minor Program Requirements:

UNITS

Mathematics..... 20
Upper division units in mathematics (exclusive of Mathematics 192, 197TC, 198, 199) 20

Teaching Credential Subject Representative. E. Silvia. See also under Teacher Education Program.

Graduate Study. The Department offers programs of study and research leading to the M.A., M.A.T., and Ph.D. degrees in mathematics. Detailed information regarding graduate study may be obtained by writing to the Graduate Coordinator, Department of Mathematics.

Courses in Mathematics (MAT)

Lower Division Courses

B. Elementary Algebra (no credit)
Lecture—3 hours. Basic concepts of algebra, including polynomials, factoring, equations, graphs, and inequalities. Offered only if sufficient number of students enroll. Not open to Concurrent student enrollment. (P/NP grading only.) (There is a fee of $45.)—I. (I.)

C. Trigonometry (no credit)
Lecture—2 hours. Basic concepts of trigonometry, including trigonometric functions, identities, inverse functions, and applications. Offered only if sufficient number of students enroll. Not open to Concurrent student enrollment. (P/NP grading only.) (There is a fee of $30.)—I, II. (I, II.)

D. Intermediate Algebra (no credit)
Lecture—3 hours. Basic concepts of algebra, designed to prepare the student for college work in mathematics, such as course 16A or 21A. Functions, equations, graphs, logarithms, and systems of equations. Offered only if sufficient number of students enroll. Not open to Concurrent student enrollment. (P/NP grading only.) (There is a fee of $15.)—I, II. (I, II.)

12. Precalculus (3)
Lecture—3 hours. Prerequisite: Two years of high school algebra, plane geometry, plane trigonometry; and obtaining required score on the Precalculus Qualifying Examination. Topics selected for their use in calculus, including functions and their graphs, slope, zeroes of polynomials, exponential, logarithmic and trigonometric functions, sketching surfaces and solids. Not open for credit to students who have completed any of courses 16A, 16B, 16C, 21A, 21B, or 21C with a C– or better.—I, II, III. (I, II, III.)

(Note: Mathematics 16A, 16B, and 16C are intended for students who will take no more Mathematics courses.)

16A. Short Calculus (3)
Lecture—3 hours. Prerequisite: one and one half years of high school algebra, plane geometry, plane trigonometry, and satisfaction of the Mathematics Placement Requirement. Limits; differentiation of algebraic functions; analytic geometry; applications, in particular to maxima and minima problems. Not open for credit to students who have completed course 21A. GE credit: SciEng.—I, II, III. (I, II, III.)

16B. Short Calculus (3)
Lecture—3 hours. Prerequisite: course 16A or 21A. Integration; calculus for trigonometric, exponential, and logarithmic functions; applications. Not open for credit to students who have received credit for course 21B. GE credit: SciEng.—I, II, III. (I, II, III.)

16C. Short Calculus (3)
Lecture—3 hours. Prerequisite: course 16B or 21B. Differential equations; partial derivatives; double integrals; applications; series. Not open for credit to students who have received credit for course 21C. GE credit: SciEng.—I, II, III. (I, II, III.)

17A. Calculus for Biology and Medicine (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry, and analytical geometry, and satisfaction of the Mathematics Placement Requirement. Introduction to differential calculus via applications in biology and medicine. Limits, derivatives of polynomials, trigonometric, and exponential functions, graphing, applications of the derivative to biology and medicine. Only 2 units of credit to students who have completed course 16A. Not open for credit to students who have completed course 21A.—I.

17B. Calculus for Biology and Medicine (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 17A or 21A. Introduction to integral calculus and elementary differential equations via applications to biology and medicine. Fundamental theorem of calculus, techniques of integration including integral tables and numerical methods, improper integrals, elementary first order differential equations, applications in biology and medicine. Only 2 units of credit to students who have completed course 16B. Not open for credit to students who have completed course 21B.—II.

17C. Calculus for Biology and Medicine (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 17B or 21B. Matrix algebra, functions of several variables, partial derivatives, systems of differential equations, and applications to biology and medicine. Only 2 units of credit to students who have completed course 21C.—III.

21A. Calculus (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry, and analytic geometry or course 12 and satisfaction of the Mathematics Placement Requirement. Functions, limits, continuity. Slope and derivative. Differentiation of algebraic and transcendental functions. Applications to motion, natural growth, graphing, extrema of a function. Differentials. L'Hopital's rule. Two units of credit to students who have completed course 16A. GE credit: SciEng.—I, II, III. (I, II, III.)

21AH. Honors Calculus (4)
Lecture/discussion—4 hours. Prerequisite: a Precalculus Qualifying Examination score significantly higher than the minimum for course 21A is required. More intensive treatment of material covered in course 21A. GE credit: SciEng.—I. (I.)

21AL. Emerging Scholars Program Calculus Workshop (2)
Workshop—6 hours. Prerequisite: concurrent enrollment in course 21A. Functions, limits, continuity. Slope and derivative. Differentiation of algebraic and transcendental functions. Applications to motion, natural growth, graphing, extrema of a function. Differentials, L'Hopital's rule. Enrollment for students in the Emerging Scholars Program by instructor's invitation only. (P/NP grading only.)—I. (I.)

21B. Calculus (4)
Lecture—3 hours; discussion; 1 hour. Prerequisite: course 21A or 21AH. Continuation of course 21A. Definition of definite integral, fundamental theorem of calculus, techniques of integration. Application to area, volume, arc length, average of a function, improper integral, surface of revolution. Only two units of credit will be allowed to students who have received credit for course 16B or 16C. GE credit: SciEng.—I, II, III. (I, II, III.)

21BH. Honors Calculus (4)
Lecture/discussion—4 hours. Prerequisite: a grade of B or better in course 21A or 21AH. More intensive treatment of material covered in course 21B. Students completing 21BH can continue with course 21CH or the regular 21C. GE credit: SciEng.—II. (II.)

21BL. Emerging Scholars Program Calculus Workshop (2)
Workshop—6 hours. Prerequisite: course 21A or 21AH, concurrent enrollment in course 21B. Continuation of course 21A. Definition of definite integral, fundamental theorem of calculus, techniques of integration. Application to area, volume, arc length, average of a function, improper integrals, surface of revolution. Enrollment for students in the Emerging Scholars Program by instructor's invitation only. (P/NP grading only.)—II. (II.)

21C. Calculus (4)
Lecture—3 hours; discussion; 1 hour. Prerequisite: course 21B or 21BH. Continuation of course 21B. Sequences, series, tests for convergence, Taylor expansions. Partial derivatives, total differentials. Applications to maximum and minimum problems in two or more variables. Definite integrals over plane and solid regions in various coordinate systems. Applications to physical systems. GE credit: SciEng.—I, II, III. (I, II, III.)

21CH. Honors Calculus (4)
Lecture/discussion—4 hours. Prerequisite: a grade of B or better in course 21B or 21BH. More intensive treatment of material covered in course 21C. GE credit: SciEng.—III. (III.)

21CL. Emerging Scholars Program Calculus Workshop (2)
Workshop—6 hours. Prerequisite: course 21B or 21BH, concurrent enrollment in course 21C. Continuation of course 21B. Sequences, series, tests for convergence, Taylor expansions. Partial derivatives, total differentials. Applications to maximum and minimum problems in two or more variables. Definite integrals over plane and solid regions in various coordinate systems. Applications to physical systems. Enrollment for students in the Emerging Scholars Program by instructor's invitation only. (P/NP grading only.)—III. (III.)

21D. Vector Analysis (4)
Lecture—3 hours; discussion; 1 hour. Prerequisite: course 21C or 21CH. Continuation of course 21C. Vector algebra, vector calculus, scalar and vector fields. Line and surface integrals. Green's theorem, Stokes' theorem, divergence theorem.—I, II, III. (I, II, III.)

21M. Accelerated Calculus (5)
Lecture/discussion—4 hours; discussion/laboratory—1 hour. Prerequisite: grade of B or higher in both semesters of high school calculus or a score of 4 or higher on the Advanced Placement Calculus AB exam, and obtaining the required score on the Precalculus Qualifying Examination and its trigonometric component. Accelerated treatment of material from courses 21A and 21B, with detailed presentation of theory, definitions, and proofs, and treatment of computational aspects of calculus at a condensed but sophisticated level. Not open for credit to students who have completed course 21A or 21B; only 3 units of credit will be allowed to students who have completed course 16A and only 2 units of credit will be allowed to students who have completed course 16B. GE credit: SciEng.—I. (I.)

22A. Linear Algebra (3)
Lecture—3 hours. Prerequisite: nine units of college mathematics and Engineering 6 or knowledge of Matlab or course 22AL (to be taken concurrently). Matrices and linear transformation, determinants, eigenvalues, eigenvectors, diagonalization, factorization.—I, II, III. (I, II, III.)

22AL. Linear Algebra Computer Laboratory (1)
Laboratory—2-3 hours. Prerequisite: nine units of college mathematics. Introduction to Matlab and its

use in linear algebra. (P/NP grading only.)—I, II, III. (I, II, III.)

22B. Differential Equations (3)
Lecture—3 hours. Prerequisite: courses 21C, 22A. Solutions of elementary differential equations.—I, II, III. (I, II, III.)

36. Fundamentals of Mathematics (3)
Lecture—3 hours. Prerequisite: satisfaction of the Mathematics Placement Requirement. Introduction to fundamental mathematical ideas selected from the principal areas of modern mathematics. Properties of the primes, the fundamental theorems of arithmetic, properties of the rationals and irrationals, binary and other number systems. Not open for credit to students who have completed course 108. GE credit: SciEng.—I.

71A-71B. Explorations in Elementary Mathematics (3-3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: two years of high school mathematics. Weekly explorations of mathematical ideas related to the elementary school curriculum will be carried out by cooperative learning groups. Lectures will provide background and synthesize the results of group exploration. (Deferred grading only, pending completion of sequence.)—I-II. (I-II.)

89. Elementary Problem Solving (1)
Lecture—1 hour. Prerequisite: high school mathematics through precalculus. Solve and present solutions to challenging and interesting problems in elementary mathematics. May be repeated once for credit. (P/NP grading only.)—I, II, III.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

108. Introduction to Abstract Mathematics (4)
Lecture/discussion—4 hours. Prerequisite: course 21B or consent of instructor. Rigorous treatment of abstract mathematics with the emphasis on developing ability to understand and present mathematics arguments. GE credit: Wrt.—I, II, III. (I, II, III.)

111. History of Mathematics (4)
Lecture—3 hours; term paper. Prerequisite: 8 units of upper division mathematics including course 108. The history of mathematics from ancient times through the development of calculus. Mathematics from Arab, Hindu, Chinese and other cultures. Selected topics from the history of modern mathematics.—I. (I.)

114. Convex Geometry (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 21C, 22A, 108, or consent of instructor. Topics selected from the theory of convex bodies, convex functions, geometric inequalities, combinatorial geometry, and integral geometry. Offered in alternate years.—(II.)

115A. Number Theory (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 108. Divisibility and related topics, diophantine equations, selected topics from the theory of prime numbers.—I. (I.)

115B. Number Theory (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 108. Euler function, Moebius function, congruences, primitive roots, quadratic reciprocity law. Offered in alternate years.—II.

115C. Number Theory (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 108. Continued fractions, partitions. Offered in alternate years.—III.

116. Differential Geometry (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 22A, 21D, or consent of instructor. Vector analysis, curves and surfaces in three dimensions. Offered in alternate years.—III.

118A. Partial Differential Equations: Elementary Methods (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 22A, 22B, 21D. Derivation of partial differential equations; separation of variables; equilibrium solutions and Laplace's equation; Fourier series; method of characteristics for the one-dimensional wave equation; solution of nonhomogeneous equations.—I. (I.)

118B. Partial Differential Equations: Eigenfunction Expansions (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 118A. Sturm-Liouville Theory; self-adjoint operators; mixed boundary conditions; partial differential equations in two and three dimensions; Eigenvalue problems in circular domains; nonhomogeneous problems and the method of eigenfunction expansions; Poisson's Equations.—II. (II.)

118C. Partial Differential Equations: Green's Functions and Transforms (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 118B. Green's functions for one-dimensional problems and Poisson's equation; Fourier transforms; Green's Functions for time dependent problems; Laplace transform and solution of partial differential equations.—III. (III.)

119A-119B. Ordinary Differential Equations (4-4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 22A, 22B. Scalar and Planar Autonomous Systems, nonlinear systems and linearization. Phase plane analysis. Classification of singular points. Scalar and Planar maps. Bifurcations and the implicit function theorem. Notions of stability and Liapunov's method. Periodic orbits and their bifurcations. Poincare Bendixon theory.—II-III. (II-III.)

121. Advanced Analysis for the Sciences (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 21D, 22A, 22B. Introduction to Fourier series and Fourier transforms. Theory and solutions of basic partial differential equations, such as Laplace, heat and wave equations. Green's functions. Special functions of importance in physics and engineering.—I. (I.)

124. Mathematical Biology (4)
Lecture—3 hours; project—3 hours. Prerequisite: knowledge of a computer language or Matlab, course 22B or the equivalent. Methods of mathematical modeling of biological systems including difference equations, ordinary differential equations, stochastic and dynamic programming models. Computer simulation methods as applied to biological systems. Applications to population growth, cell biology, physiology, evolutionary ecology and protein clustering. Offered in alternate years.—III.

127A-127B-127C. Advanced Calculus (4-4-4)
Lecture/discussion—4 hours. Prerequisite: courses 21D, 22A, 108. Real number system, continuity, differentiation and integration on the real line; vector calculus and functions of several variables; theory of convergence.—I-II-III, II-III. (I-II-III, II-III.)

128A. Numerical Analysis (4)
Lecture—3 hours; term project. Prerequisite: course 21C; knowledge of a programming language such as Pascal, FORTRAN or BASIC. Error analysis, approximation, interpolation, numerical differentiation and integration.—I. (I.)

128B. Numerical Analysis in Solution of Equations (4)
Lecture—3 hours; term project. Prerequisite: courses 21C and 22A; knowledge of a programming language such as Pascal, FORTRAN or BASIC. Solution of nonlinear equations and nonlinear systems. Minimization of functions of several variables. Simultaneous linear equations. Eigenvalue problems.—II. (II.)

128C. Numerical Analysis in Differential Equations (4)
Lecture—3 hours; term project. Prerequisite: courses 22A, 22B, and a knowledge of a programming language such as Pascal, FORTRAN or BASIC. Difference equations, operators, numerical solution of ordinary and partial differential equations.—III. (III.)

131. Probability Theory (4)
Lecture—4 hours. Prerequisite: course 21C, 22A. Probability space, event, combinatorics; discrete, continuous distributions; random variables; joint, marginal, conditional densities; transformation; expectation; sums and moments; inequalities; laws of large numbers; central limit law; probability models via conditioning. Not open for credit to students who have completed Statistics 131A.—I, II, III. (I, II, III.)

132A-132B. Stochastic Processes (4-4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 131 or Statistics 131A. Markov chains, Poisson process, birth and death processes, renewal theory, queueing theory, Brownian motion, stationary processes. Course 132B is offered in alternate years.—II. (II-III.)

141. Euclidean Geometry (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 108. An axiomatic and analytic examination of Euclidean geometry from an advanced point of view. In particular, a discussion of its relation to other geometries.—II. (II.)

145. Combinatorics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 108. Combinatorial methods using basic graph theory counting methods, generating functions, and recurrence relations.—III. (III.)

147. Topology (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 108, 127A. Basic notions of point-set and combinatorial topology.—III. (III.)

149A-149B. Discrete Mathematics (4-4)
Lecture/discussion—4 hours. Prerequisite: courses 22A and 108. Coding theory and counting theory and the algebraic concepts needed in their development.—II-III. (II-III.)

150A-150B-150C. Modern Algebra (4-4-4)
Lecture/discussion—4 hours. Prerequisite: course 108. Basic concepts of groups, rings, and fields. Emphasis on the techniques used in the proof of the ideas (Lemmas, Theorems, etc.) developing these concepts. Precise thinking, writing, and the ability to deal with abstraction.—I-II-III. (I-II-III.)

160. Mathematical Foundations of Database Theory, Design and Performance (4)
Lecture—3 hours; term project. Prerequisite: course 108 and familiarity with one high-level computer language. The relational model; relational algebra, relational calculus, normal forms, functional and multivalued dependencies. Separability. Cost benefit analysis of physical database design and reorganization. Performance via analytical modeling, simulation, and queueing theory. Block accesses; buffering; operating system contention; CPU intensive operations. Offered in alternate years.—(I.)

165. Mathematics and Computers (4)
Lecture—3 hours; project—3 hours. Prerequisite: Computer Science Engineering 30 or the equivalent, course 22B, 108. Computational mathematics and computer generated/verified proofs in algebra, analysis and geometry. Investigation of rigorous new mathematics developed in conjunction with modern computational questions and the role that computers play in mathematical conjecture and experimentation.—III. (III.)

167. Advanced Linear Algebra (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 22A. Introduction to linear algebra; linear equations, orthogonal projections, similarity transformations, quadratic forms, eigenvalues and eigenvectors. Applications to physics, engineering, economics, biology and statistics.—I, II, III. (I, II, III.)

168. Mathematical Programming (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 21C, and 22A or 167; knowledge of a programming language. Linear programming, simplex method. Basic properties of unconstrained nonlinear problems, descent methods, conjugate direction method. Constrained minimization.—III. (III.)

180. Special Topics (3)
Lecture—3 hours. Prerequisite: course 22B or consent of instructor. Special topics from various fields

of modern pure and applied mathematics. Some recent topics include Knot Theory, General Relativity, and Fuzzy Sets. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

185A. Complex Analysis with Applications (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 21D. Complex number systems, analyticity and the Cauchy-Riemann equations, elementary functions, complex integration, power and Laurent series expansions, residue theory.—II. (II.)

185B. Complex Analysis with Applications (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 185A or consent of instructor. Analytic functions, elementary functions and their mapping properties, applications of Cauchy's integral theorem, conformal mapping and applications to heat flow and fluid mechanics. Offered in alternate years.—(III.)

189. Advanced Problem Solving (1)
Lecture—1 hour. Prerequisite: courses 21A-21B-21C-21D, 22A, 22B, or the equivalent. Introduction to advanced problem solving techniques outside the usual context of homework style problems. The problems only require a background in second year college mathematics. May be repeated once for credit. (P/NP grading only.)—I, II, III.

192. Internship in Applied Mathematics (1-3)
Internship; final report. Prerequisite: upper division standing; project approval by faculty sponsor prior to enrollment. Supervised work experience in applied mathematics. May be repeated for credit for a total of 10 units. (P/NP grading only.)

194. Undergraduate Thesis (3)
Prerequisite: consent of instructor. Independent research under supervision of a faculty member. Student will submit written report in thesis form. May be repeated with consent of Vice Chairperson. (P/NP grading only.)—I, II, III. (I, II, III.)

197TC. Tutoring Mathematics in the Community (1-5)
Seminar—1-2 hours; laboratory—2-6 hours. Prerequisite: upper division standing and consent of instructor. Special projects in mathematical education developing techniques for mathematics instruction and tutoring on an individual or small group basis. May be repeated once for credit. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

201A-201B-201C. Analysis (4-4-4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 127C or 203C or consent of instructor. Topological, metric, normed spaces. Stone-Weierstrass theorem. Contraction mapping theorem. Banach spaces. Bounded linear maps. Lebesgue measure. Fubini and Radon-Nikodym theorems. Lp spaces. Distributions, Fourier transform. Linear operators on Hilbert spaces. Spectral theorem. Variational methods.—I-II-III. (I-II-III.)

202. Functional Analysis (4)
Lecture—3 hours; term paper. Prerequisite: course 201A-201B-201C. The theory of Fredholm operators. Examples of Fredholm operators (singular integral operators, elliptic operators in Sobolov spaces). Index theory for Fredholm operators. Unbounded self-adjoint operators. Schrodinger operators and other differential operators. The spectral theorem for these and for unitary operators. Offered in alternate years.—II.

203A-203B-203C. Modern Applied Analysis (4-4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Metric and normed spaces. Continuous functions. Topological, Hilbert, and Banach spaces. Fourier series. Spectrum of bounded linear operators. Compact and linear differential operators. Green's functions. Distributions, Fourier transform. Measure theory. Lp and Sobolev spaces. Calculus of Variations.—I-II-III. (I-II-III.)

204. Applied Asymptotic Analysis (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Scaling and non-dimensionalization. Asymptotic expansions. Regular and singular perturbation methods. Applications to algebraic and ordinary and partial differential equations in the natural sciences and engineering. Offered in alternate years.—I.

205. Complex Analysis (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 185 or the equivalent or consent of instructor. Analytic continuation, Riemann mapping theorem, elliptic functions, modular forms, Riemann zeta function, Riemann surfaces. Offered in alternate years.—I.

206. Measure Theory (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 127C. Introduction to measure theory. The study of lengths, surface areas, and volumes in general spaces, as related to integration theory. Offered in alternate years.—III.

210A. Topics in Geometry (3)
Lecture—3 hours. Prerequisite: bachelor's degree in mathematics or consent of instructor. Topics in advanced geometry related to curriculum at all levels. Required for M.A.T. degree program for prospective teachers. May be repeated for credit with prior consent of instructor.—I. (I.)

210AL. Topics in Geometry: Discussion (1)
Lecture/discussion—1 hour (to be arranged). Prerequisite: course 210A (concurrently); consent of instructor. Special topics related to course 210A which are of special interest to teachers and candidates for M.A.T. degree program. May be repeated for credit.—I. (I.)

210B. Topics in Algebra (3)
Lecture—3 hours. Prerequisite: bachelor's degree in mathematics or consent of instructor. Topics in advanced algebra related to curriculum at all levels. Required for M.A.T. degree program for prospective teachers. May be repeated for credit with prior consent of instructor.—II. (II.)

210BL. Topics in Algebra: Discussion (1)
Lecture/discussion—1 hour (to be arranged). Prerequisite: course 210B (concurrently); consent of instructor. Special topics related to course 210B which are of special interest to teachers and candidates for M.A.T. degree program. May be repeated for credit.—II. (II.)

210C. Topics in Analysis (3)
Lecture—3 hours. Prerequisite: bachelor's degree in mathematics or consent of instructor. Topics in advanced analysis related to curriculum at all levels. Required for M.A.T. degree program for prospective teachers. May be repeated for credit with prior consent of instructor.—III. (III.)

210CL. Topics in Analysis: Discussion (1)
Lecture/discussion—1 hour (to be arranged). Prerequisite: course 210C (concurrently); consent of instructor. Special topics related to course 210C which are of special interest to teachers and candidates for M.A.T. degree program. May be repeated for credit.—III. (III.)

215A-215B-215C. Topology (4-4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Fundamental group and covering space theory. Homology and cohomology. Manifolds and duality. CW complexes. Fixed point theorems. Offered in alternate years.—I-II-III.

218A-218B. Partial Differential Equations (4-4)
Lecture—3 hours; term paper or discussion. Prerequisite: courses 22A, 127C. Initial and boundary value problems for elliptic, parabolic and hyperbolic partial differential equations; existence, uniqueness and regularity for linear and nonlinear equations; maximum principles; weak solutions, Holder and Sobolev spaces, energy methods; Euler-Lagrange equations.—II-III. (II-III.)

219. Ordinary Differential Equations (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 22A, 22B, 127C or consent of instructor. Theory of ordinary differential equations. Dynamical systems. Geometric theory. Normal forms. Bifurcation theory. Chaotic systems. Offered in alternate years.—I.

221A. Mathematical Fluid Dynamics (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 118B or consent of instructor. Kinematics and dynamics of fluids. The Euler and Navier-Stokes equations. Vorticity dynamics. Irrotational flow. Low Reynolds number flows and the Stokes equations. High Reynolds number flows and boundary layers. Compressible fluids. Shock waves. Offered in alternate years.—I.

221B. Mathematical Fluid Dynamics (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 118B or consent of instructor. Kinematics and dynamics of fluids. The Euler and Navier-Stokes equations. Vorticity dynamics. Irrotational flow. Low Reynolds number flows and the Stokes equations. High Reynolds number flows and boundary layers. Compressible fluids. Shock waves. Offered in alternate years.

222. Introduction to Biofluid Dynamics (3)
Lecture—3 hours. Prerequisite: Population Biology 231/Ecology 231 and Neurobiology, Physiology and Behavior 245 or consent of instructor. The basic principles of fluid dynamics are introduced in the first half of the course by describing various phenomena studies from a biofluids perspective. The equations of fluid motion associated with these phenomena are derived and studied in the second half.—III. (III.)

227. Mathematical Biology (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Nonlinear ordinary and partial differential equations and stochastic processes of cell and molecular biology. Scaling, qualitative, and numerical analysis of mathematical models. Applications to nerve impulse, chemotaxis, muscle contraction, and morphogenesis. Offered in alternate years.—I.

228A-228B-228C. Numerical Solution of Differential Equations (4-4-4)
Lecture—3 hours; term paper or discussion. Prerequisite: course 128C. Numerical solutions of initial-value, eigenvalue and boundary-value problems for ordinary differential equations. Numerical solution of parabolic and hyperbolic partial differential equations. Offered in alternate years.—I-II-III.

229A-229B. Numerical Methods in Linear Algebra (4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 22A and 167 or the equivalent or consent of instructor. Computational methods for the solution of linear algebraic equations and matrix eigenvalue problems. Analysis of direct and iterative methods. Special methods for sparse matrices. Offered in alternate years—II-III.

235A-235B-235C. Probability Theory (4-4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 127C and 131 or Statistics 131A or consent of instructor. Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariance principle. Conditional expectation. Topics selected from martingales, Markov chains, ergodic theory. (Same course as Statistics 235A-235B-235C.)—I-II-III.

236A-236B. Stochastic Dynamics and Applications (4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 201C or course/Statistics 235B; course/Statistics 235A-235B-235C recommended. Stochastic processes, Brownian motion, Stochastic integration, martingales, stochastic differential equations. Diffusions, connections with partial differential equations, mathematical finance. Offered in alternate years.—I-II.

240A-240B-240C. Differential Geometry (4-4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 116 or consent of instructor. Manifolds. Differentiable structures. Vector fields and tangent spaces. Bundles, tensors, forms, Grassman algebras. DeRham cohomology. Riemannian geometry. Connections, curvature, geodesics, submanifolds. Curves and surfaces. Positive and negative curvature; Morse Theory; homogeneous spaces; Hodge theory; applications. Offered in alternate years.—I-II-III.

245. Enumerative Combinatorics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 145, 150 or the equivalent, or consent of instructor. Introduction to modern combinatorics and its applications. Emphasis on enumerative aspects of combinatorial theory. Offered in alternate years.—I.

246. Algebraic Combinatorics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 245 or consent of instructor. Algebraic and geometric aspects of combinatorics. The use of structures such as groups, polytopes, rings, and simplicial complexes to solve combinatorial problems. Offered in alternate years—II.

250A-250B-250C. Algebra (4-4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing in mathematics or consent of instructor. Group and rings. Sylow theorems, abelian groups, Jordan-Holder theorem. Rings, unique factorization. Algebras, and modules. Fields and vector spaces over fields. Field extensions. Commutative rings. Representation theory and its applications.—I-II-III. (I-II.)

258A. Numerical Optimization (4)
Lecture—3 hours; term paper or discussion. Prerequisite: courses 127A, 167. Numerical methods for infinite dimensional optimization problems. Newton and Quasi-Newton methods, linear and sequential quadratic programming, barrier methods; large-scale optimization; theory of approximations; infinite and semi-infinite programming; applications to optimal control, stochastic optimization and distributed systems.—I. (I.)

258B. Variational Analysis (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 127A and 167 or consent of instructor. Foundations of optimization theory. The design of solution procedures for optimization problems. Modeling issues, and stability analysis. Offered in alternate years.—II. (II.)

261A-261B. Lie Groups and Their Representations (4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 215A, 240A, 250A-250B or the equivalent or consent of instructor. Lie groups and Lie algebras. Classification of semi-simple Lie groups. Classical and compact Lie groups. Representations of Lie groups and Lie algebras. Root systems, weights, Weil character formula. Kac-Moody and Virasoro algebras. Applications. Offered in alternate years.—II-III.

265. Mathematical Quantum Mechanics (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 201 or consent of instructor. Mathematical foundations of quantum mechanics: the Hilbert space and Operator Algebra formulations; the Schrödinger and Heisenberg equations, symmetry in quantum mechanics, basics of spectral theory and perturbation theory. Applications to atoms and molecules. The Dirac equation. Offered in alternate years.—I.

266. Mathematical Statistical Mechanics and Quantum Field Theory (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 265 or consent of instructor. Mathematical principles of statistical mechanics and quantum field theory. Topics include classical and quantum lattice systems, variational principles, spontaneous symmetry breaking and phase transitions, second quantization and Fock space, and fundamentals of quantum field theory. Offered in alternate years.—II.

271. Applied and Computational Harmonic Analysis (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 121, 127C, 128A, 128B, 167, 201C, or the equivalent, or consent of instructor. Introduction to mathematical basic building blocks (wavelets, local Fourier basis, and their relatives) useful for diverse fields (signal and image processing, numerical analysis, and statistics). Emphasis on the connection between the continuum and the discrete worlds. Offered in alternate years.—II.

280. Topics in Pure and Applied Mathematics (3)
Lecture—3 hours. Prerequisite: graduate standing. Special topics in various fields of pure and applied mathematics. Topics selected based on the mutual interests of students and faculty. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290. Seminar (1-6)
Seminar—1-6 hours. Advanced study in various fields of mathematics, including analysis, applied mathematics, discrete mathematics, geometry, mathematical biology, mathematical physics, optimization, partial differential equations, probability, and topology. May be repeated for credit. (S/U grading only.)—I, II, III.

298. Group Study (1-5)
299. Individual Study (1-12)
(S/U grading only.)

299D. Dissertation Research (1-12)
(S/U grading only.)

Professional Courses

301A-301B-301C. Mathematics Teaching Practicum (3-3-3)
Fieldwork—5 hours; discussion—1 hour. Prerequisite: course 302A-302B-302C and 303A-303B-303C concurrently or consent of instructor. Specialist training in mathematics teaching. Teaching, training, and cross observing classes taught using large group Socratic techniques, small group guided inquiry experiences, and/or other approaches to teaching at various grade levels. Required for advanced degrees in mathematics education. May be repeated once for credit.—I-II-III.

302A-302B-302C. Curriculum Development in Mathematics (1-1-1)
Lecture/discussion—1 hour. Prerequisite: course 303A-303B-303C concurrently or consent of instructor. Mathematics curriculum development for all grade levels. Required for advanced degrees in mathematics education. May be repeated once for credit.—I-II-III.

303A-303B-303C. Mathematics Pedagogy (1-1-1)
Lecture/discussion—1 hour. Prerequisite: course 302A-302B-302C or 210L concurrently or consent of instructor. An investigation of the interplay of mathematical pedagogy and mathematical content, including a historical survey of past and present methods in view of some of the influences that shaped their development. May be repeated once for credit.—I-II-III.

390. Methods of Teaching Mathematics (3)
Lecture—1 hour; discussion—1 hour; laboratory—2 hours. Prerequisite: graduate standing. Practical experience in methods and problems of the teaching of mathematics at the university level. Includes discussion of lecturing techniques, analysis of tests and supporting material, preparation and grading of examinations, and related topics. Required of departmental teaching assistants. May be repeated for credit. (S/U grading only.)—I. (I.)

399. Individual Study (2-4)
Independent study—2-3 hours; discussion—1 hour. Individual study of some aspect of mathematics education or a focused work on a curriculum design project under supervision of a faculty member in mathematics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Medical Informatics (A Graduate Group)

Richard F. Walters, Ph.D., Chairperson of the Group
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Faculty

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James Case, D.V.M., Ph.D., Professor *(California Veterinary Diagnostic Laboratory)*
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Mary Christopher, D.V.M., Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Tom Engel, M.D., Assistant Professor *(Anesthesiology and Pain Medicine)*
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Michael Gertz, Ph.D., Assistant Professor *(Computer Science)*
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Wasyl Malyj, Ph.D., Assistant Director *(Veterinary Genetics Laboratory)*
Harry Matthews, Ph.D., Professor *(Medical Biochemistry)*
Bruno Olshausen, Ph.D., Associate Professor *(Psychology)*
Nancy Reed, Ph.D., Adjunct Assistant Professor *(Computer Science)*
Todd Reed, Ph.D., Associate Professor *(Electrical and Computer Engineering)*
Anthony Seibert, Ph.D., Professor *(Radiology)*
Richard Walters, Ph.D., Professor *(Computer Science, Pathology)*
David White, M.D., Professor *(Anesthesiology and Pain Medicine)*

Affiliated Faculty

Dennis Ballance, D.V.M., Programmer *(Veterinary Medicine Teaching Hospital)*
JoAnne Boorkman, MLS Librarian *(Health Sciences Library)*
Paul Brentson, M.S., Hospital Administrator *(Veterinary Medicine Teaching Hospital)*
John Drummer, B.S., Academic Coordinator *(School of Medicine)*
David Hill, M.D., Physician *(Family Practice)*
Christine Hotz, D.V.M., Lecturer *(Pathology, Microbiology and Immunology)*
Eric Liederman, M.D., M.P.H., Medical Director *(Clinical Information Systems)*
Sivanarulselvan Sachidanandam, M.D., Lecturer *(Computer Science Engineering)*
James Self, M.S. Programmer/Analyst Supervisor *(Veterinary Medicine Computing Services)*
Jie Zhou, M.D., General Surgery Resident *(Surgery)*

Graduate Study. The Group currently offers an M.S. degree in Medical Informatics. Aimed at doctors, veterinarians and other health professionals, the program provides basic training in computer uses

in medicine, including an introduction to programming, clinical data acquisition, the electronic medical record, managing clinical data on the World Wide Web, and decision support systems. Participants have an opportunity to develop independent projects under faculty supervision in a wide range of life sciences applications. An effort is made to accommodate part-time students continuing with their own professional positions while completing the program.

Preparation. The Group encourages applications from health professionals who have had experience in the manipulation of clinical information. Basic qualifications include a degree in a health-related field or the equivalent in work experience. Background in a programming language is desirable but not required. Applicants with extensive computer background but little knowledge of clinical information would need to gain practical experience in dealing with clinical information to be competitive in applying to the program.

Graduate Advisors: J. Case *(Veterinary Medicine),* M. Gertz *(Computer Science),* T. Engel *(Anesthesiology and Pain Medicine).*

Courses in Medical Informatics (MDI)

Graduate Courses

202. Computer-Based Patient Records (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: consent of instructor. Conversion from paper-based to computer-based medical records, advantages, disadvantages, barriers to conversion. Storage and representation of medical data to facilitate, interpretation. Review of current computer-based medical record models and standards in data storage and transmission.—III. (III.)

207. Decision Support System (4)
Lecture/discussion—2 hours; laboratory—2 hours; independent study—2 hours. Prerequisite: consent of instructor. Decision support system for medical application. Knowledge and computer representation, review of existing decision support system.—III. (III.)

208. Electronic Medical Data (4)
Lecture/discussion—2 hours; laboratory—4 hours. Prerequisite: consent of instructor. Electronic resources for medical practice, review of existing resources and development of materials.—II. (II.)

209. Data Acquisition in Medicine and Veterinary Medicine (4)
Lecture/discussion—2 hours; laboratory/discussion—6 hours. Prerequisite: basic proficiency in computer operation. Overview of the nature of medical/veterinary data, methods for capturing and storing data in electronic formats. Data validation, retrieval considerations.—I. (I.)

210. Introduction to Medical Informatics (2)
Lecture—2 hours. Introductory course in medical computing and bioinformatics. Topics include expert systems, computer-based medical record systems, ethics and confidentiality, controlled medical vocabulary systems and medical imaging and Telemedicine genetic analysis algorithms. (S/U grading only.)—I. (I.) Hogarth

215. Beginning and Intermediate Programming in M (MUMPS) (3)
Online lecture—10 hours. Project-oriented approach to fundamentals of programming in ANSI Standard M (MUMPS) language. Basic syntax, Hierarchical file structure; arrays and string subscripts, indirection and extrinsic functions. (S/U grading only.)—I, II, III. (I, II, III.) Walters

289A-I. Special Topics in Medical Informatics (1-5)
Lecture, laboratory, or combination. Prerequisite: consent of instructor. Special topics in **(A)** Data Acquisition, **(B)** Electronic Medical Information, **(C)** Computer Based Patient Records, **(D)** Decision Support, **(E)** Medical Image Analysis, **(F)** Database Systems, **(G)** Biostatistics, **(H)** Modeling Biological Systems, **(I)** Coding Systems. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

290. Seminar in Medical Informatics (1)
Seminar—1 hour. Discussion of current graduate research and topics in Medical Informatics. Oral presentations of individual study. Limited enrollment. (S/U grading only.)—I, II, III. (I, II, III.)

299. Research in Medical Informatics (1-12)
(S/U grading only)

Medical Microbiology

See Medicine, School of

Medical Pharmacology and Toxicology

See Medicine, School of

Medicine

See Medicine, School of; and Medicine and Epidemiology (Veterinary Medicine)

Medicine, School of

Joseph Silva, Jr., M.D., Dean of the School
Claire Pomeroy, M.D., M.B.A., Executive Associate Dean
Fitz-Roy Curry, Ph.D., Associate Dean
Faith T. Fitzgerald, M.D., Assistant Dean
Lydia Howell, M.D., Associate Dean
Vijaya K. Kumari, M.B.B.S., Ph.D., Assistant Dean
Elizabeth Mourning, Assistant Dean
Thomas Nesbitt, M.D., Associate Dean
Brian O'Neill, M.D., Assistant Dean
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Robert Allen, M.D., Assistant Clinical Professor *(Orthopaedic Surgery)*
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Huong Bach, M.D., Clinical Professor *(Internal Medicine)*
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Stephen Barthold, Ph.D., Professor *(Pathology)*
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Laurel Beckett, Ph.D., Professor *(Epidemiology and Preventive Medicine)*
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Sue Bodine, Ph.D., Professor *(Human Physiology)*
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Joseph Watson, M.D., Assistant Professor *(Neurological Surgery)*
Jacob Wegelin, Ph.D., Assistant Adjunct Professor *(Epidemiology and Preventive Medicine)*
Kaimin Wei, M.D., Ph.D., Assistant Professor *(Obstetrics and Gynecology)*
Robert Weiss, M.D., Professor *(Internal Medicine)*
Steven Weiss, M.D., Professor *(Internal Medicine)*
Jeanna Welborn, M.D., Associate Professor *(Internal Medicine)*
Wanda M. Wenman, M.D., Professor *(Pediatrics)*
Hans Jurgen Wenzel, M.D., D.Sc., Adjunct Professor *(Neurological Surgery)*
John Werner, Ph.D., Professor *(Ophthalmology)*
Daniel C. West, M.D., Associate Professor *(Pediatrics)*
Jason Wexler, M.D., Assistant Professor *(Internal Medicine)*
Vicki Wheelock, M.D., Associate Clinical Professor *(Neurology)*
Thomas P. Whetzel, M.D., Professor *(Surgery)*
Charles Whitcomb, M.D., Associate Clinical Professor *(Internal Medicine)*
David A. White, M.D., Clinical Professor *(Anesthesiology and Pain Medicine)*
Richard H. White, M.D., Professor *(Internal Medicine)*
Jonathan Widdicombe, Ph.D., Professor *(Human Physiology)*
Jean Wiedeman, M.D., Ph.D., Associate Professor *(Pediatrics)*
Michael Wilkes, M.D., Ph.D., Professor *(Internal Medicine)*
Jacob Willig-Onwuachi, Ph.D., Assistant Professor *(Radiology)*
Barth Wilsey, M.D., Associate Clinical Professor *(Anesthesiology and Pain Medicine)*
Sharon Wilson, M.D., Assistant Clinical Professor *(Internal Medicine)*
Mark Wineinger, M.D., Associate Professor *(Physical Medicine and Rehabilitation)*
Garen Wintemute, M.D., M.P.H., Professor *(Epidemiology and Preventive Medicine)*
Ronald Wisdom, M.D., Associate Professor *(Internal Medicine)*
Phyllis Wise, Ph.D., Professor *(Human Physiology)*
David H. Wisner, M.D., Professor *(Surgery)*

Erik Wisner, D.V.M., Professor *(Radiology)*
Heidi Wolf, M.D., Assistant Clinical Professor *(Pediatrics)*
Bruce M. Wolfe, M.D., Professor *(Surgery)*
Philip Wolinsky, M.D., Associate Professor *(Orthopaedic Surgery)*
Gail Wong, M.D., Assistant Professor *(Internal Medicine)*
Michael Wong, M.D., Assistant Professor *(Surgery)*
David L. Woods, Ph.D., Adjunct Professor *(Neurology)*
Jian Wu, M.D., Ph.D., Assistant Adjunct Professor *(Internal Medicine)*
Mark Wu, M.D., Assistant Clinical Professor *(Pathology)*
Reen Wu, Ph.D., Professor *(Internal Medicine)*
Heike Wulff, Ph.D., Assistant Professor *(Pharmacology and Toxicology)*
Theodore Wun, M.D., Associate Professor *(Internal Medicine)*
George Xakellis, Jr., M.D., M.B.A., Associate Professor *(Family and Community Medicine)*
Ebenezer Yamoah, M.D., Associate Professor *(Otolaryngology)*
Shagufta Yasmeen, M.D., Assistant Professor *(Obstetrics and Gynecology)*
Jane Yeun, M.D., Associate Professor *(Internal Medicine)*
Ken Yoneda, M.D., Associate Professor *(Internal Medicine)*
J. Nilas Young, M.D., Professor *(Surgery)*
Mark Zern, M.D., Professor *(Internal Medicine)*
Vincent Ziboh, Ph.D., Professor *(Dermatology, Biological Chemistry)*
Lin Zhang, M.D., Ph.D., Assistant Professor *(Neurology)*
Jie Zheng, Ph.D., Professor *(Dermatology*
Edie Zusman, M.D., Assistant Professor *(Neurological Surgery)*
Theodore Zwerdling, M.D., Associate Professor *(Pediatrics)*

Emeriti Faculty

Charles F. Abildgaard, M.D., Professor Emeritus
Deborah Ablin, M.D., Professor Emeritus
Neil C. Andrews, M.D., Professor Emeritus
Len H. Andrus, M.D., Professor Emeritus
C. Robert Ashmore, Ph.D., Professor Emeritus
Charles J. Beauchamp, M.D., Ph.D., Professor Emeritus
James Beaumont, Ph.D., Professor Emeritus
Joseph Belber, M.D., Professor Emeritus
John R. Benfield, M.D., Professor Emeritus
William F. Benesek, Ph.D., Professor Emeritus
Eli Benjamini, Ph.D., Professor Emeritus
Herbert Berkoff, M.D., Professor Emeritus
Edmund Bernauer, Ph.D., Professor Emeritus
Kay H. Blacker, M.D., Professor Emeritus
F. William Blaisdell, M.D., Professor Emeritus
Robert J. Bolt, M.D., Professor Emeritus
George Cardinet, Ph.D., Professor Emeritus
Marion A. Carnes, M.D., Professor Emeritus
James Castles, M.D., Professor Emeritus
Joseph Castro, M.D., Professor Emeritus
Willard R. Centerwall, M.D., Professor Emeritus
Robert S. Chang, M.D., D.Sc., Professor Emeritus
Loring F. Chapman, Ph.D., Professor Emeritus
Michael Chapman, M.D., Professor Emeritus
Matthew Connors, M.D., Professor Emeritus
Sakti Das, M.D., Professor Emeritus
Robert Davidson, M.D., M.P.H., Professor Emeritus
Gerald L. DeNardo, M.D., Professor Emeritus
Pierre M. Dreyfus, M.D., Professor Emeritus
John H. Eisele, M.D., Professor Emeritus
Allen C. Enders, Ph.D., Professor Emeritus
William M. Fowler, Jr., M.D., Professor Emeritus
Dennis Fung, M.D., Professor Emeritus
Charles Frey, M.D., Professor Emeritus
Andrew J. Gabor, M.D., Ph.D., Professor Emeritus
Murray B. Gardner, M.D., Professor Emeritus
Michael C. Geokas, M.D., Ph.D., Professor Emeritus
Boyd Goetzman, M.D., Ph.D., Professor Emeritus
Elliot Goldstein, M.D., Professor Emeritus
Edward C. Gomez, M.D., Ph.D., Professor Emeritus
Jerry F. Green, Ph.D., Professor Emeritus
Gerald A. Gronert, M.D., Professor Emeritus
Paul F. Gulyassy, M.D., Professor Emeritus
Crystalenia C. Halsted, M.D., Professor Emeritus
Anthony J. Hance, Ph.D., Professor Emeritus
Frederick W. Hanson, M.D., Professor Emeritus
Paul G. Hattersley, M.D., Professor Emeritus
Glenn Hawkes, Ph.D., Professor Emeritus
Andrew Hendrickx, Ph.D., Professor Emeritus
Paul D. Hoeprich, M.D., Professor Emeritus
Mannfred Hollinger, Ph.D., Professor Emeritus
Robert L. Hunter, Ph.D., Professor Emeritus
Edward J. Hurley, M.D., Professor Emeritus
Gordon Jensen, M.D., Professor Emeritus
E. Ralph Johnson, M.D., Professor Emeritus
George W. Jordan, M.D., Professor Emeritus
David Katz, Ph.D., Professor Emeritus
Eva K. Killam, Ph.D., Professor Emerita
Lindy F. Kumagai, M.D., Professor Emeritus
Bo Lantz, M.D., Professor Emeritus
Ruth Lawrence, M.D., Professor Emeritus
Gerald Lazarus, M.D., Professor Emeritus
Alvin E. Lewis, M.D., Professor Emeritus
Ernest Lewis, M.D., Professor Emeritus
Jerry Lewis, M.D., Professor Emeritus
Glen A. Lillington, M.D., Professor Emeritus
Paul R. Lipscomb, M.D., Professor Emeritus
George H. Lowrey, M.D., Professor Emeritus
Peter Lynch, M.D., Professor Emeritus
Harry Matthews, Ph.D., Professor Emeritus
Malcolm R. MacKenzie, M.D., Professor Emeritus
Thurman A. Merritt, M.D., Professor Emeritus
Claramae Miller, Ph.D., Professor Emeritus
Kenneth R. Niswander, M.D., Professor Emeritus
Lois F. O'Grady, M.D., Professor Emeritus, Academic Senate Distinguished Teaching Award
Ronan O'Rahilly, M.D., Professor Emeritus
Richard H. Oi, M.D., Professor Emeritus
John Palmer, M.D., Professor Emeritus
Philip E.S. Palmer, M.D., F.R.C.P., Professor Emeritus
Ernesto Pollitt, Ph.D., Professor Emeritus
Lawrence Rabinowitz, Ph.D., Professor Emeritus
John Reitan, M.D., Professor Emeritus
Eugene M. Renkin, Ph.D., Professor Emeritus
Juan J. Rodrigo, M.D., Professor Emeritus
Alan Roth, M.D., Professor Emeritus
Boris Ruebner, M.D., Professor Emeritus
Amira Safwat, M.B.B.C.A., Professor Emeritus
Ethelda N. Sassenrath, Ph.D., Professor Emerita
Robert Scobey, M.D., Professor Emeritus
Robert E. Smith, Ph.D., Professor Emeritus
Elizabeth M. Smithwick, M.D., Professor Emeritus
J. Stuart Soeldner, M.D., Professor Emeritus
Robert Stadalnik, M.D., Professor Emeritus
Larry G. Stark, Ph.D., Professor Emeritus
Margaret S, Steward, Ph.D., Professor Emeritus
Robert E. Stowell, M.D., Ph.D., Professor Emeritus
Raymond L. Teplitz, M.D., Professor Emeritus
Henry Tesluk, M.D., Professor Emeritus
W. E. Toreson, M.D., Ph.D., Professor Emeritus
Duane E. Townsend, M.D., Professor Emeritus
Robert R. Traut, Ph.D., Professor Emeritus
John D. Trelford, M.D., Professor Emeritus
Walter Trudeau, M.D., Professor Emeritus
Joe P. Tupin, M.D., Professor Emeritus
Zakauddin Vera, M.D., Professor Emeritus
Franklin C. Wagner, M.D., Professor Emeritus
Richard F. Walters, Ph.D., Professor Emeritus
Worden Waring, Ph.D., Professor Emeritus
Edward J. Watson-Williams, M.D., Professor Emeritus
Sefton R. Wellings, M.D., Ph.D., Professor Emeritus
Richard P. Wennberg, M.D., Professor Emeritus
Theodore C. West, Ph.D., Professor Emeritus
Hibbard E. Williams, M.D., Professor Emeritus
Lowell D. Wilson, M.D., Professor Emeritus
Wallace Winters, M.D., Ph.D., Professor Emeritus
Hanspeter Witschi, D.V.M., Professor Emeritus
Bruce Wolfe, M.D., Professor Emeritus
Earl F. Wolfman, Jr., M.D., Professor Emeritus
Hiroshi Yamauchi, M.D., Professor Emeritus
Julian R. Youmans, M.D., Ph.D., Professor Emeritus

Admission Requirements and Professional Curriculum. Detailed information can be obtained from the School of Medicine. See also the School of Medicine chapter of this catalog.

Courses in the School of Medicine

Curriculum for the School of Medicine

The curriculum for the M.D. degree at the UC Davis School of Medicine is a four-year program providing comprehensive preparation for graduate medical training (internships and residencies) and the practice of medicine. It offers a blend of basic science training and clinical experience with opportunities for research. The first-year program is for three quarters, beginning in the fall. Basic science courses (anatomy, physiology, biochemistry, histology, endocrinology, neurosciences, immunology, genetics, reproduction, general pathology) provide a firm foundation in normal structure and function needed for further study of pathophysiology of disease in the second year. These courses also provide abundant clinical correlation to help students appreciate the contribution of these sciences to the care of patients. Doctoring 1, the first course in the three-year Doctoring series, begins in fall quarter and runs parallel to the basic science courses. Students are introduced to the art and science of communicating with patients, physical diagnosis, and clinical problem solving through a combination of longitudinal small group experiences and preceptorships. Didactic sessions and cases are designed to help students integrate the basic and clinical sciences, and appreciate the central role of psychosocial, cultural and ethical perspectives in patient care..

The second-year program is for four quarters, but with the Summer Quarter abbreviated to six weeks. The applied basic sciences (microbiology, pharmacology, and systemic pathology) are integrated with the study of the pathophysiological basis of disease (dermatology, oncology, hematology, endocrinology, orthopedics, cardiology, pulmonary, psychiatry, neurology, nephrology, nutrition, gastroenterology). The Doctoring program continues with a combination of longitudinal small groups, didactic presentations, clinical rotations, apprenticeships, and preceptorships. Major themes of the program include intermediate-level instruction in patient evaluation and physical diagnosis, clinical reasoning, biostatistics and epidemiology, human sexuality, geriatrics, and medical ethics, and critical review of the biomedical literature.

The third-year program includes six required clerkship rotations in the clinical specialties: eight weeks each of surgery, medicine, obstetrics/gynecology, pediatrics, ambulatory medicine (jointly administered by Family Practice and Internal Medicine) and psychiatry. Students may elect to defer one of the required clerkships to the fourth year. The third year Doctoring program consists of longitudinal small groups led by faculty members who remain with their group throughout the year as the students rotate through their clerkships. Doctoring 2 themes include advanced interviewing techniques, clinical reasoning, clinical epidemiology, evidence-based medicine, and ethics/jurisprudence.

The fourth year features built-in flexibility to allow students to begin to individualize their medical careers. All students are required to select 32 weeks of learning activities. Individual student programs are designed under the guidance of faculty advisors, and each student's fourth year program must be approved by a faculty oversight committee to ensure appropriate breadth and depth. The fourth-year curriculum also provides 12 weeks of undesignated time.

To satisfy the M.D. degree program, the student must successfully complete the required course work, clerkships, and fourth year elective program. Students who enter the program with advanced training in one of the areas required for the program are permitted to substitute required courses with electives of equal credit. In addition to the fourth-year elective program available, there is the opportunity for students to select from a variety of electives during the first two years. Examples include electives in medical economics, history of ethics and medi-

cine, medical Spanish, insights in clinical research. Most students also participate in one of several student-run, community clinics for elective credit during their first and second years.

Coordination with other Advanced Degree Programs

The curriculum for the M.D. degree provides flexibility and encourages coordination with other advanced degree programs (Ph.D., M.S., M.A., M.B.A., and M.P.H.). These programs offer a wide breadth of study areas and draw upon the considerable expertise of the entire campus faculty. In addition, the UC Berkeley School of Public Health offers an M.P.H. program in conjunction with the M.D. program. The School of Medicine's department of Epidemiology and Preventive Medicine also offers a M.P.H. This program is restricted to professional students in the Schools of Veterinary Medicine and Medicine, health professionals and State Health Department employees.

School of Medicine administrators enthusiastically support students interested in pursuing advanced degree programs. The dual-degree program for the M.D./Ph.D. is targeted to train physicians to meet, respond to and solve the broad diversity of problems and dilemmas facing current and future health care. Students are encouraged to seek degrees in any of the campuswide Ph.D. programs, including those in social sciences and humanities. The UC Davis School of Medicine awards competitive fellowships each year to students enrolled in the M.D./Ph.D. program.

Required Curriculum for the M.D. Degree

The following listing is the typical sequencing of all courses required for earning the M.D. degree. Course descriptions are given under the individual departmental course offerings.

First-Year Required Courses

Quarter I: Fall
Biological Chemistry 410A, Molecular and Cell Biology
Cell Biology and Human Anatomy 400, Developmental, Gross and Radiologic Anatomy
Psychiatry 401, Medicine and the Mind*
Family Practice 400A, Introduction to Patient Evaluation*
Medical Sciences 400A, Application of Medical Principles*

Quarter II: Winter
Biological Chemistry 410B, Cell Biology and Metabolism
Cell Biology and Human Anatomy 402, Human Microscopic Anatomy
Human Physiology 400, Human Physiology
Family Practice 400B, Introduction to Patient Evaluation*
Medical Sciences 400B, Application of Medical Principles*

Quarter III: Spring
Biological Chemistry/Human Physiology 418, Mammalian Endocrinology and Homeostasis
Cell Biology and Human Anatomy/Human Physiology 403, Neurobiology
Medical Microbiology 480A, Medical Immunology
Obstetrics and Gynecology 420, Genetics and Reproduction
Pathology 410A, General Systemic Pathology
Family Practice 400C, Introduction to Patient Evaluation*
Medical Sciences 400C, Application of Medical Principles*

*These courses will be integrated into a single, three quarter course (Doctoring I, described above) in Fall 2004.

Second-Year Required Courses

Quarter IV: Summer
Pathology 410B, General Pathology
Microbiology 480B
Medical Pharmacology and Toxicology 400A
Dermatology 420, Integumentary System
Hematology-Oncology 420: Oncology
Medical Sciences 421A

Quarter V: Fall
Medical Microbiology 480C, Pathogenic Microbiology
Internal Medicine 420A, Hematopoietic and Lymphoreticular System
Orthopaedic Surgery 420, Musculoskeletal System
Medical Pharmacology and Toxicology 400B, Principles of Pharmacology
Internal Medicine 420 F, Metabolic Regulatory System
Pathology 410C, General Pathology
Internal Medicine 420F, Metabolic Regulatory System
Medical Sciences 421A, Doctoring 2

Quarter VI: Winter
Medical Pharmacology and Toxicology 400C, Principles of Pharmacology
Internal Medicine 420C, Respiratory System
Internal Medicine 420D, Cardiovascular System
Neurology 420, Clinical Neurosciences
Psychiatry 403, Fundamentals of Clinical Psychiatry
Pathology 410D, General Pathology
Medical Sciences 421A, Doctoring 2

Quarter VII: Spring
Internal Medicine 420B, Gastrointestinal System
Internal Medicine/Biological Chemistry 419, Basic and Clinical Nutrition
Internal Medicine 420E, Nephrology
Pathology 410E, General Pathology
Medical Sciences 421A, Doctoring 2

Third- and Fourth-Year Required Courses

Third-Year Clerkships
Internal Medicine 430, Medicine Clerkship ..... 8 weeks
Surgery 430, Surgery Clerkship ..... 8 weeks
Pediatrics 430, Pediatrics Clerkship 8 weeks
Family Practice 430, Ambulatory Care Clerkship ..... 8 weeks

Third- or Fourth-Year Clerkships
Obstetrics and Gynecology 430, Obstetrics and Gynecology Clerkship ..... 8 weeks
Psychiatry 430, Psychiatry Clerkship 8 weeks
Medical Sciences 430A-430B-430C-430D, Doctoring 3

Fourth-Year Requirements
32 weeks of learning experiences
Clinical experiences are chosen by the student in consultation with, and with approval of, the Fourth Year Oversight Committee.

The fourth-year curriculum also allows for 12 weeks of undesignated time (electives, interviews, free time).

Medical Sciences (MDS)

Lower Division Course

99. Special Study in Medicine for Undergraduates (1-5)
Independent study—3-15 hours. Prerequisite: consent of instructor. Participate in research projects relating to medicine with faculty in the School of Medicine. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Kumari

Upper Division Course

192. Medical Education Internship for Advanced Undergraduates (1-12)
Internship—3-36 hours. Prerequisite: competency with computers. Enrollment dependent on availability of intern positions. Participate in projects related to curriculum development in support of curriculum for M.D. degree. Gain work experience and appreciation for innovative approaches to learning in basic and clinical sciences of medical education. May be repeated for credit for up to 12 units. (P/ NP grading only.)—I, II, III, IV. (I, II, III, IV.) Kumari

Professional Courses

400. Application of Medical Principles (1)
Discussion—1.5 hours. Prerequisite: student in the School of Medicine. Application of multidisciplinary basic, social, and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (H/P/F grading only.)—II, III. (II, III.)

400B-400C. Application of Medical Principles (1-1.5)
Discussion—2-3 hours. Prerequisite: approval of the Committee on Student Progress. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—II-III. Stevenson

400D. Application of Medical Principles (1)
Discussion—1.5 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. P/F grading only.)—IV. Stevenson

400F. Application of Medical Principles (1)
Discussion—1.5 hours. Prerequisite: second year medical student. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (H/P/F grading only.)—IV.

400J. Application of Medical Principles (1)
Discussion—1.5 hours. Prerequisite: third year medical student. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (H/P/F grading only.)—II. (II.)

400K. Application of Medical Principles (1)
Discussion—1.5 hours. Prerequisite: third year medical student. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (H/P/F grading only.)—III. (III.)

401. Applications of Computers to Medical Practice (2)
Autotutorial—2 hours. Prerequisite: enrollment in medical school. Proficiency in computer applications relative to practice of medicine, with emphasis on e-mail, literature searching, file transfer, and hospital information services. Course given online, at home or in lab; time and place determined by student. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Huntley

413. Doctoring (1-2)
Fieldwork—1-2 hours; independent study—1-2 hours; discussion—0.25 hours. Prerequisite: medical clearance for patient contact and consent of instructor. Clinically oriented experiential learning combined with mentor-directed discussion and self-directed

research on a selected medical topic. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine as well as in-depth, self-directed learning. (H/P/F grading only; deferred grading only pending completion of sequence.)—II, III. (II, III.)

421B. Doctoring 2 (4.5)
Discussion—2 hours; lecture/discussion—2 hours; internship—1 hour. Prerequisite: approval by the School of Medicine Committee on Student Progress. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions. History and physical examination with M.D. preceptors. Didactics in epidemiology, ethics, sexuality, economics, and clinical reasoning. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. P/F grading only.)—I. Stevenson

421C-421D. Doctoring 2 (3.5-2.5)
Discussion—2 hours; lecture/discussion—2 hours; internship—1 hour. Prerequisite: approval of the Committee on Student Progress. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. P/F grading only.)—II, III. Stevenson

430. Applications of Medical Principles (1)
Discussion—2 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (H/P/F grading only.)—I, II, III, IV. Stevenson

430A. Applications of Medical Principles (2)
Discussion—3 hours. Prerequisite: approval of the School of Medicine Committee on Student Progress. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—IV. Stevenson, Wilkes

430B-430C-430D. Doctoring 3 (2-2-2)
Discussion—2 hours. Prerequisite: approval of School of Medicine Committee on Student Progress. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—I, II, III. Wilkes

431A. Doctoring 3 (2)
Discussion—3 hours. Prerequisite: Approval by School of Medicine Committee on Student Progress. Application of multidisciplinary basic, social and clinical science concepts to clinical cases. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—I. (I.) Wilkes

440. Responsibilities of Medical Practice (3)
Lecture/discussion—60 hours total. Prerequisite: approval by Committee on Student Evaluation and Promotion. Students will address nonbiological components of the patient-physician relationship (medical ethics, medical jurisprudence, medical economics, alcoholism and drug abuse, etc.) and critically explore social, ethical and cultural issues arising in medical practice. (S/U grading only.)—II. (II.)

441. Combined Ophthalmology and Otolaryngology Clerkship (6)
Clinical activity—4 weeks. Prerequisite: approval by Committee on Student Promotion and Evaluation. Fundamental knowledge of ophthalmology and otolaryngology for the treatment of eye, ear, nose and throat problems at a level of training of general physicians, including when to refer patients to a specialist. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Brandt, Strong

444. Medical Education for Senior Students (3)
Discussion—1.5 hours; seminar—0.5 hours. Prerequisite: courses 430A, 430B, 430C, 430D. Teaching and learning theory and practice, and practical experience in facilitating small group learning for first, second, or third year medical students. Mentored practice in lecture technique. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—I, II, III, IV. Stevenson

450. Introduction to UCD Medical Center (1)
Seminar—20 hours total. Prerequisite: second-year medical student. Designed to assist medical student in transition from classroom to hospital setting. (H/P/F grading only.)—III. (III.)

480. Insights in Clinical Research (1)
Lecture—1 hour. Prerequisite: medical student in good standing. Seminars on research presented by Medical School faculty; overview of pertinent issues, including medical ethics, human subjects protocols, case control methods, etc. (P/F grading only.)—III. (III.) Kumari

481. Insights into Clinical Specialties (1)
Lecture/discussion—1 hour. Prerequisite: medical student in good standing. Exposure to various medical specialties, their residency programs and ways in which medical students can prepare for and improve their candidacy for such programs. (H/P/F grading only.)—II. (II.) Kumari

482. Lecture Series in Reproductive Health (1)
Lecture—1 hour. Psychosocial and public health aspects of providing quality reproductive health care and application in student-run free clinics and in 3rd year clerkships. May be repeated twice for credit. (P/F grading only.)—II. (II.) Paik

483. Insights in Political, Legal and Business Aspects of Medicine (1)
Lecture—1 hour. Prerequisite: medical students in good standing. The practical aspects of a medical career. May be repeated twice for credit. (P/F grading only)—III. (III.) Kumari

487. History and Ethics of Medicine (1)
Lecture—1.25 hours. Introduction to ethical problems and events in health care in both modern and historical contexts. Historical topics in medicine and medical ethics. (P/F grading only.)—II. (II.) Fitzgerald

489. Directed Studies (9)
Independent study—40 hours weekly. Prerequisite: individual directed studies in extended preparation for USMLE Part I, and/or as required by Promotion Board. Independent studies to review material from Years I and II in the curriculum in preparation for taking USMLE Part I in the fall, and for remediation course work directed by the Promotion Board. Students are expected to spend 8 to 12 hours per day on these studies. Faculty consultation and tutoring available on individual basis. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

495. Medicine Literature Review (1-9)
Discussion—3-27 hours. Prerequisite: medical student in good academic standing and permission of the Associate Dean of Curricular Affairs. Independent study: topics for selection include, but are not restricted to, medical ethics, economics and jurisprudence, culture and medicine, ethnicity and medicine, gender and medicine, history of medicine, health manpower, and medical education. A prepared paper on the selected topic will be required. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Kumari

499. Research in Medical Education and Curriculum Development (4-9)
Independent study—10-36 hours. Prerequisite: medical student in good standing and competency with computers. Research and development of an independent project related to expanding computer-assisted resources in support of the M.D. curriculum at UC Davis. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Kumari

Departmental Courses:

Anesthesiology and Pain Medicine (ANE)

Upper Division Course

192. Internship in Anesthesiology (1-6)
Internship—3 to 18 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in anesthesia and related fields. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

Professional Courses

460. Anesthesiology Clinical Clerkship (3-18)
Full-time clinical activity (3 full days per unit). Prerequisite: medical student. In-depth exposure to anesthesia through informal lectures and mentoring by anesthesiologists. Emphasis on understanding and applying anesthetic principles in managing administration of general, regional, and specialized areas. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

462. Anesthesiology (3)
Clinical activity—full time. Prerequisite: medical student (geared toward second and third-year students). Exposure to anesthesiology through combination of informal lectures and mentoring by anesthesiologists. Anesthetic procedures, pharmacology, and basic anesthetic principles. (H/P/F grading only.)—I, II. (I, II.) Kantor

463. Multidisciplinary Pain Management (6)
Clinical Activity—30 hours; lecture/discussion—10 hours. Prerequisite: senior medical student in good standing. Senior clerkship to expose students to all facets of treating pain in all aspects of clinical care: outpatient and inpatient settings, acute and chronic pain, end of life issues, pediatrics, rehabilitation, etc. Daily clinics, rounds, and lectures. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Fishman

480. Brief Introduction to Clinical Anesthesiology and Chronic Pain Management (3)
Clinical activity—25-30 hours (two weeks). Prerequisite: second-year medical student. Daily experience in clinical anesthesiology at the preoperative screening unit, operating room, post anesthesia care unit, chronic pain management clinic with daily clinical correlation case discussions, and one-on-one interaction with faculty anesthesiologists. (H/P/F grading only.)—II. (II.) Jahr, Kantor

498. Individual or Group Study (1-5)
Discussion—1-5 hours; laboratory—2-10 hours. Prerequisite: interns and residents with consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

499. Anesthesiology Research (4-18)
Laboratory—12-54 hours. Prerequisite: third- or fourth-year medical students, advanced standing undergraduate and veterinary medicine students; or consent of instructor. Problems in clinical and/or laboratory research. (H/P/F grading only for medical students.)—I, II, III, IV. (I, II, III, IV.)

Biological Chemistry (BCM)

Lower Division Course

92. Internship in Biological Chemistry (1-12)
Internship—3-36 hours; final report. Prerequisite: consent of instructor. Supervised work experience in biological chemistry and related fields. (P/NP grading only.)

Upper Division Courses

192. Internship in Biological Chemistry (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to internship by preceptor. Supervised work experience in Biological Chemistry and related fields. (P/NP grading only.)

198. Group Study (1-5)
Prerequisite: consent of instructor. For undergraduate students desiring to explore particular topics in depth. Lectures and conferences may be involved. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

209. Prostaglandins/Leukotrienes and Related Lipids (2)
Lecture—2 hours. Prerequisite: Biochemistry 101A-101B or Physiological Sciences 101A-101B or Physiology 100A-100B. Oxidative desaturation/elongation of poyunsaturated fatty acids. Biosynthesis of prostaglandins/leukotrienes from polyunsaturated fatty acids. Chemistry, biochemistry, and metabolism. Nutritional regulation. Physiological/pathophysiological implications; pharmacological and clinical relevance. Offered in alternate years.—(II.) Ziboh

214. Molecular Medicine (1)
Discussion—1 hour. Prerequisite: course in molecular genetics, molecular and cellular biology, biochemistry or the equivalent. Series of lectures on current topics of molecular genetics related to medicine. Material stresses concepts derived from genetic research which have some potential clinical relevance. (Same course as course 414.) (S/U grading only.)—II. (II.) Seldin

217. Molecular Genetics of Fungi (3)
Lecture—3 hours. Prerequisite: graduate standing in a biological science; Biochemistry 101B; Genetics 100, 102A; Botany 119; Plant Pathology 130, 215X; Microbiology 215 recommended. Advanced treatment of molecular biology and genetics of filamentous fungi and yeasts, including gene structure, organization and regulation; secretion; control of reproduction; molecular evolution; transformation; and gene manipulation. Offered in alternate years. (Same course as Plant Pathology 217.)—II. Holland, Tyler

222. Mechanisms of Translational Control (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: Biochemistry 201C or consent of instructor. Molecular mechanisms of protein synthesis and translational control in eukaryotic cells, with emphasis on mammalian cells and their viruses. An advanced graduate-level treatment of topics of current interest, with readings and discussion of primary papers from the literature. Offered in alternate years.—II. Hershey

230. Practical NMR Spectroscopy and Imaging (1)
Lecture—1 hour. Prerequisite: Chemistry 107A-107B, Physics 5A-5B-5C or 9A-9B-9C, or consent of instructor. Basic theory, experimental methods, and instrumentation of NMR. Enables students to understand NMR spectroscopy and imaging experiments. (S/U grading only.)—I. (I.)

231. Biological Nuclear Magnetic Resonance (3)
Lecture—3 hours. Prerequisite: Molecular and Cellular Biology 221A or the equivalent or consent of instructor. Principles and applications of magnetic resonance in biomedicine. Fundamental concepts and the biophysical basis for magnetic resonance applications in areas of tissue characterization/imaging, metabolic regulation, and cellular bioenergetics. (Same course as Biophysics 231.)—III. (III.) Jue

291. Seminar in Genetic Approaches to Pathogenesis of Human Disease (1)
Seminar—1 hour. Prerequisite: student in Genetics Graduate Group of consent of instructor. Current genetic approaches to understanding the pathogenesis of disease and mammalian development presented and critically discussed by faculty, fellows and students. Topics include Mendelian and non-Mendelian diseases, imprinting, homologous recombination, statistical methods, genetic epidemiology and cell cycle dependent expression. (Same course as course 491.) (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

298. Group Study (1-5)
Prerequisite: consent of instructor. For graduate students desiring to explore particular topics in depth. Lectures and conferences may be involved.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

410A. Molecular and Cell Biology (3.5)
Lecture—4 hours. Prerequisite: approval by Committee on Student Evaluation and Promotion. Basic biochemistry of proteins and nucleic acids, molecular genetics, regulation of gene expression, biomembranes and structural proteins. Applications to clinically relevant systems, particularly cysticic fibrosis, synaptic conductance, muscular dystrophy, and oncogenes and cell proliferation control. (P/F grading only.)—I. Voss

410B. Cell Biology and Metabolism (3)
Lecture—3 hours. Prerequisite: approval of the Committee on Student Progress. Introduction to the transport of small molecules and ions across membranes followed by study of energy metabolism and biosynthetic processes in humans. Membrane receptors are considered as they regulate to basic metabolic processes. Correlations to human disease. (P/F grading only.)—II. Jue, Troy

414. Molecular Medicine (1)
Discussion—1 hour. Prerequisite: course in molecular genetics, molecular and cellular biology, biochemistry or the equivalent. Series of lectures on current topics of molecular genetics related to medicine. Material stresses concepts derived from genetic research which have some potential clinical relevance. (Same course as course 214.) (H/P/F grading only.)—II. (II.) Seldin

418. Mammalian Endocrinology and Homeostasis (3)
Lecture—3 hours; discussion—1 hour. Prerequisite: approval of Committee on Student Progress. Physiological and biochemical properties of the mammalian endocrine system both at the cellular and systemic level. Principles that regulate homeostasis, especially in organ-organ interrelationships, metabolites and minerals. Reproductive endocrinology. (Same course as Human Physiology 418.) (P/F grading only.)—III. Widdicombe

491. Seminar in Genetic Approaches to Pathogenesis of Human Disease (1)
Seminar—1 hour. Prerequisite: student in Genetics Graduate Group of consent of instructor. Current genetic approaches to understanding the pathogenesis of disease and mammalian development presented and critically discussed by faculty, fellows and students. Topics include Mendelian and non-Mendelian diseases, imprinting, homologous recombination, statistical methods, genetic epidemiology and cell cycle dependent expression. (Same course as course 291.) (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

497T. Tutoring in Biological Chemistry (1-5)
Tutoring—3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/P/F grading only.)

498. Group Study (1-5)
Prerequisite: medical students with consent of instructor. (H/P/F grading only.)

499. Research (1-12)
Prerequisite: medical students with consent of instructor. (H/P/F grading only.)

Cell Biology and Human Anatomy (CHA)

Upper Division Courses

101. Human Gross Anatomy (4)
Lecture—4 hours. Prerequisite: Biological Sciences 1B; concurrent enrollment in course 101L strongly recommended. A detailed study of the gross anatomical structure of the human body, with emphasis on function and clinical relevance to students entering health care professions. GE credit: SciEng.—II. (II.) Gross

101L. Human Gross Anatomy (3)
Laboratory—6 hours; lecture/discussion—3 hours. Prerequisite: course 101 (may be taken concurrently). A detailed study of prosected human cadavers in small group format with extensive hands-on experience. GE credit with concurrent enrollment in 101: Wrt.—II. (II.) Gross

192. Internship in Morphology (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; laboratory science experience including some chemistry; approval of project by preceptor prior to period of internship. Experience of supervised internship in research laboratories of members of the department. (P/NP grading only.)

197T. Tutoring in Cell Biology and Human Anatomy (1-5)
Discussion—1 hour; laboratory—6-9 hours. Prerequisite: completion of course 101 with a grade of B or better and consent of instructor. Provides laboratory instruction in gross and microscopic human anatomy, with small groups of undergraduates under the supervision of the instructor. (S/U grading only.)

198. Directed Group Study (1-5)
Discussion—1-10 hours. Prerequisite: consent of instructor. Directed reading, discussion, and/or laboratory experience on selected topics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200. Gross Anatomy—Graduate Courses (9)
Lecture—6 hours; laboratory—12 hours. Prerequisite: approval by committee on student evaluation and promotion. Integrated presentation of developmental, gross, and radiologic anatomy. Four students assigned to cadaver and dissect entire body. Embryology and radiology are correlated with the dissections. Embryology is covered from implantation to birth.—I. (I.) Tucker

202. Human Microscopic Anatomy (5)
Lecture—3 hours; laboratory—6 hours. Examines the normal microscopic structure of the basic cells, tissues, and organs of the body. Lectures emphasize morphology and structure-function relationships. Accompanying laboratories involve analysis and identification of sectioned material at the light microscopic and ultrastructural levels.—II. (II.) Primakoff

203. Neurobiology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: two upper division or one graduate course in Neurobiology, consent of instructor. Physiology and anatomy of the normal human nervous system in an integrated format.—III. (III.) Kumari

290. Seminar (1)
Seminar—1 hour. Prerequisite: consent of instructor. (S/U grading only.)—I, III. (I, III.)

290C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: graduate student with research experience (may be taken concurrently); consent of instructor. Discussion of problems, progress and literature relevant to current research undertaken by laboratory groups in Human Anatomy. (S/U grading only.)—I, II, III. (I, II, III.)

292. Fertilization and Gamete Literature Critique (1)
Discussion—1 hour. Prerequisite: consent of instructor. Critical evaluation of current journal articles dealing with cell biology and biochemistry of gametes and fertilization. Selected papers will be presented and discussed in detail by students and faculty. May be repeated for credit. (S/U grading only.)—I, III. (I, III.) Meizel

298. Advanced Group Study (1-5)
Prerequisite: consent of instructor.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

400. Developmental, Gross, and Radiologic Anatomy (7.5)
Lecture—4 hours; laboratory—12 hours. Prerequisite: consent of Committee on Educational Progress. An integrated presentation of developmental, gross and radiologic anatomy. Embryology and radiology correlated with the dissection of the entire body. Embryology from implantation to birth. (P/F grading only.)—I. Tucker

402. Human Microscopic Anatomy (4.5)
Lecture—3 hours; laboratory—5 hours. Prerequisite: approval of the Committee on Student Progress. Microscopic structure of the basic cells, tissues and organs of the body with an emphasis on how structure explains function. Analysis and identification of sectioned material at the light microscopic and ultrastructural levels. (P/F grading only.)—II. Primakoff

403. Neurobiology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: approval of Committee on Student Progress. Physiology and anatomy of the normal human nervous system. Gross and microscopic brain structure, functional neuroanatomy, and the physiology, biochemistry, and pharmacology of the nervous system. (Same course as Human Physiology 403.) (P/F grading only.)—III. (III.) Kumari, Carlsen

497T. Tutoring in Human Anatomy (1-5)
Tutoring—3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum for the School of Medicine. (H/P/F grading only.)

498. Advanced Group Study (1-12)
Prerequisite: medical students, interns, and residents with consent of instructor. Directed reading and group discussion and/or laboratory experience on selected topics. (H/P/F grading only.)

499. Research (1-12)
Prerequisite: consent of instructor. (H/P/F grading only.)

Clinical Psychology (CPS)

Graduate Course

299. Research (1-12)
Prerequisite: graduate student in Clinical Psychology or consent of instructor. Individual or group research on selected topics. (S/U grading only.)—Morrison

Dermatology (DER)

Upper Division Courses

192. Internship in Cutaneous Biology (1-4)
Internship—8-20 hours; final report. Prerequisite: upper division standing or consent of instructor. Approval of project prior to internship by preceptor. Supervised work experience involving research on the skin. (P/NP grading only.)—Isseroff

199. Special Study in Cutaneous Biology (1-4)
Prerequisite: advanced undergraduate standing and/or consent of instructor. Special study by individual arrangement of specialized topics in biology of skin. Work may be assigned readings, laboratory research or a combination. (P/NP grading only.)

Graduate Course

299. Research in Cutaneous Biology (1-12)
Laboratory—3-36 hours. Prerequisite: consent of instructor. Independent research in cellular and biochemical mechanisms of cutaneous biology and pathology. (S/U grading only.)

Professional Courses

420. Integumentary System (2)
Lecture/discussion—4 hours. Prerequisite: approval of School of Medicine Committee on Student Progress. Cell biology, pathology, and physical diagnosis of the skin. Recognition of normal variations, and common or important dermatoses. Patient demonstrations of select conditions. (P/F grading only.)—IV. Isseroff

460. Dermatology Clinical Clerkship (6)
Clinical activity (inpatient/outpatient service)—40 hours for four weeks. Prerequisite: completion of three years of medical school; or consent of instructor. Observation and participation in dermatology clinics/practice and participation in Ward Rounds and Dermatology Clinics at UCD Medical Center, Kaiser, and private practitioner offices. Limited enrollment.—I, II, III, IV. (I, II, III, IV.) Lynch

480. Insights in Dermatology (1-3)
Clinical activity—3-9 hours. Prerequisite: first- and second-year medical students in good academic standing; consent of instructor. Clinical experience limited to observation of delivery of dermatologic care and attendance at some conferences. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Huntley

495. Wound Healing: From Bench to Bedside (6)
Clinical activity—12 hours; laboratory—8 hours; autotutorial—15 hours; term paper. Prerequisite: Medical students only. An integrated, multi-specialty approach to clinical soft tissue wound healing.—I, II, III, IV. Rivkah

498. Special Topics in Clinical Dermatology (1-6)
Independent study—3-18 hours. Prerequisite: medical students with consent of instructor. Individually arranged study of special topics in clinical dermatology determined by student and instructor. Assigned readings and/or clinical examination of selected patients. (H/P/F grading only.)

499. Research in Cutaneous Biology (1-12)
Laboratory—3-36 hours. Prerequisite: consent of instructor. Research, either laboratory or clinical, on ongoing projects within the department under supervision of faculty. (H/P/F grading only.)

Epidemiology and Preventive Medicine (EPP)

Lower Division Course

92. Internship in Community Health (1-12)
Internship—3-36 hours. Prerequisite: lower division standing; consent of instructor. Students apply theory and concepts learned in the classroom through field work in a community health agency. (P/NP grading only.)

Upper Division Courses

101. Perspectives in Community Health (3)
Lecture—3 hours. Prerequisite: undergraduate standing. Covers comprehensively the responsibilities, obligations, roles and professional activities of various health care disciplines in the community; provides students with perspectives on preventive medicine in society.—III. (III.) Chen

160. General Health Education and Prevention (5)
Lecture—4 hours; discussion—1 hour. Topics include addiction, substance abuse/prevention, nutrition, stress management, physical fitness, body image, reproductive anatomy and physiology, contraceptive options, safer sex, sexual health, healthy relationships, and other general wellness/health promotion topics. Practice in peer counseling and outreach presentations. (P/NP grading only.)—Lake, Ferguson

161. Campus Alcohol/Drug Abuse Prevention Program Peer Educator Training (4)
Lecture/discussion—3 hours; practice—1 hour. Prerequisite: course 160 (may be taken concurrently). Preparation for internship in campus and community substance abuse prevention and educational intervention. Addiction and other physiological responses to alcohol and other drugs. Harm-reduction strategies for individuals and target populations. High risk behaviors. Practice in peer counseling skills and outreach presentations to small and large groups. (P/NP grading only.)—III. (III.) Lake

162. Health Advocates Peer Educator Training (4)
Lecture/discussion—3 hours; practice—1 hour. Prerequisite: course 160 (may be taken concurrently). Preparation for internship in campus and community health promotion and risk reduction. Nutrition, stress management, physical fitness, body image and disordered eating, skin cancer prevention, and other general wellness/health promotion topics. (P/NP grading only.)—III. (III.) Belden, Gruhn

163. Peer Counselors in Sexuality Training (4)
Lecture/discussion—3 hours; practice—1 hour. Prerequisite: course 160 (may be taken concurrently). Preparation for internship in campus and community sexual health promotion. Reproductive anatomy and physiology, contraceptive options, safer sex and sexually transmitted disease prevention, healthy relationships and communication skills, gender roles/orientation/expression, culture and religion as influences on sexuality. Practice in peer counseling and outreach presentations to small and large groups. (P/NP grading only.)—III. (III.) Lindsay, Lake, Gruhn

164. Peer Counselors in Athletics Training (1)
Lecture/discussion—1 hour. Prerequisite: course 160 and Physical Education 40 (may be taken concurrently). Preparation for internship in athlete-to-athlete health promotion program. Peer health education in nutrition, body image, eating disorders, stress management, exercise and athletic training injury prevention, addictions and other physiological responses to alcohol/tobacco/performance enhancement and other drugs. Health risk issues unique to athletics. Practice in peer counseling and outreach presentations to small and large groups. May be repeated up to 5 units of credit. (P/NP grading only.)—I, II, III. (I, II, III.) Lake

175W. Health Policy and Health Politics (4)
Seminar—3 hours; extensive writing or discussion—1 hour. Following the model of a Congressional subcommittee, identification of four salient health policy issues for study, research, and development of model policies to address them. (Same course as UC Davis Washington Center 175.) GE credit: SocSci, Wrt.—III. Wintemute

188. Economics of Preventive Medicine (3)
Lecture—2 hours; discussion—1 hour. Assessment of the benefits and costs of proposals to improve aggregate health of groups of people and the health of individuals. Issues include cigarette taxes, hazardous wastes, diet, exercise, and breast cancer screening, among others.—III. (III.) Leigh

190C. Research Conference in Community and International Health (1)
Discussion—1 hour. Prerequisite: consent of instructor. Weekly conference on research problems, progress, and techniques in Community and International Health. Critical discussion of recent journal articles. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.) Gold, Samuels, Haan

192. Internship in Community Health Practice (1-12)
Internship—3-36 hours. Prerequisite: upper division and graduate students; consent of instructor. The student, through fieldwork in a community health agency, learns to apply theory and concepts learned in the classroom. (P/NP grading only.)

198. Study in Community and International Health (1-5)
Prerequisite: undergraduate standing and consent of instructor. Study and experience for undergraduate students in any number of areas in community and international health. (P/NP grading only.)

199. Research in Community and International Health (1-5)
Prerequisite: undergraduate standing; consent of instructor. Student will work with faculty member in areas of research interest, including but not limited

to injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women's health, and health demographics. (P/NP grading only.)

Graduate Courses

222. Social and Behavioral Aspects of Public Health (3)
Lecture/discussion—3 hours. Prerequisite: Statistics 102 and 106 or the equivalent, graduate standing, consent of instructor. Concepts and methods of social and behavioral sciences relevant to the identification and solution of public health problems. Topics include nutrition, physical activity, smoking, socioeconomic status, gender, race/ethnicity, stress, social support, social marketing, media advocacy and behavioral theories of change.—II. Gibson

255. Human Reproductive Epidemiology (3)
Lecture—3 hours. Prerequisite: Preventative Veterinary Medicine 405, 406, Physics 220, Physiology 222 or equivalents, or consent of instructor. Human reproductive effects and risk of reproductive disorders, examined from macro- and micro-environmental exposures in community and occupational settings, epidemiologic study designs and analyses. Offered in alternate years.—(I.) Gold

262. Principles of Environmental Health Science (3)
Lecture—3 hours. Prerequisite: consent of instructor. Principles, approaches and issues related to environmental health. Recognizing, assessing, understanding and controlling the impact of people on their environment and the impact of the environment on the public.—I. (I.)

273. Health Services Administration (3)
Lecture—3 hours. Prerequisite: consent of instructor. Structure and function of public and private medical care. Topics include categories and trends in national medical spending, predictors of patient use, causes of death, managed care, HMOs, Medicare, Medicaid, costs of technology, and medical care in other countries.—II. (II.) Leigh

290. Topics in Public Health (1)
Seminar—1 hour. Prerequisite: open to students in Master of Public Health program or consent of instructor. Seminar on key issues and current topics in public health. May be repeated for credit up to 3 times. (S/U grading only.)—I, II, IV. (I, II, IV.) Schenker, Leistikow, McCurdy

297. Public Health Practicum (1-8)
Fieldwork—3-16 hours; term paper. Open to students in Master of Public Health. Practical fieldwork experience in public health. Placement site varies. May be repeated up to 8 units of credit. (Deferred grading only, pending completion of sequence. S/U grading only.)—I, II, III, IV. (I, II, III, IV.) McCurdy

298. Study in Community and International Health (1-5)
Prerequisite: graduate student in good academic standing and consent of instructor. Study and experience for graduate students in any number of areas in community and international health. (S/U grading only.)

299. Research in Community and International Health (1-12)
Prerequisite: graduate standing; consent of instructor. Student will work with faculty member in areas of research interest, including but not limited to injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women's health, and health demographics. (S/U grading only for graduate students.)

Professional Courses

402. Introductory Medical Spanish (2)
Lecture—2 hours. The vocabulary needed to conduct a basic history and physical examination in Spanish. (H/P/F grading only.)—III. (III.)

455. Multidisciplinary Clinical Preceptorship (4.5)
Clinical activity—full time (3 weeks). Prerequisite: second-year student in good academic standing. Students will be introduced to basic principals of geriatric health care and provided with opportunities for clinical observation and experience in a variety of facilities that serve older adults. Multidisciplinary nature of geriatrics will be emphasized. (H/P/F grading only.)—IV. (IV.)

461. Clerkship in Community Health Group Practice (3-9)
Clinical activity—full time (2-6 weeks). Prerequisite: third- or fourth-year medical student. Overview of local community health in group practice situations. Students participate in treatment at several clinic sites in Yolo County. Topics include primary care, environmental health, maternal and child health, jail health, and preventive health care for the aged. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

465. Community Health Preceptorship (3-18)
Clinical activity—full time (2-12 weeks). Prerequisite: fourth-year medical student. Students participate at the California Department of Health Services in ongoing investigations into current public health problems, e.g., birth defects, cancer control, diabetes, hypertension, injury control, infectious diseases, aging, Alzheimer's disease, and smoking and tobacco use control. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

466. Occupational and Environmental Medicine Elective (6-12)
Clinical and laboratory experience—full time (4 to 8 weeks). Prerequisite: fourth-year medical student and consent of instructor. Participate in activities of Occupational and Environmental Health Unit. Major activity is involvement in an epidemiologic research project of the University. Also participate in Ambulatory Occupational and Environmental Medicine Clinic at UCD Medical Center. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Schenker

470. Clinical Selective in Occupational and Environmental Medicine (3)
Clinical activity—full time. Prerequisite: fourth-year medical students in good academic standing, with consent of instructor. Outpatient clinical experience in Occupational and Environmental Medicine at UCDMC and in local industries. Participants will gain experience in evaluating occupational and environmental medical conditions, use of medical literature resources, the worker's compensation system, and toxicological principles. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) McCurdy

480. Insights in Occupational and Environmental Medicine (1-3)
Clinical activity—3-9 hours. Prerequisite: first- or second-year medical student in good academic standing; consent of instructor. Students will observe and participate in research and clinical activities in occupational and environmental medicine which include conferences, occupational and environmental medicine clinical activities and field visits. Students develop and present small individual research projects. (Former course Occupational and Environmental Health 480.) (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Schenker

495. International Health Care (1)
Lecture/discussion—1 hour. Prerequisite: medical student in good academic standing. Forum for learning health issues and health care systems in other countries. Topics include health care for refugees, the impact of political strife on health, the health care professional in international settings. (H/P/F grading only.)—I. (I.) Schenker

496. Current Issues in Public Health (1)
Lecture/discussion—1 hour. Topical issues in public health. Speakers from the local public health community address issues such as disease control programs, access to care. May be repeated up to three times for credit. (P/F grading only.)—III. McCurdy

498. Study in Community and International Health (1-6)
Prerequisite: medical student in good standing and consent of instructor. Study and experience for medical students in areas in community and international health. May be repeated for credit. (H/P/F grading only.)

499. Research in Community and International Health (1-9)
Prerequisite: medical students with consent of instructor. Student will work with faculty member in areas of research interest, including but not limited to injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women's health, and health demographics. (H/P/F grading only.)

Family and Community Medicine (FAP)

Lower Division Course

92C. Primary Care Clinics (2)
Clinical activity—6-8 hours; seminar—2 hours; lecture—1-2 hours. Prerequisite: consent of instructor, enrollment at the UC Davis campus, for freshman and sophomore students. Students must apply and interview with the Board of Clinica Tepati or Imani Clinic. Field experience exposes lower division students to health care delivery, patient histories, physical examinations, health promotion, disease prevention, diagnosis; treatment of episodic, acute, chronic illness; appropriate referral and follow-up. May be repeated for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) Solis, Smith

Upper Division Courses

192C. Primary Care Clinics (2)
Clinical activity—6-8 hours; seminar—2 hours; lecture—1-2 hours. Prerequisite: consent of instructor, enrollment at the UC Davis campus, upper division standing. Students must apply and interview with the Board of Clinica Tepati or Imani Clinic. Field experience introduces students to health care delivery; patient histories and physical examinations; health promotions and disease prevention; diagnosis and treatment of episodic, acute, and chronic illness; basic laboratory testing; appropriate referral and follow-up. May be repeated for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) Solis, Smith

195. Health Care to Underserved Populations (1)
Lecture—1 hour. Prerequisite: sociology, political science, or applied behavioral science background recommended, or registration in medical school. Discusses sociocultural perspectives of underserved populations in California impacting their health; roles of family/interpersonal relationships in making health care decisions; and clinician's perspectives in treating people of cultures which are unfamiliar and/or uncomfortable with Western medicine. (P/NP grading only.)—II. (II.) Nesbitt

Graduate Courses

The following courses are for students enrolled in the Family Nurse Practitioner/Physician Assistant (FNP/PA) program.

240A-240B-240C-240D-240E-240F. Clinical Preceptorship (1-13)
Clinical activity—9-36 hours. Prerequisite: enrollment in the Master's Track of the FNP Certificate Program, and successful completion of each preceding 240A-F section. Diagnosis and treatment of patients of all ages in an ambulatory care setting, under the supervision of a preceptor. May be repeated twice for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) DeAmicis

242A-242B. Clinical Role Seminar (1.5-1.5)
Seminar—1.5 hours. Prerequisite: course 240 concurrently and student in the Master's Track of the FNP certificate program. Accompanies course 240 and provides a small group forum for students to explore role development and clinical management issues based on nursing theories and research. (Deferred grading only, pending completion of sequence.)—I, II, III. (I, II, III.) DeAmicis, Fraser

252A. Professional Role Development (1.5)
Lecture/discussion—1.5 hours. Prerequisite: enrollment in the Master's Track of the FNP Certificate Program. Provides opportunity to discover strategies for promoting role development and role satisfaction via

discussion of pertinent issues, theory, and research. (Deferred grading only, pending completion of sequence.)—I, II, III, IV. (I, II, III, IV.) Hass

252B. Nurse Practitioner as Leader (1.5)
Lecture/discussion—1.5 hours. Prerequisite: course 252A and concurrent enrollment in Master's Track of the FNP Certificate Program. Study of advanced practice role of nurse practitioner. Overview of legal and regulatory issues, certification and malpractice liability issues. Includes critical analysis of theories, issues and research related to nurse practitioner role development and applied legislation through community involvement. (Deferred grading only, pending completion of sequence.)—I, II, III, IV. (I, II, III, IV.) Hass

264. Psychosocial Concepts and Issues in Primary Care (2)
Lecture/discussion—2 hours. Prerequisite: B.S. degree in nursing and enrollment in the Master's Track of the FNP Certificate Program. Introduces the principles of effective communication in establishing the therapeutic provider-patient relationship. Provides an examination of relevant psychosocial concepts and issues related to primary care. Research and theory are emphasized.—I, II, III, IV. Hass

266A. Health Maintenance/Promotion (2)
Lecture—2 hours. Prerequisite: B.S. degree in nursing and enrollment in the Master's Track of the FNP Certificate Program. Focuses on the health and wellness of individuals throughout the lifespan. Critical analyses of nursing interventions in health promotion and maintenance based on nursing and other theoretical frameworks and research data are emphasized.—I. (I.) DeAmicis

266B. Family Nursing Theory (1)
Lecture—1 hour. Prerequisite: enrolled in master's track of the FNP Certificate Program or consent of instructor. Exploration of family theories as related to advanced primary care nursing practices.—I, II, III. (I, II, III.) Stewart

266C. Family Nursing Interventions (2)
Lecture—2 hours. Prerequisite: course 266B and enrollment in the Master's Track of the FNP Certificate Program. Course integrates family theoretical and therapeutic concepts to focus on nursing assessment and intervention strategies for family problems in health and illness.—III. (III.) Stewart

266D. Community Assessment and Intervention (1)
Lecture—1 hour. Prerequisite: enrollment in the Master's Track of the FNP Certificate Program. The relationship between advanced primary care nursing practice and community is explored. Community assessment and intervention strategies appropriate for the family nurse practitioner are discussed. May be repeated twice for credit.—II. (II.) Stewart

Professional Courses

The following courses are for students enrolled in the Family Nurse Practitioner/Physician Assistant (FNP/PA) Program.

300. Health Assessment for Advanced Practice (4.5)
Lecture/discussion—4.5 hours. Prerequisite: enrolled in the FNP/PA Certificate Program, or consent of instructor. Advanced concepts and skills in health and physical assessment essential to the clinical decision making and caring process for the FNP, PA or advance practice nurse. Emphasis on eliciting an accurate and thorough history and performing a physical examination.—I, II, III, IV. (I, II, III, IV.) Stewart

331A. Scientific Basis of Diseases—A (4)
Independent study—3 hours; lecture/discussion—1 hour. Prerequisite: registered student in the FNP/PA Certificate Program or consent of instructor. Anatomy, physiology and concepts of pathophysiology.—I, II, III, IV. (I, II, III, IV.) Fraser

331B. Scientific Basis of Disease—B (1)
Independent study—0.5 hours; lecture/discussion—0.5 hours. Prerequisite: course 331A, registered student in the FNP/PA Certificate Program or consent of instructor. Neurological and renal diseases and abnormalities of adrenal function. Builds on concepts covered in prior coursework; Web-enhanced course.—I, II, III, IV. (I, II, III, IV.) Fraser

340. Clinical Preceptorship for FNP/PA Students (19)
Clinical activity—13 hours. Prerequisite: student in the Family Nurse Practitioner/Physician Assistant Program. Hands-on clinical experience including supervised patient care, development of clinical skills, assessment and management of patients in the medical ambulatory care setting. May be repeated twice for credit with consent of instructor. (Deferred grading only, pending completion of sequence. P/F grading only.)—I, II, III, IV. Stewart

341. Advanced Clinical Preceptorship for FNP/PA Students (26)
Clinical activity—26 hours. Prerequisite: registered students in the Family Nurse Practitioner/Physician Assistant Program, course 340. Development of skills learned in course 340 through an approved clinical preceptorship. May be repeated twice for credit. (Deferred grading only, pending completion of sequence. P/NP grading only.)—I, II, III. (I, II, III.) Stewart

344. Inpatient Surgical Experience for FNP/PA Students (3)
Clinical activity—9 hours. Prerequisite: Registration in the FNP/PA program. Course 340, 240A, 240B, 240C, 354A, 354B, 354C, or consent of instructor. Student clerkships in the inpatient setting in surgery at UCDMC and/or affiliated institutions. Designed to expose the students to inpatient management of surgical patients; acquaint student with FNP/PA role in surgical setting. May be repeated twice for credit (Deferred grading only, pending completion of sequence. S/U grading only.)—I, II, III, IV. Rios, Stewart

346. Clinical Geriatrics (3)
Clinical activity—90 hours. Prerequisite: registered student in the FNP/PA program and successful completion of course 340A-340B-340C and 354A-354B-354C and 365A-365B-365C or consent of instructor. Application of principles of geriatric care in the outpatient, nursing home, acute hospitals and community settings that provide services for the elderly, including visits to patients' homes. (P/NP grading only; Deferred grading only, pending completion of sequence.)—I-II-III-IV. (I-II-III-IV.) Fraser, Stewart

347. Inpatient Medical Experience for FNP/PA Students (4)
Clinical activity—12 hours. Prerequisite: Registration in the FNP/PA program. Course 340, 240A, 240B, 240C, 354A, 354B, 354C, or consent of instructor. Student clerkships in the inpatient setting in Family Practice at UCDMC and/or affiliated institutions. Designed to expose the students to inpatient management; acquaint student with FNP/PA role in the inpatient setting. May be repeated twice for credit. (Deferred grading only, pending completion of sequence. S/U grading only.)—I, II, III, IV. Rios, Stewart

350. Ethics and Trends in Health Care for FNP/PA Students (2)
Lecture/discussion—2 hours. Prerequisite: registered student in the FNP/PA Program. Trends and ethical issues in health care, review of the process and policies for ethical decisionmaking in patient care. These issues, trends, and processes will be related to the role of the Family Nurse Practitioner/Physician Assistant.—III. (III.) Hass

353. Geriatric Medicine for FNP/PA Students (1)
Lecture—1 hour. Prerequisite: registered student in the FNP/PA Program. Introduction to advanced concepts in geriatric medicine. Comprehensive assessment, decision making, and management of selected medical problems encountered in primary care. Appropriate consultation and referral are discussed. May be repeated twice for credit.—I, II, III, IV. (I, II, III, IV.) Fraser

354A. Fundamentals of Primary Health Care for FNP/PAs (5)
Lecture/discussion—5 hours. Prerequisite: enrollment in the Family Nurse Practitioner/Physician Assistant Program. Anatomy and physiology, pathophysiology, diagnostic criteria, approaches to assess and manage medical problems common in primary care. May be repeated twice for credit.—I, II, III, IV. (I, II, III, IV.) Hass, Hasselbach

354B-354C. Fundamentals of Primary Health Care for FNP/PA Students (6-4)
Lecture/discussion—4-6 hours. Prerequisite: registered student in FNP/PA Program. Study of anatomy and physiology, pathophysiology, diagnostic criteria, approaches to assess and manage common medical problems seen in primary health care. May be repeated for credit.—I-II-III. (I-II-III.) Hasselbach, Barakzai, Milton, Dean

355A. Advanced Principles of Family Health Care (5)
Lecture/discussion—5 hours. Prerequisite: enrollment in the Family Nurse Practitioner/Physician Assistant Program. Advanced concepts in the management of cardiac, respiratory, gastrointestinal, renal, and endocrine problems in primary health care. Emphasis on comprehensive assessment, appropriate clinical decision making and management of selected medical problems commonly encountered in primary care settings, appropriate consultation and referral. May be repeated twice for credit.—I, II, III. (I, II, III.) Fraser

355B. Advanced Principles of Primary Health Care (5)
Lecture/discussion—5 hours. Prerequisite: registered student in the FNP/PA Program; successful completion of course 354A-354B-354C. Anatomy and physiology, pathophysiology, diagnostic criteria, approaches to assessment and management of patients with complex and/or multiple health care problems in primary care settings.—I, II, III, IV. (I, II, III, IV.) Rios

355C. Advanced Principles of Health Care for FNP/PA Students (4)
Lecture/discussion—4 hours. Prerequisite: registered student in the FNP/PA Program; course 354A-354B-354C. Study of anatomy and physiology, pathophysiology, diagnostic criteria and approaches to assess and manage patients with complex and/or multiple health care problems in primary care settings, and to learn the management of patients in inpatient settings. May be repeated for credit.—I, II, III, IV. (I, II, III, IV.) Barakzai, DeAmicis

355D. Advanced Principles of Health Care for FNP/PA Students (4)
Lecture/discussion—4 hours. Prerequisite: registered student in the FNP/PA Program; course 354A-354B-354C. Study of anatomy and physiology, pathophysiology, diagnostic criteria and approaches to assess and manage patients with complex and/or multiple health care problems in primary care settings, and to learn the management of patients in inpatient settings. May be repeated for credit.—I. (I.)

358. Pharmacology (6)
Lecture/discussion—6 hours. Prerequisite: registered student in the Family Nurse Practitioner/Physician Assistant Program. Core knowledge in pharmacokinetics and pharmacodynamics, and clinical therapeutics necessary to make rational and optimal therapeutic plans in ambulatory settings. (Deferred grading only, pending completion of sequence.)—I, II, III, IV. (I, II, III, IV.) Hasselbach

361. Family Theory and Assessment (1)
Lecture—1 hour. Prerequisite: registered student in the FNP/PA Program. Examines the family using a family system framework within the context of its internal dynamics, relationship to community and cultural variations. May be repeated twice for credit.—II. (II.) Stewart

367A. Family Practice and Community Health for FNP/PA Students (2)
Lecture/discussion—2 hours. Prerequisite: registered student in the FNP/PA Program. Examines pediatric and adolescent concepts of growth and develop-

ment as related to primary health care. Primary health care issues and needs will be assessed in relationship to family and community. Health promotion and disease concepts. May be repeated twice for credit.—I, II, III, IV. (I, II, III, IV.) Barakzai

367B. Family Practice and Community Health for FNP/PA Students (1)
Lecture/discussion—1 hour. Prerequisite: registered student in the FNP/PA Program. Examines concepts of adult growth and development as related to primary health care. Issues and needs of the adult are examined in relationship to family and community, health promotion, disease prevention and wellness concepts. May be repeated twice for credit.—I, II, III, IV. (I, II, III, IV.) Barakzai

367C. Family Practice and Community Health for FNP/PA Students (1)
Lecture/discussion—1 hour. Prerequisite: registered student in the FNP/PA Program. Examines concepts of development in the elderly as related to primary health care. Health care issues and unique needs are presented with an emphasis on health promotion and disease prevention. May be repeated twice for credit.—I, II, III, IV. (I, II, III, IV.) Fraser

368A. Behavioral Science for FNP/PA Students (1)
Lecture/discussion—1 hour. Prerequisite: registered student in the FNP/PA Certificate Program or consent of instructor. Principles of effective communication in therapeutic provider-patient relationship. History taking techniques that foster empathy and respect. Biopsychosocial model of health care.—I, II, III, IV. (I, II, III, IV.) Stewart

368B. Behavioral Science (1)
Lecture/discussion—1 hour. Prerequisite: completion of course 368A and registered student in the Family Nurse Practitioner/Physician Assistant Program. Exploration into a variety of addictive behaviors within diverse populations. Utilization of clinical case studies to develop skills in the identification, interview and management of these patients and recognition of how these behaviors impact the family system.—I, II, III, IV. (I, II, III, IV.) Hass

368C. Behavioral Science (1)
Lecture/discussion—1 hour. Prerequisite: registered student in the Family Nurse Practitioner/Physician Assistant Program. Multicultural perspectives of health. Traditional health, beliefs and healing practices of several California cultures.—I, II, III, IV. (I, II, III, IV.) Barakzai, Hass

368D. Behavioral Science for FNP/PA Students (1)
Lecture—1 hours. Prerequisite: registered student in the FNP/PA Program. Basic principles of assessment, counseling and treatment of individual patients, their families and support systems as they experience the effects of chronic illnesses, chronic pain, terminal diseases, death and grieving, Students are strongly encouraged to explore their coping styles. May be repeated twice for credit.—I, II, III, IV. (I, II, III, IV.) Stewart, Hass

370A-370B-370C-370D-370E-370F. Clinical Case Seminars for FNP/PA Students (1.5-1.5-1.5-1.5-1.5-1.5)
Seminar—1.5 hours. Prerequisite: registered student in the FNP/PA Program. Designed to increase critical thinking by utilizing the development and processing of the differential diagnoses of several cases based on the topics covered in the medicine course (course 354, 355) taught the same quarter. May be repeated twice for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) Ingell, Milton

372A. Professional Development for FNP/PA Students (1.5)
Lecture/discussion—1.5 hours. Prerequisite: registered student in the Family Nurse Practitioner/Physician Assistant Program. Understanding the Family Nurse Practitioner (FNP) and Physician Assistant (PA) roles, history of the profession and impact of FNP and PA on health care systems; critical review of medical literature including introduction to evidence based medicine and statistics; managed care. (Deferred grading only, pending completion of sequence.)—I, II, III, IV. (I, II, III, IV.) Hass

372B. Professional Development for FNP/PA Students (1.5)
Lecture/discussion—1.5 hours. Prerequisite: registered student in the Family Nurse Practitioner/Physician Assistant Program. Roles of the Family Nurse Practitioner (FNP) and Physician Assistant (PA) including legal and regulatory issues affecting practice, licensing requirements, elements of negotiating a job, legislative and political awareness, and community involvement. (Deferred grading only, pending completion of sequence.)—I, II, III, IV. (I, II, III, IV.) Hass

390. Health Care of the Western Farmworkers (2)
Independent study—1.2 hours; clinical activity—2.4 hours. Prerequisite: Enrollment in the Family Nurse Practitioner/Physician Assistant Program. Basic concepts for providing primary health care to migrant and seasonal agricultural workers. (P/NP grading only; deferred grading only, pending completion of sequence.)—I, II, III, IV. (I, II, III, IV.) DeAmicis

399. Special Study (1-12)
Prerequisite: enrolled in the FNP/PA Certificate Program or consent of instructor. Research and clinical interests to enhance education in family practice. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Ingell

Professional Courses

400A. Introduction to Patient Evaluation (2)
Discussion—2 hours; clinical activity—1 hour. Prerequisite: consent of Committee on Student Progress. Practice dealing with communication problems; continuity preceptorship and introduction to emergency medicine. (Deferred grading only, pending completion of sequence. P/F grading only.)—I. Jerant, Callahan

400B. Introduction to Patient Evaluation (2)
Discussion—2 hours; clinical activity—1 hour. Prerequisite: consent of committee on student progress. Basic physical examination skills through small group interactions; continuity preceptorship. (Deferred grading only, pending completion of sequence. P/F grading only.)—II. Jerant, Callahan

400C. Introduction to Patient Evaluation (2)
Lecture/discussion—2 hours; clinical activity—1 hour. Prerequisite: consent of Committee on Student Progress. Practice dealing with communication problems; continuity preceptorship. (P/F grading only.)—III. Jerant, Callahan

401. Introductory Preceptorship in Family Practice (3-9)
Clinical activity—20-40 hours. Prerequisite: completion of first year of medical training. Preceptorship in family practice offered as an introduction to clinical medicine. 20 hours or 40 hours per week in a family physician's office, doing patient interviews, history-taking, and performing physical exams. (H/P/F grading only.)—IV. (IV.) Morgan

407. Davis Community Clinic (3)
Clinical activity—8 hours. Prerequisite: second-year medical student in good academic standing. Students learn to diagnose and treat common medical problems as seen at a community clinic, under the direct supervision of a physician. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

411. Selected Studies of Systems for Chronic Illness Care (3)
Clinical activity—4 hours; discussion—4 hours. Prerequisite: course 400A, 400B, 400C, medical students with consent of instructor. Understanding of chronic illness, particularly diabetes, participation in patient care, alternative techniques. May be repeated once for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Balsbaugh

430. Primary Care Clerkship (12)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Eight week primary care clerkship for third year medical students. Four week primary care experience with an additional four weeks in Internal Medicine clinics. (H/P/F grading only.)—I, II, III, IV. Morgan

434. Primary Care Clinics (3-12)
Clinical activity—32-36 hours; seminar—0-2 hours; lecture—1-2 hours. Prerequisite: open to medical students in all four years of medical school. Medical students will learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Provides exposure to special health care needs of various ethnic and poverty-level populations. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Solis, Smith

444. Advanced Preceptorship in Family Medicine (3-18)
Clinical activity—40 hours. Prerequisite: completion of third-year primary care plus clerkship or consent of instructor. Preceptorships with primary care physicians in a variety of settings. Acquisition skills to evaluate and develop a treatment plan for patients with common medical problems seen by primary care physicians in an out patient setting. May be repeated up to 18 units of credit. (H/P/F grading only.)—I, II, III, IV. Morgan

460. Geriatrics in Community Health (3-6)
Fieldwork—24 hours; clinical activity—12 hours; lecture—4 hours. Prerequisite: course 430. Visits to community agencies including mental health teams, adult day health centers, a diagnostic and research center, and case management specialists. Observation and participation in MMSE's, patient-family conferences, interdisciplinary team meetings, neuropsychiatric testing and home visit evaluations. (H/P/F grading only.)—I, II, III, IV. Xakellis

468. International Preceptorship (3-12)
Clinical activity—40 hours. Prerequisite: medical student with consent of instructor. Preceptorship with a family practitioner in a foreign country (arranged by student contact or with assistance of the Family and Community Medicine Department.) Participate in clinical activities, analyze and report characteristics of the practice. May be repeated up to 12 units of credit. (H/P/F grading only.)—I, II, III, IV.

469. Clerkship in Family Practice Residency (3-12)
Clinical activity—40 hours. Prerequisite: completion of third year of medical school or consent of instructor. Comprehensive primary medical care of patients in a family practice hospital or residency. Usually includes inpatient and outpatient experience. May be repeated up to 12 units of credit. (H/P/F grading only.)—I, II, III, IV.

482. Medical Issues for Older Adults (1)
Lecture/discussion—1 hour. Prerequisite: medical students only. The medical needs of geriatric patients. Topics include societal prejudices regarding aging, special nutritional and exercise needs, pharmacologic challenges, maintaining independence, and end of life. Course may be repeated for credit 3 times. (S/U grading only.)—III. Xakellis

488. Selected Studies in Family Practice (1-9)
Prerequisite: medical students with consent of instructor. Assigned readings in family practice to increase understanding on selected topics relating to family medicine and primary health care delivery; visits to and written analysis of selected health care programs; and/or exposure to family practice with a community physician preceptor who is a member of the clinical faculty. May be repeated up to 9 units of credit.—I, II, III, IV.

499. Research (1-12)
Prerequisite: medical students with consent of instructor. Research in various aspects of the health care delivery system. (H/P/F grading only.)

Human Physiology (HPH)

Upper Division Courses

192. Internship in Human Physiology (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in physiology and related fields. (P/NP grading only.)

198. Directed Group Study (1-5)
To be arranged. Prerequisite: consent of instructor. Directed reading, discussion and/or laboratory experience on selected topics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Laboratory—3-15 hours; undergraduate research project. Prerequisite: senior standing in biology, chemistry, physics, psychology, or engineering. (P/NP grading only.)

Graduate Courses

200. Human Physiology (6)
Lecture—48 hours total; discussion—12 hours total. Prerequisite: graduate standing and consent of instructor. General cellular and organ system physiology, including neural, cardiovascular, respiratory, gastrointestinal and urinary systems in the human. Lectures concurrent with course 400; research/discussion and laboratory/demonstration sessions, and examinations separate.—II. (II.) Carlsen, O' Donnell

210A. Advanced Physiology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physiology Ph.D. program, or consent of instructor. Advanced course in general principles of physiology, surveying homeostasis, cellular and selected topics, and neurophysiology. (Same course as Physiology 210A.)—I. (I.) Cala, Payne

285. Peripheral Circulation (3)
Lecture—1 hour; discussion—2 hours. Prerequisite: Physiology 111A, 113; or course 200 and consent of instructor. Lectures and critical analysis of papers on peripheral vascular function, including: structure/function and pressure/flow relationships, innervation, receptor pharmacology, endothelial and smooth muscle interactions, signal transduction, ion transport, permeability, paracrine mediators and disease mechanisms. Offered in alternate years.—(III.) Gray, O'Donnell

298. Group Study (1-5)
Prerequisite: consent of instructor. For graduate students desiring to explore particular topics in depth. Lectures and conferences may be involved.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

400. Human Physiology (6)
Lecture—4 hours; laboratory—4 hours. Prerequisite: consent of Committee on Student Progress. General, cellular and systemic physiology of cardiovascular, respiratory, gastrointestinal and urinary systems. (P/F grading only.)—II. Carlsen, O'Donnell

403. Neurobiology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: approval of Committee on Student Progress. Physiology and anatomy of the normal human nervous system. Gross and microscopic brain structure, functional neuroanatomy, and the physiology, biochemistry, and pharmacology of the nervous system. (Same course as Cell Biology and Human Anatomy 403.) (P/F grading only.)—III. Kumari, Carlsen

418. Mammalian Endocrinology and Homeostasis (3)
Lecture—3 hours; discussion—1 hour. Prerequisite: approval of Committee on Student Progress. Physiological and biochemical properties of the mammalian endocrine system both at the cellular and systemic level. Principles that regulate homeostasis, especially in organ-organ interrelationships, metabolites and minerals. Reproductive endocrinology. (Same course as Biological Chemistry 418.) (P/F grading only.)—III. Widdicombe

497T. Tutoring in Human Physiology (1-5)
Tutoring—3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/P/F grading only.)—Cala

498. Directed Reading and Group Study (1-4)
Discussion—2-8 hours. Prerequisite: medical student. Directed reading and discussion on selected topics in human physiology. (H/P/F grading only.)

499. Research (1-6)
Prerequisite: medical students with consent of instructor. Laboratory investigation on selected topics. (H/P/F grading only.)

Internal Medicine (IMD)

Lower Division Courses

92. Internship (1-4)
Internship—3-12 hours. Prerequisite: lower division standing and consent of instructor. Supervised internship in internal medicine and related fields. (P/NP grading only.)—Last

98. Directed Group Study (1-2)
Seminar—1-2 hours. Prerequisite: lower division standing and consent of instructor. Directed group study in medicine and related fields. (P/NP grading only.)—Last

99. Undergraduate Research in Medicine: Molecular and Cell Biology (1-3)
Prerequisite: consent of instructor. (P/NP grading only.)—Last

Upper Division Courses

192. Internship in Internal Medicine (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing. Supervised work experience in internal medicine and related fields. (P/NP grading only.)

194. Practicum in Community Health Clinics (1-3)
Clinical activity—5-15 hours on Saturday mornings and during the week as necessary, excluding holidays. Prerequisite: consent of instructor. The undergraduate student, through active participation in the medical aspects of community health clinics, gains knowledge of the organization, administration, and problem-solving capabilities of these primary care facilities. May be repeated for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) Kumagai

198. Directed Group Study (1-2)
Seminar—1-2 hours. Prerequisite: consent of instructor. Directed group study in medicine and related fields. (P/NP grading only.)—Last

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)

Graduate Course

214. Topics in Medical Ethics (1)
Seminar—1 hour. The complex moral, legal, and ethical dilemmas that patients, families, and health care providers face in today's clinics. May be repeated once for credit. (S/U grading only.)—I. Loewy

220D. Cardiovascular System (2.5)
Lecture/discussion—5.5 hours. Prerequisite: Human Physiology 200, graduate student status and consent of instructor. Principles of etiology, mechanisms, diagnosis and management of the major diseases of the cardiovascular system. Included are ischemic, valvular, hypertensive, cardiomyopathic, pericardial, and electrical disorders.—II. (II.) Laslett

250. Medicine and the Law (3)
Lecture/discussion—2 hours; project—2 hours. Legal and bioethical principles and concepts in medicine. Topics include standard of care, informed consent, reproductive medicine, and end-of-life issues. (S/U grading only.)—II. Rich

Professional Courses

401A. Physical Diagnosis Practicum (1)
Lecture/discussion; fieldwork. Prerequisite: consent of Committee on Student Progress. Overall framework for performance of a history and physical exam and with identification of abnormal physical findings. (Deferred grading only, pending completion of sequence. P/F grading only.)—IV. Stevenson

419. Introduction to Clinical Nutrition (2.5)
Lecture—2 hours; lecture/discussion—2 hours. Prerequisite: approval of Committee on Student Progress. Basic and clinical concepts of human nutrition. Nutrient homeostasis and regulation and current perspectives on the role of nutrition in disease. (P/F grading only.)—III. Halsted

420A. Hematology (2)
Lecture/discussion—3 hours; laboratory—2 hours. Prerequisite: consent of Committee on Student Progress. Normal hematopoiesis and basic disorders of blood cells, leukemia and lymphoma, transfusion therapy, immunoglobulin disorders, thrombosis and hemostasis. Normal and abnormal blood cells and the interpretation of common laboratory tests. (P/F grading only.)—Wisdom

420B. Gastrointestinal System (2.5)
Lecture/discussion—6 hours. Prerequisite: approval of Committee on Student Progress. Basic pathophysiologic principles of digestive diseases on which clinical concepts and judgments can be developed. Emphasis on pathophysiologic basis of gastroenterological and hepatic disorders with discussion of major disorders and their diagnosis and management. (P/F grading only.)—III. (III.) Rossaro

420C. Pulmonary and Critical Care Medicine (2.5)
Laboratory/discussion—5.5 hours. Prerequisite: approval of Committee on Student Progress. Clinical aspects of respiratory anatomy, physiology, and pathology. Diagnostic procedures and a description of the major pulmonary diseases and disorders, and critical care medicine. (P/F grading only.)—II. Louie

420D. Cardiovascular System (2.5)
Lecture/discussion—5.5 hours. Prerequisite: approval of the School of Medicine Committee on Student Progress. Principles of etiology, mechanisms, diagnosis and management of the major diseases of the cardiovascular system. Included are ischemic, valvular, hypertensive, cardiomyopathic, pericardial, and electrical disorders. (P/F grading only.)—II. Laslett

420E. Nephrology (2)
Lecture—2 hours; discussion—2 hours; laboratory—2 hours. Prerequisite: approval of Student Progress Committee. Fundamental aspects of disorders of body water, electrolytes and acid/base balance; major categories and mechanisms of parenchymal renal diseases; urinary tract infections. (P/F grading only.)—II. Stevenson

420F. Metabolic Regulatory System (2.5)
Lecture/discussion—5.5 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Basic understanding of pathophysiological processes in organs and tissues primarily involved in metabolic regulation and sufficient factual base so that clinical and laboratory findings, diagnosis, and elementary management of patients with endocrinological disorders can be rationalized. (P/F grading only.)—I. Wexler, Rutledge

430. Medicine Clerkship (12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Clerkship is divided into two, four-week blocks, one each at UCDMC and at Kaiser Hospitals. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only.)—I, II, III, IV. Prescott

450. Medicine and the Law (1-3)
Legal and bioethical principles and concepts in medicine. Topics include standard of care, informed consent, reproductive medicine, and end-of-life issues. Not offered every year. (H/P/F grading only.)—I, II, III, IV. Rich

459. Oncology: Research and Treatment of Cancer (2)
Lecture/discussion—2 hours. Prerequisite: second-, third-, or fourth-year medical student and/or consent of instructor. Comprehensive review of current treatment practices of cancer and state-of-the-art re-search impacting treatment and prevention of cancer. Emphasis on epidemiology, molecular biol-

ogy, and pharmacology. (H/P/F grading only.)—I. (I.) DeGreggio

460. Correctional Health Care Clerkship (1-4)
Clinical activity—full time. Prerequisite: fourth-year medical student in good academic standing. Covers Correctional Health delivery and the effects of detention and incarceration on health status. Special emphasis on problems unique to health care delivery in a prison setting. Student will spend time in clinical settings at three prison facilities. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Silva

462. Externship in Medicine (1-21)
Clinical Activity—40 hours. Prerequisite: Medical Sciences 431; demonstrated ability to accept responsibility; consent of instructor. Student assumes role of acting intern and will be primary physician on medical ward under direction of medical resident and staff. Responsibility for patients admitted to acting intern. Teams I–V take call every fifth night. Team VI students assume role of acting intern and will be primary physician on the medical hospitalist service under direct supervision of the hospitalist staff. Responsibility for patients admitted to acting intern with in-hospital daytime call. Emphasis on evidence-based inpatient care. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Meyers

463. Acting Internship in Medicine Intensive Care Unit (MICU) (9)
Clinical activity—full time. Prerequisite: completion of third year in medical school; consent of Director of MICU. At UCDMC, student functions as acting intern on MICU service under direction of medical resident and staff. Responsibility for patients admitted to MICU. On call in hospital every third night. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Albertson

470. Landmark Clinical Trials and Evidence-Based Medicine (3)
Lecture/discussion—10 hours; clinical activity—8 hours. Prerequisite: fourth-year medical student. Ten landmark clinical trials from a historical, clinical, and epidemiological/research perspective. Principals of evidence-based medicine. (H/P/F grading only.)—III. Kravitz, Amsterdam

480. Person Centered Assessment (1)
Lecture—1 hour. Prerequisite: medical student. Person-centered assessment modalities and diagnostic approaches with regards to Internal Medicine and its different subspecialties. (P/F grading only)—I. Fitzgerald

494. Practicum in Community Health Clinics (1-3)
Clinical activity—15-40 hours. Prerequisite: medical student with consent of instructor. Students are assigned to clinical settings that demonstrate ethnic, urban/rural, or other related aspects of clinical community health. Through active participation in health care delivery, students are able to relate conceptual with practical aspects of primary health care. May be repeated for credit. (H/P/F grading only.)—I, II, III. (I, II, III.) Kumagai

497. Medicine, Bioethics and the Holocaust (3)
Lecture/discussion—10 hours. Prerequisite: medical students only, consent of instructor. The concept of "evil" and the role of collaborators, bystanders and participants exemplified by the holocaust and compared to problems physicians face in practice today. Demonstration that evil emerges incrementally until taken for granted. (P/F grading only.) Not offered every year.—I, II, III. Loewy

498. Group Study in Internal Medicine (1-18)
Prerequisite: consent of instructor. Special study for medical students which may involve laboratory or library research, ambulatory or inpatient care responsibility on campus, at UCDMC or off campus by specific arrangement. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

Internal Medicine—Cardiology (CAR)

Upper Division Courses

192. Internship in Cardiology (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in cardiology. May be repeated for credit up to 12 units. (P/NP grading only.)

199. Cardiology Research (1-5)
Prerequisite: consent of instructor. Special study by individual arrangement in cardiovascular medicine. Work will include directed readings, laboratory and discussions. (P/NP grading only.)

Graduate Courses

220. Basic Science in Cardiology (1)
Lecture—1 hour. Prerequisite: graduate or medical student status. Fundamentals underlying cardiovascular medicine. Including hemodynamics, neural control of the circulation, biochemistry and some experimental design and statistics. Experts in each of these fields will give current information in their areas. Offered in alternate years. (S/U grading only.)—III. Kaufman

299. Cardiology Research (2-3.5)
Prerequisite: consent of instructor. Research or special studies. (S/U grading only.)—Bonham, Longhurst

Professional Courses

401. Clinical Cardiology Clerkship: Kaiser (3-18)
Clinical activity (4 weeks)—8-12 hours (hospital); 1-5 hours (clinics). Prerequisite: third- and fourth-year medical students with advance approval by Division of Cardiology. Emphasis placed on history taking and physical examination of pediatric and adult patients with congenital and acquired cardiovascular disease. Hospital rounds in CCU and elsewhere. The roles of ECG, PCG, and cardiac fluoroscopy, etc., in office cardiology will be evaluated. May be repeated for credit. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

460. Cardiology Clinical Clerkship (3-18)
Clinical activity—full time (2-12 weeks). Prerequisite: Internal Medicine 430, third- and fourth-year medical students in good academic standing with consent of instructor. Participation with members of subspecialty consultation service in initial clinical evaluation, work-up, management, and follow-up of patients with cardiologic disorders. Two outpatient clinics per week. May be repeated for credit. Limited enrollment. (H/P/F grading only.)—I, II, III, IV.

461. Management of Coronary Artery Disease: Coronary Care Unit (3-18)
Clinical activity (inpatient service)—full time (4 weeks). Prerequisite: completion of second year of medical school and advance approval by Division of Cardiology. Research in laboratory and exercise testing to be determined by instructor. Current methods of clinical research involving certain aspects of diagnosis and treatment. Includes acute coronary care, hemodynamic monitoring, stress testing, cardiac catheterization, pathologic correlations and the modern approach to therapy, both medical and surgical, based on pathophysiologic mechanisms. May be repeated for credit. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

464. Preventive Cardiology (3-6)
Seminar—2 hours (for 2-4 weeks); clinical activity—full time (2-4 weeks). Prerequisite: completion of third year of medical school. Clinical experience, weekly seminar and reading on primary and secondary prevention of cardiovascular disease. Will be carried out in Lipid and Hypertension Clinics, Exercise Laboratory, Cardiac Care Unit, Cardiac Catheterization, and Cardiac Surgery services. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Amsterdam

480. Insights in Cardiology (1-3)
Clinical activity—3-9 hours. Prerequisite: medical student in good academic standing and approval by Division of Cardiology. Students attend one or more cardiovascular medicine clinics: general, hypertension, arrhythmia. Introduction to the diagnosis/treatment of common cardiovascular problems. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

498. Special Group Study: EKG Unit (1-12)
Special study—2-week sessions. Prerequisite: medical students with advance approval by monthly attending faculty. Special group study in cardiology for medical students in EKG unit. May include lectures, directed reading, and/or discussion groups. May be repeated for credit. Limited enrollment. (H/P/F grading only.)

499. Research (1-12)
Prerequisite: approval by Division of Cardiology. (H/P/F grading only.)

Internal Medicine—Clinical Nutrition and Metabolism (NCM)

Upper Division Course

192. Internship in Clinical Nutrition (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in nutrition. May be repeated for credit up to 12 units. (P/NP grading only.)

Graduate Course

290C. Clinical Nutrition Research Conference (1)
Seminar—1 hour. Weekly seminar presented by a graduate student, taking the form of research completed or in progress, topic review or journal review from current journal. (S/U grading only.)—I, II, III. (I, II, III.) Davis

Professional Courses

461. Nutrition Clinical Clerkship (3-18)
Lecture—2 hours; clinical activity—full time (2 to 12 weeks). In-depth experience in assessment and monitoring of nutritional support of adult patients at UCD Medical Center whose illnesses are complicated by malnutrition, and of patients attending the Nutrition Clinic with problems in under-nutrition due to various illnesses.—I, II, III, IV. (I, II, III, IV.)

480. Insights in Clinical Nutrition (1-3)
Clinical activity—3-9 hours. Prerequisite: student in good standing; consent of instructor. Student will attend weekly clinical nutrition consult rounds (four evenings) and/or Nutrition Clinic (one day). Introduction to diagnosis and treatment of common nutritional problems. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

499. Research in Nutrition (9-18)
Prerequisite: medical student in good standing; consent of instructor. Participation in ongoing clinical or basic nutrition research. Student may devise own project depending upon time commitments.—Halsted, Davis

Internal Medicine—Emergency Medicine (EMR)

Upper Division Courses

192. Emergency Medicine Clinical Research Internship (4)
Internship—8 hours; lecture/discussion—1 hour. Prerequisite: undergraduate student in good academic standing. Clinical research by assisting in identifying and enrolling patients for clinical studies in the Emergency Department. Basic principles of clinical research from directed readings and selected didactic lectures. (P/NP grading only.)—I, II, III. Diercks

Professional Courses

401. Preceptorship in Emergency Medicine (1-4)
Clinical activity—6 hours; tutorial—2 hours. Prerequisite: consent of instructor and completion of first year of medical school. Exposure to the specialty of Emergency Medicine and observation of a wide

array of patients in the Emergency Department. A literature review of an Emergency Medicine topic of interest to the student must be performed and discussed. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Lee

430. Introduction to Medical Toxicology (3)
Independent study—24 hours; lecture/discussion—4 hours; fieldwork—12 hours. Prerequisite: fourth-year medical student with consent of instructor. Student will become familiar with the resources available to manage exposure and poison cases. Hands-on training in the use of Poisindex® computer database. Additional readings from medical literature required. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Bair

440. Emergency Medicine Required Clerkship (6)
Clinical activity—46 hours; lecture/discussion—8 hours. Prerequisite: satisfactory completion of Medicine, Surgery, and Pediatric Clerkship. Student will see patients primarily in the Emergency Department under the supervision of an Emergency Medicine Attending. Emphasis will be on the recognition and management of acute life threats, as well as the treatment of common medical and surgical conditions. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Lee

450. Ambulatory Care Clerkship (6)
Clinical activity—full time (4 weeks). Prerequisite: Medicine, Surgery, and one month of Emergency Medicine Clerkship. Ambulatory care experience in the "fast track" area of the Emergency Department. Exposure to patients with minor illnesses and injuries. Emphasis on wound management and treatment of orthopaedic injuries. (Former course Internal Medicine 440.) (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Lee

465. Acting Internship in Emergency Medicine (6)
Clinical activity—36 hours; lecture/discussion—4 hours. Prerequisite: satisfactory completion of Medicine, Surgery, Pediatric and Emergency Medicine Clerkship. The student will function as an Acting Intern and treat a wide variety of patients and problems under the supervision of the Emergency Medicine Attending. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Lee

499. Research (2-18)
Laboratory—full time (1 to 12 weeks). Prerequisite: consent of instructor. Elective where topics may be selected in either basic or clinical research areas of Emergency and/or Critical Care Medicine. The goals will be tailored to each individual student. Enrollment requires prior discussion and consent of instructor. (H/P/F grading only.) Kupperman

Internal Medicine—Endocrinology and Metabolism (ENM)

Upper Division Course

192. Internship in Endocrinology (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in endocrinology. May be repeated for credit up to 12 units. (P/NP grading only.)

Graduate Course

299. Research (1-12)
Prerequisite: consent of instructor. Endocrinology research. (S/U grading only.)

Professional Courses

460. Endocrinology Clinical Clerkship (3-18)
Clinical activity (inpatient-outpatient service)—full time (3 days per unit). Prerequisite: Internal Medicine 430 and/or consent of instructor. Participation with members of subspecialty service in the initial evaluation, work-up, management and follow-up of patients with endocrinologic disorders. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

480. Insights in Endocrinology (1-3)
Clinical activity—3-9 hours; oral presentation. Prerequisite: student in good academic standing and consent of instructor. First- or second-year students observe in morning Endocrine and Diabetes clinics and attend bi-weekly noon and afternoon endocrine conferences. They also give brief endocrine physiology oral presentation to the endocrine group. (H/P/F grading only).—I, II, III, IV. (I, II, III, IV.)

499. Research (1-12)
Prerequisite: consent of instructor. (H/P/F grading only.)

Internal Medicine—Gastroenterology (GAS)

Upper Division Course

192. Internship in Gastroenterology (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in gastroenterology. May be repeated for credit up to 12 units. (P/NP grading only.)

Graduate Course

299. Research (1-12)
Research in gastroenterology. (S/U grading only.)—Bowlus

Professional Courses

460. Clinical Clerkship (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: completion of third year of medical school. Work-up, manage, and follow-up new patients on active inpatient consulting service. Gastroenterology/Hepatology patients. Daily rounds with attending physician. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

480. Insights in Gastroenterology (1-3)
Clinical activity—3-9 hours. Prerequisite: student in good academic standing and consent of instructor. To gain insight in clinical activities of Gastroenterology Division through attendance at any of the following: endoscopic procedures, ward rounds, outpatient clinic, and G.I. grand rounds. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Leung, Hsu

499. Research (1-12)
Clinical activity—varied. Prerequisite: medical student status; consent of instructor. Part-time participation in active clinical and basic research projects. Some will involve both patient care and relevant laboratory procedures. Basic research includes liver metabolism, cancer markers, porphyrias diet and cancer, folate metabolism. May be repeated for credit. (H/P/F grading only.)—Leung, Bowlus, Pimstone, Prindiville

Internal Medicine—General Medicine (GMD)

Upper Division Course

192. Internship in General Medicine (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in general medicine. May be repeated for credit up to 12 units. (P/NP grading only.)

Graduate Course

291. Seminars in Human Health Services Research and Clinical Epidemiology (1)
Seminar—1 hour. Critical review, evaluation, and discussion of research in health services and clinical epidemiology. Presentation of statistical, epidemiologic, and econometric methods. Students present their own research and critique the work of others. May be repeated for credit. (Same course as Epidemiology 291.) (S/U grading only.)—I, II, III. (I, II, III.)

Professional Courses

460. General Medicine Consults (1-18)
Clinical activity (inpatient-outpatient service)—40 hours. Prerequisite: fourth-year medical students with consent of instructor; a general medicine clerkship. Supervised opportunity to see entire spectrum of medical problems encountered by a general internist. Student spends time in General Medicine Clinic and on the General Medicine Consult Service. Consultation Service is particularly concerned with medical evaluation of surgical patients. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

470. Health Care Ethics (3-9)
Discussion and conference—full time (2-6 weeks). Prerequisite: consent of instructor. Guided independent study of issues in biomedical ethics, with discussion of readings that are based on student interests and needs. Student participation in ethics rounds. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Loewy

480. Insights in General Medicine (1-3)
Clinical activity—one to nine 4-hour sessions; rounds—one to nine 2- to 4-hour sessions. Prerequisite: student in good academic standing and consent of instructor. Student will observe work-up, diagnostic evaluation and management of common general internal medicine problems in ambulatory and inpatient settings; be supevised by attending physician while attending General Medicine Clinic and/or Consult Rounds; and make brief presentations to consult service. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Robbins

485. Introduction to Health Care Ethics (1)
Lecture—10 weeks. Prerequisite: medical student in good standing. Introduction to concepts and methods of healthcare ethics. Emphasis on problems and methods. (H/P/F grading only.)—I. (I.) Loewy

499. General Medicine Research (1-18)
Discussion—3 hours; clinical research—8-40 hours. Prerequisite: consent of instructor. Student will be involved in a clinical research problem within the areas, interest and expertise of members of Division of General Internal Medicine. Alternatively, the research effort will be directed toward investigation of a clinical problem of general medical interest. May be repeated for credit. (H/P/F grading only.)

Internal Medicine—Hematology-Oncology (HON)

Upper Division Course

199. Research in Hematology–Oncology (1-5)
Laboratory—hours variable. Prerequisite: upper division standing and consent of instructor. Experience in laboratory research. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

Graduate Courses

298. Topics in Hematology (1-4)
Prerequisite: one year of graduate work and/or consent of instructor. Basic concepts of the physiology of the hematopoietic organ, the pathophysiology of hematopoietic disease, and concepts of therapeutics will be offered for study. The specific topics to be dictated by the interest and background of the students.

299. Research (1-12)
Prerequisite: consent of instructor. Laboratory investigation contributing to the dissertation for a graduate degree. (S/U grading only.)

Professional Courses

420. Oncology (1)
Lecture—9 hours; discussion—9 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Cancer epidemiology, cancer genetics, and cancer pharacology; the pathophysiologic principles of oncology as they relate to specific common cancers using both lectures and case discussions. (P/F grading only.)—IV. Wisdom, DeGregorio

460. Hematology–Oncology Acting Internship (6-18)
Clinical activity—full time (4-12 weeks). Prerequisite: fourth-year medical student in good academic standing. Acting intern on inpatient hematology/oncology ward service. May be repeated for credit.

Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

461. Hematology–Oncology Consult Clerkship (6-12)
Clinical activity—full time (4-8 weeks). Prerequisite: fourth-year medical student in good academic standing. Student is an integral member of the inpatient hematology and oncology consult service, the bone marrow service, and will attend all conferences sponsored by the Division. May be repeated for credit. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

462. Hematology–Oncology Ambulatory Clerkship (6-18)
Clinical activity (inpatient/outpatient service)—full time (4 weeks). Prerequisite: fourth-year medical student in good academic standing. Outpatient rotations in related clinics. Participation with members of the subspecialty service in the initial clinical evaluation, work-up, management and follow-up of the patient with hematologic or oncologic disorders. May be repeated for credit. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

490. Practicum in Care for the Terminally Ill (3-6)
Clinical activity—full time (2-4 weeks); three 4-hour seminars included. Prerequisite: fourth-year medical student and an interview with Program Medical Director. Work with hospice interdisciplinary team. Direct experience in the care of patients with illnesses where no cure is possible. Emphasis on symptom relief, end of life issues, physician-assisted suicide. Fulfills the Ambulatory Care requirement. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

499. Research (1-12)
Prerequisite: consent of instructor. (H/P/F grading only.)

Internal Medicine—Infectious Diseases (IDI)

Upper Division Courses

141. Infectious Diseases of Humans (1)
Lecture—1 hour. Prerequisite: introductory knowledge in biology and chemistry recommended. Course integrates information on biological and molecular nature of the causative organism, modern diagnostics, treatment and prevention strategies, and the role of infectious diseases in contemporary society and through-out human history. (P/NP grading only.)—I. (I.) Dandeker

192. Research Internship in Internal Medicine (1-12)
Internship—3-36 hours; final report. Supervised work experience in the division of Infectious Diseases. Undergraduates will have an opportunity to acquire research experience in clinical settings. May be repeated for credit up to 12 units. (P/NP grading only.)

199. Infectious Diseases Research (1-5)
Prerequisite: chemistry through organic chemistry (in addition, physical and biochemistry preferred), biology through basic bacteriology (in addition, microbiology and immunology preferred); and consent of instructor. Discrete problem requiring reading and actual manual effort in solution will be assigned to each student. Progress and results will be reviewed at intervals with instructor and via seminar presentation. (P/NP grading only.)

Graduate Courses

211. Epidemiology and Prevention of Infectious Diseases (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Epidemiology 205B, 207 or Internal Medicine 421. Infectious disease epidemiology and prevention, with equal emphasis on human and veterinary diseases. Major categories of infectious diseases by mode of transmission.—III. Flynn, Gibson

299. Research in Infectious Diseases (1-12)
Prerequisite: consent of instructor. Laboratory investigation contributing to the dissertation for a graduate degree. (S/U grading only.)

Professional Courses

440. Introduction to AIDS and Related Disorders (2)
Clinical activity—30 hours; discussion—10 hours. Prerequisite: first- and second-year medical students in good academic standing and consent of instructor. Familiarizes students with the diagnosis and treatment of individuals infected with the human immunodeficiency virus. Students will interview patients, observe patient care and participate in ongoing clinic research as well as examine alternative life styles. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Flynn

450. Clinical and Social Care of the Injection Drug User (1-4)
Lecture—1 hour; clinical activity—3 hours. Prerequisite: first and second year medical students in good academic standing. Lecture and guided clinical practice in a supervised clinical setting, focusing on the social and medical aspects of health care for injection drug users. May be repeated for credit up to 24 units. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

460. Infectious Diseases Clinical Clerkship (3-6)
Clinical activity. Prerequisite: successful completion of two years of study in an accredited medical school. Limited enrollment with priority to fourth-year medical students. Patients ill with infectious diseases, including AIDS, will be evaluated and presented at rounds and case conferences. Patients are also seen in the Infectious Diseases Clinic. Instruction in clinical microbiology and the proper use of the laboratory will be provided. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

499. Research Topics in Infectious Disease (2-12)
Prerequisite: successful completion of the first year of study in School of Medicine, graduate students (approved for graduate credit), and/or consent of instructor. Discrete problem requiring reading and actual manual effort in solution will be assigned to each student. Progress and results to be reviewed at intervals with instructor and via seminar presentation. (H/P/F grading only.)

Internal Medicine—Nephrology (NEP)

Upper Division Course

192. Internship in Nephrology (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in nephrology. May be repeated for credit up to 12 units. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.)

Graduate Courses

299. Nephrology Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

460. Nephrology and Fluid Balance (3-6)
Clinical activity—full time. Prerequisite: completion of third year of medical school; consent of instructor. Active participation in all inpatient/outpatient clinical activities, attendance at specific lectures and conferences at UCD Medical Center covering the field of nephrology and fluid-electrolyte disorders. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

499. Research in Nephrology (3-18)
Prerequisite: individual arrangement and consent of instructor. Independent laboratory research on a specific problem related to biochemical or immunologic causes of renal disease and/or uremic disorders in humans or animals. (H/P/F grading only.)—Kaysen

Internal Medicine—Pulmonary Medicine (PUL)

Upper Division Course

192. Internship in Pulmonary Medicine (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in pulmonary medicine. May be repeated for credit up to 12 units. (P/NP grading only.)

Graduate Courses

299. Pulmonary Disease Research (1-12)
Laboratory. Prerequisite: by arrangement only. Pulmonary disease research activity with focus in inhalation toxicity, oxidants or lung biochemistry, and cell and molecular biology. (S/U grading only.)—Cross

Professional Courses

460. Pulmonary and Critical Care Medicine Clinical Clerkship (6-18)
Clinical activity—full time (4-12 weeks). Prerequisite: Medical Sciences 431. At UCD Medical Center participating and rounding with Pulmonary/Critical Care Medicine fellows and consultation staff. Also includes pulmonary function test interpretation, outpatient assignments in outpatient clinic and preparation and presentation of material at weekly conferences. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

462. Pulmonary Clinical Clerkship (3-12)
Clinical activity—full time (2-8 weeks). Prerequisite: completion of second year of medical school and/or consent of instructor. Participation at the Sacramento VA clinic with members of the subspecialty service in initial clinical evaluation, workup, management, and follow-up of patients with pulmonary disorders. Includes experience in Pulmonary Function Laboratory, and pulmonary diagnostic processes. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Bonekat

480. Pulmonary-Critical Care Medicine Insights (1-3)
Clinical activity—3-9 hours. Prerequisite: student in good academic standing and consent of instructor. Student will attend respiratory outpatient clinics and in-patient pulmonary consultation rounds and medical intensive care rounds. Introduction to diagnosis and treatment of common pulmonary problems. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Albertson

499. Research (1-12)
Prerequisite: consent of instructor. (H/P/F grading only.)

Internal Medicine—Rheumatology-Allergy (RAL)

Lower Division Course

99. Directed Research in Immunology (1-5)
Laboratory. Prerequisite: consent of instructor. Independent research will be encouraged in basic immunology, including the role of the cellular immune system in oncogenesis. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) Gershwin

Upper Division Courses

192. Internship in Rheumatology-Allergy (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in rheumatology-allergy. May be repeated for credit up to 12 units. (P/NP grading only.)

199. Directed Research in Immunology (1-5)
Laboratory. Prerequisite: consent of instructor. Independent research will be encouraged in basic immunology, including the role of the cellular immune system in oncogenesis. (P/NP grading only.)—Gershwin

Graduate Courses

298. Topics in Rheumatology and Clinical Immunology (1-5)
Laboratory. Prerequisite: consent of instructor. Library and/or laboratory work as required. (S/U grading only.)—Gershwin

299. Research in Autoimmune Disease (1-12)
Laboratory. Prerequisite: consent of instructor. Independent research will be encouraged in both animal models of human disease (including congenitally athymic [nude], asplenic, and New Zealand mice) and the cellular immune system of patients with systemic lupus erythematosus, Sjögren's syndrome, polymyositis and drug hypersensitivity. (S/U grading only.)—Gershwin

Professional Courses

460. Rheumatology Clinical Clerkship (1-18)
Clinical activity (inpatient-outpatient service)—full time. Prerequisite: Medical Sciences 431 and consent of instructor. Participation with members of the subspecialty service in the diagnosis and therapeutic management of patients with rheumatologic diseases. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

461. Allergy Clinical Clerkship (3-18)
Clinical activity (inpatient-outpatient service)—full time (2 to 12 weeks). Prerequisite: completion of second year of medical school and consent of instructor. Student will work with practicing allergist in daily work with patients and participate in weekly allergy clinic and teaching conferences. Study of the literature. Will see patients with problems in clinical immunology, immunodeficiency, asthma, allergic rhinitis. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

480. Insights in Rheumatology (1-3)
Clinical activity—3–9 hours. Prerequisite: student in good academic standing and consent of instructor. Participation in rheumatology consultation rounds, rheumatic disease clinics and conferences with supervised readings in rheumatology. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Leek

499. Research (1-12)
Prerequisite: medical student with consent of instructor. Part-time participation in active clinical and basic research projects which can involve both patient care and relevant laboratory procedures. Students can gain experience in clinical medicine and clinical investigation. (H/P/F grading only.)

Medical Microbiology (MMI)

Lower Division Courses

10. Parasitic Disease in Humans (2)
Seminar—2 hours. Introduction to parasitic diseases in humans, including relationships between humans and parasites, symptoms, diagnosis, geographical distribution, treatment and prevention of parasitic disease. Not offered every year. (P/NP grading only).—Theis

Upper Division Courses

115. Ecological Parasitology (3)
Lecture—3 hours. Parasitism as a life style is explored from the ecological point of view, illustrating the way parasites utilize biotic habitats and the influence climate, geography, behavior, cultural change and alteration of habitat can have on the distribution and prevalence of parasites.—II. (II.) Theis

116. Parasitology for Wildlife Biologists (3)
Lecture—3 hours. Prerequisite: upper division standing or consent of instructor. Emphasis on the role infectious diseases play in wildlife dynamics. Lectures and demonstrations on techniques and methods for examining wild animals for evidence of infectious diseases, methods used in preserving and identifying parasites of wildlife, as well as what is known about their pathogenesis.—III. (III.) Theis

130. Medical Mycology (2)
Lecture—2 hours. Prerequisite: a course in pathogenic microbiology and consent of instructor. Various aspects of pathogenic fungi, particularly affecting humans, will be discussed including epidemiology, pathogenesis and pathology, diagnosis and therapy. Offered in alternate years. (Same course as 430.)—II. Pappgianis

188. Human Immunology (3)
Lecture—3 hours. Prerequisite: undergraduate level introductory biology course. Human immune system and mechanisms of immunity. Basic components and function of immune system. Molecular basis of immune response; basic cellular and molecular mechanisms. Interactions between cells of immune system producing immune responses; regulating molecules.—III. (III.) Torres

192. Internship in Medical Microbiology (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in medical microbiology and related fields. (P/NP grading only.)

198. Group Study in Medical Microbiology (1-5)
Prerequisite: upper division standing and consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (P/NP grading only.)

199. Research in Medical Microbiology (1-5)
Prerequisite: upper division standing and consent of instructor. Individual research. (P/NP grading only.)

Graduate Courses

200D. Mechanisms for Microbial Interactions with Hosts (3)
Lecture/discussion—3 hours. Prerequisite: Microbiology 200A or consent of instructor. Study of mechanisms involved in microbial interactions within a host environment. The following principles are basic to understanding these interactions: host recognition, invasion, competition and growth, and host defense.—II. (II.) Beaman

209. Current Immunology (2)
Discussion—2 hours. Prerequisite: consent of instructor. Current developments in various aspects of immunology and their interrelationships. May be repeated for credit. (Same course as 409.) (S/U grading only.)—II, III. (I, II, III.) Van de Water

215. Medical Parasitology (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: graduate student with consent of instructor. Epidemiological, pathogenesis, diagnostic methods and laboratory studies of protozoa, helminths and arthropods of medical importance. Offered in alternate years. (Same course as 415.)—I. Theis

220. Current Concepts in Bacterial Ultrastructure (2)
Discussion—2 hours; student presentations; term paper. Prerequisite: Microbiology 105 or consent of instructor. Critical evaluation of current literature dealing with all aspects of bacterial ultrastructure. Discussion of selected and assigned reading and formal student presentations of assigned topics.—III. (III.) Beaman

280. Molecular Pathobiology for Diagnosis and Therapy of Human and Animal Diseases (3)
Lecture—3 hours. Prerequisite: graduate standing. Molecular pathobiology of phenotypes caused by human hereditary diseases and viruses. Emphasis on molecular diagnostics at cellular/tissue level, and therapy including vaccines and gene transfer using recombinant DNA technology. Not open for credit to students who have completed Internal Medicine: Infectious Diseases 280. Offered in alternate years.—(III.) Dandekar

298. Group Study in Medical Microbiology and Immunology (1-5)
Prerequisite: consent of instructor; open to graduate students. Directed reading and discussion and/or laboratory investigation on selected topics. (Sections 1, 2, 4, 5: S/U grading only.)

299. Research (1-12)
Prerequisite: consent of instructor; open to graduate students. Laboratory investigation contributing to the dissertation for a graduate degree. (S/U grading only.)

Professional Courses

409. Current Immunology (2)
Discussion—2 hours. Prerequisite: consent of instructor. Current developments in various aspects of immunology and their interrelationships. (Same course as 209.) May be repeated for credit. (H/P/F grading only.)—II, III. (I, II, III.)

410. Physician Scientist Molecular Medicine Journal Club (1)
Lecture—1 hour. Weekly seminars by students on research articles in current literature. Topics/articles to be selected by instructors to include a broad range of frontiers in biomedical literature. May be repeated for credit. (H/P/F grading only.)—I. (I.) Bevins

415. Medical Parasitology (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: medical student with consent of instructor. Approved for graduate degree credit. Epidemiological, pathogenesis, diagnostic methods and laboratory studies of protozoa, helminths and arthropods of medical importance. Offered in alternate years. (Same course as 215.) (H/P/F grading only.)—I. Theis

420. Current Concepts in Bacterial Ultrastructure (2)
Discussion—2 hours; formal presentation or term paper. Prerequisite: medical students with consent of instructor. Evaluation of current status of bacterial ultrastructure with an emphasis on host-parasite interactions through discussions and assigned readings. (H/P/F grading only.)—III. (III.) Beaman

430. Medical Mycology (2)
Lecture—2 hours. Prerequisite: a course in pathogenic microbiology and consent of instructor. Various aspects of pathogenic fungi, particularly affecting humans, will be discussed including epidemiology, pathogenesis and pathology, diagnosis and therapy. Offered in alternate years. (Same course as 130.) (H/P/F grading only.)—II. Pappagianis

480A. Medical Immunology (2)
Lecture—4 hours. Prerequisite: approval of Committee on Student Progress. Structure and function of the molecules, cells and tissues involved in immunity, and their interactions in health and disease. (P/F grading only.)—III. (III.)

480B. Pathogenic Microbiology (3.5)
Lecture—4 hours; laboratory—3 hours. Prerequisite: approval of the School of Medicine Committee on Student Progress. The biology of pathogenic microorganisms with emphasis on their role in human disease. May be repeated for credit. (P/F grading only.)—IV. Beaman

480C. Pathogenic Microbiology (2)
Lecture/laboratory—5 hours. Prerequisite: approval of the School of Medicine Committee on Student Progress. The biology of pathogenic microorganisms with emphasis on their role in human disease. (P/F grading only).—I. Dandekar

497T. Tutoring in Medical Microbiology (1-5)
Tutoring—3-15 hours. Prerequisite: appropriate preparation in subject matter and consent of instructor. Assist instructor by tutoring medical students in one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/P/F grading only.)

498. Group Study in Medical Microbiology and Immunology (1-5)
Prerequisite: medical students with consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (H/P/F grading only.)

499. Research (1-12)
Prerequisite: medical students with consent of instructor. (H/P/F grading only.)

Master of Public Health (MPH)

Graduate Course

210. Public Health Informatics (1)
Lecture—2 hours. Collection, verification, and utilization of data related to populations; infrastructure, functions, and tools used to generate public health

knowledge supporting public health practices and policy development/dissemination. (S/U grading only.)—Hogarth, Doebbert

Medical Pharmacology and Toxicology (PHA)

Lower Division Courses

92. Internship in Pharmacology (1-12)
Internship—3-36 hours; final report. Prerequisite: lower division student with good academic standing; approval of project prior to period of internship. Supervised work experience in pharmacology and related fields. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: lower division standing. (P/NP grading only.)

Upper Division Courses

192. Internship in Pharmacology (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in pharmacology and related fields. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200A. Advanced General Pharmacology (3)
Lecture—3 hours. Prerequisite: upper division courses in biochemistry (101A-101B) and mammalian physiology (111A-111B and 112-113) or the equivalent (may be taken concurrently). Core course in human pharmacology designed for graduate and medical students. Principles in pharmacology, including pharmacokinetics and drug metabolism and the actions, use and toxicity of the major classes of drugs.—I. (I.)

200B. Advanced General Pharmacology (4)
Lecture—4 hours. Prerequisite: upper division courses in biochemistry (101A-101B) and mammalian physiology (111A-111B and 112-113) or the equivalent (may be taken concurrently). Core course in human pharmacology designed for graduate and medical students. The actions, use and toxicity of major classes of drugs. Continuation of course 200A.—II. (II.)

206. Pharmacokinetics (2)
Lecture—2 hours. Prerequisite: courses 200A, 200B. Physiochemical and physiological factors affecting absorption, distribution, metabolism and excretion of drugs. Mathematical and graphical methods for determining pharmacokinetic parameters. Calculation of dose regimens. Offered in alternate years.—(I.) Henderson

298. Group Study (1-5)
Prerequisite: consent of instructor.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

400A. Pharmacology (2)
Lecture—18 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Principles in pharmacology, including pharmacokinetics, drug metabolism and the actions, uses and toxicities of the major classes of drugs. (Deferred grading only, pending completion of sequence. P/F grading only.)—IV. Fischer

400B. Pharmacology (1.5)
Lecture—22 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Principles in pharmacology, including autonomic pharmacology, endocrine pharmacology, general anesthetics, GI drugs, substance abuse and general toxicology. (Deferred grading only, pending completion of sequence. P/F grading only.)—I. Fischer

400C. Pharmacology (2.5)
Lecture—23 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Principles in pharmacology, including pharmacokinetics, drug metabolism and the actions, uses and toxicities of the major classes of drugs. (P/F grading only.)—II. Fischer, Albertson

445. Introduction to Integrative Medicine (1)
Lecture/discussion—1 hour. Prerequisite: medical student in good standing. Basic principles of alternative medical systems (e.g., traditional Chinese, Ayurvedic, Tibetan), alternative practices (e.g., chiropractic, osteopathy, naturopathy, homeopathy, herbalism, guided imagery/meditation, massage therapy), and mind/body connection are presented as introduction to integrating alternative treatments into traditional medicinal practice. (H/P/F grading only.)—II. (II.) Harkey

490. Seminar in Pharmacology for Medical Students (1)
Seminar—1 hour. Prerequisite: consent of instructor. Seminar in pharmacology for medical students. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

497T. Tutoring in Pharmacology (1-5)
Tutoring—3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/P/F grading only.)

498. Special Study for Medical Students (1-5)
Lecture, directed reading, and/or discussion groups—3-15 hours. Prerequisite: consent of instructor. Special study in pharmacology for medical students. (H/P/F grading only.)

499. Directed Research for Medical Students (1-12)
Laboratory—3-36 hours. Prerequisite: consent of instructor. Directed research in pharmacology for medical students. (H/P/F grading only.)

Nephrology (NEP)

Professional Courses

460. Nephrology and Fluid Balance (3-6)
Clinical activity—4 hours; lecture/discussion—10 hours. Prerequisite: completion of 3rd year medical school and medicine core clerkship, consent of instructor. Active participation in all inpatient/outpatient clinical activities, attendance at specific lectures and conferences at UCD Medical Center covering the field of nephrology and fluid-electrolyte disorders. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. Kaysen

Neurology (NEU)

Upper Division Course

199. Individual Special Study and Research (1-4)
Prerequisite: consent of instructor. Individual special study in neurophysiology and biomedical engineering is offered to qualified students. Studies on psychophysics, single-unit electrophysiology and instrumentation are offered in Davis. (P/NP grading only.)

Graduate Courses

201. Human Behavioral Neurobiology (2)
Lecture/discussion—2 hours. Prerequisite: Cell Biology and Human Anatomy 203; Psychology 108 or 136. Neurobiology of normal and abnormal behavior of humans, based on specific neuroanatomical, neurophysiological, and cognitive parameters. Evaluation of these parameters will be, for example, by application of clinical neurologic, neuropsychologic, and neuroimaging tests.—I. (I.)

202. Visuomotor Neurobiology (2)
Seminar—2 hours. Prerequisite: course 201, Cell Biology and Human Anatomy 203. An overview of neural mechanisms of visually guided behavior in humans will examine the integration of visual attention and eye movements. Performance of normal humans and neurologic patients in reflexive orienting, visual search, reading and reaching will be considered. Offered in alternate years.—(III.)

290. Seminar in Selected Topics (1)
Seminar—1 hour. Prerequisite: consent of instructor. Selected topics in Neuroscience will be offered. (S/U grading only.)—Gorin

298. Group Study (1-5)
Prerequisite: consent of instructor. For graduate students desiring to explore particular topics in depth. Lectures and conferences may be involved. (S/U grading only.)

299. Individual Special Study and Research (1-12)
Laboratory—3-36 hours. Prerequisite: consent of instructor. Individual special study and research in Neurophysiology and Biomedical engineering is offered at both Davis and Sacramento Medical Center. (S/U grading only.)

Professional Courses

420. Clinical Neurosciences (3)
Lecture/discussion—5 hours; lecture—4 hours. Prerequisite: approval of Committee on Student Progress. Pathophysiology underlying neurological disorders, including disorders of development, muscle, nerve, cerebral circulation, metabolism, myelin, cortical function, movement, cerebrospinal fluid, autonomic function and special senses. Anatomical basis of clinical testing, nervous system infection, neoplasia and trauma. (P/F grading only.)—II.

450. Clinical Neurology Clerkship (6)
Clinical activity—24 hours; conference—12 hours; seminar—4 hours; independent study—10 hours. Prerequisite: fourth-year medical student or third-year medical student with consent of instructor. Critical elements of neurological clinical skills (history & exam) and basic and clinical neurological concepts expected for general residency preparation. Active, didactic, experiential and independent learning to encourage maturation of general professional competencies. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Bowe

451. Clinical Neurology Clerkship (3-6)
Clinical activity—full time (2-4 weeks at Highland General Hospital, Oakland). Prerequisite: fourth-year medical student. Essentials of detailed neurological examination and principles of differential neurological diagnosis. Emphasis on common neurological disorders en-countered in practice. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

452. Advanced Clinical Neurology (6)
Clinical activity—full time (4 weeks). Prerequisite: completion of four-week Neurology selective and consent of instructor. Extension of basic Neurology clerkship. Designed for students with special interest in medical disorders of nervous system. By arrangement with department, student may serve as an acting intern. Principles of neurological differential diagnosis and therapeutics emphasized. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

453. Advanced Clinical Neurology (6)
Clinical activity—full time (4 weeks at Highland General Hospital, Oakland). Prerequisite: completion of four-week Neurology selective and consent of instructor. Extension of basic Neurology clerkship. Designed for students with special interest in medical disorders of the nervous system. By arrangement with department, student may serve as an acting intern. Principles of neurological differential diagnosis and therapeutics emphasized. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

454. Electroencephalography and Evoked Potentials (3-18)
Clinical activity—full time (2-12 weeks) technique and interpretation. Prerequisite: four-week Neurology clerkship and consent of instructor. Principles of electroencephalographic diagnosis including technical basis of electroencephalography and evoked potentials. Emphasis placed on how these studies

are applied to neurological diagnosis. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Gabor, Seyal

455. Child Neurology (6)
Clinical activity—full time (4 weeks). Prerequisite: satisfactory completion of Internal Medicine 430, Obstetrics and Gynecology 430, Pediatrics 430 and consent of instructor. Student exposed to children with disorders of the nervous system, both in outpatient and inpatient services. Cases presented to a member of full-time faculty who will discuss clinical findings, differential diagnosis, management and therapy. This course satisfies the fourth year neuroscience requirement. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

456. Cortical Neurology (3-18)
Clinical neurological research—full time (12 weeks at Highland General Hospital, Oakland). Prerequisite: course 451 or the equivalent; consent of instructor. Student will pursue a small project in clinical neurologic research on higher cortical functions. The focus is on scientific analysis of behavior in disease states. Study may be arranged for from two weeks to twelve weeks, with units corresponding to length of course. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Remler, Knight

457. Special Topics in Neurology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: course 450, 451 or consent of instructor. Students study areas of special interest in tutorial manner under supervision of member of faculty with expertise and interest in elected field. Students may elect tutorial clinical experience with member of staff. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

458. Introduction to Cognitive and Communication Disorders (3)
Lecture—3 hours; observations, individual projects. Prerequisite: consent of instructor. Introduction to cognitive and communication disorders. Includes a survey of disorders subsequent to brain damage; management by neurology, neuropsychology, and speech pathology; and current research on appraisal, diagnosis, and treatment. (H/P/F grading only.)—I. (I.) Dronkers

459. Independent Study in Neurogenic Communication Disorders (1-3)
Conference, observation and data collection—3-9 hours. Prerequisite: consent of instructor. Independent study of neurogenic communication disorders—aphasia, dementia, apraxia of speech, dysarthria. Designed for individual interest and includes discussion, directed reading, research design, data collection, and preparation of results. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Dronkers

464. Clinical Neurology (3-18)
Clinical activity—full time (minimum of one-half quarter). Prerequisite: fourth-year medical student or third-year medical student with completion of a medical clerkship; consent of Chairperson. Clerkship in neurology to be arranged at another institution with accredited residency programs in neurology under proper supervision. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Bowe

468. Special Clinical Elective in Neurology (6-18)
Clinical activity—full time (4 to 12 weeks). Prerequisite: fourth-year medical student or third-year medical student with clerkship in medicine and pediatrics. Emphasis will be on mastering the neurologic examination and on introduction to neurologic evaluation, diagnosis and therapy. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

480. Insights in Neurology (1-3)
Discussion—3 hours; clinical activity—3 to 9 hours. Prerequisite: student in good academic standing; consent of instructor. Attendance at neurology grand rounds and regular rounds following. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

498NE. Group Study in Neurology (1-6)
Prerequisite: medical students with consent of instructor. Directed readings and discussions with a comprehensive written examination at the end of course. (P/F grading only.)—I, II, III, IV.

499. Research (1-12)
Laboratory—2-24 hours. Prerequisite: consent of instructor. Approved for graduate degree credit. Laboratory investigation on selected topics. (H/P/F grading only for graduate and medical students.)

Neurosurgery (NSU)

Upper Division Course

199. Special Study in Neurosurgery for Advanced Undergraduates (1-5)
Prerequisite: advanced undergraduate standing with consent of instructor. Students may participate in ongoing neurosurgical projects or may pursue and design independent projects. (P/NP grading only.)

Graduate Course

299. Neurosurgery Research (3-12)
Prerequisite: graduate student with consent of instructor. Student may participate in ongoing neurosurgical projects or may pursue and design independent projects. (S/U grading only.)

Professional Courses

451. Neurosurgical Critical Care Clerkship (3)
Clinical activity—full time (2 weeks). Prerequisite: third- or fourth-year medical student having completed a neurosurgical clerkship or consent of instructor. Students participate in the care of neurosurgical patients in the NSICU and in the admission and surgical management of patients admitted through the Emergency Room. (H/P/F grading only.)—I, II, III. (I, II, III.)

455. Clinical Pediatric Neurosurgery (6)
Clinical activity—full time (4 weeks). Prerequisite: third- or fourth-year medical students who have satisfactorily completed course 460; consent of instructor. Admission and follow-up of pediatric patients. Neurological history, examination, and diagnostic procedures are emphasized. Students will participate in surgical procedures and are required to attend all pediatric neurosurgery conferences. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Pang

460. Clinical Neurosurgery (6-18)
Clinical activity—full time (3 days per unit; 4 weeks minimum). Prerequisite: third- and fourth-year medical students; consent of instructor. Approved for graduate degree credit. Admission and follow-up of patients. Neurological history, examination and further diagnostic procedures emphasized. Students participate in meaningful aspects of surgical procedures and attend listed conferences, rounds, and seminars. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

464. Externship (6-18)
Clinical activity—full time (4-12 weeks). Prerequisite: fourth-year medical student having completed a neurosurgical clerkship or consent of instructor. Clerkship in neurosurgery to be arranged at another institution with accredited residency program in neurosurgery under proper supervision. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

470. Advanced Clinical Neurosurgery (6-18)
Clinical activity—full time (4-12 weeks). Prerequisite: fourth-year medical student in good academic standing. Student will function as acting intern on neurosurgery service. Admission and management of patients. Neurological history, examination, diagnostic procedures, and surgical management are emphasized. Students participate in meaningful aspects of surgical procedures and attend required conferences and rounds. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

480. Insights in Neurosurgery (1-3)
Clinical activity—3 to 9 hours. Prerequisite: first- and second-year medical students in good academic standing; consent of instructor. Observation of neurosurgical care in emergency room, operating room and hospital floors, including manner of treatment of a variety of chronic and acute neurological diseases. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

499. Neurosurgery Research (1-18)
Prerequisite: medical student with consent of instructor. Student may participate in ongoing neurosurgical projects or may pursue and design independent projects. (H/P/F grading only.)

Obstetrics and Gynecology (OBG)

Upper Division Courses

190. Seminar in Early Mammalian Development (1)
Seminar—1 hour; short paper. Prerequisite: Zoology 100 or the equivalent. Each student will present paper from the recent scientific literature on various research topics in early mammalian development. Short paper will be required at the end of course.—I, II, III. (I, II, III.)

192. Shifa Clinic/Student Volunteer (1)
Conference—2 hours; clinical activity—6-8 hours; discussion—1-2 hours. Supervised work experience in obstetrics and gynecology. May be repeated up to 3 times for credit. (P/NP grading only.)—I, II, III, IV. (I, II, III, IV.) Yasmeen

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

220. Genetics of Reproduction (3)
Lecture/discussion—3 hours. Introduction to genetics of mammalian reproduction for domestic species, species used in research, and the human. Mendelian and non-Mendelian modes of inheritance. Research paper. Offered in alternate years.—II. (II.) Wiley

290. Current Topics in Research (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Selected topics in reproductive biology. (S/U grading only.)—I, II, III, IV. (I, II, III, IV)

291. Seminar in Early Mammalian Development (1)
Seminar—1 hour. Each student will be asked to present a paper from the recent scientific literature on various research topics in early mammalian development. Short paper will be required at the end of course.—I, II, III, IV. (I, II, III, IV.) Wiley

298. Group Study (1-5)
Prerequisite: graduate standing; consent of instructor.—Overstreet

299. Research (1-12)
Prerequisite: graduate standing; consent of instructor. (S/U grading only.)—Overstreet

Professional Courses

420. Genetics and Reproduction (2)
Lecture—20 hours; conference—4 hours. Prerequisite: Endocrinology. Introduction to medical genetics and the clinical consequences of genetic abnormalities. Aspects of reproduction including gametogenesis, development of the conceptus, maternal adaptation to pregnancy, labor and delivery and menopause. (P/F grading only.)—IV.

430. Obstetrics and Gynecology Clerkship (12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Obstetrics, gynecologic and gynecological oncology experience in the delivery room, operating room, clinics and wards at UCDMC and affiliated sites. Rounds, conferences, interactive student presentations and seminars ongoing. (H/P/F grading only.)—I, II, III, IV. Ciotti

465. Elective Clerkship (4-18)
Clinical activity—full time (3 days per unit). Prerequisite: third- and fourth-year medical student; course 430 or the equivalent; consent of instructor. Active participation in inpatient and outpatient care.

Attendance at specified conferences; student-faculty member informal conferences. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Birdsong

470. Acting Internship in Obstetrics and Gynecology (6-8)
Clinical activity—full time (4-6 weeks). Prerequisite: third- and fourth-year medical students who have completed course 430; consent of instructor. Student will perform as intern and expect the following experience: Obstetrics and Gynecology, 2 weeks each; perform inpatient care; be on call every third night; attend scheduled conferences one half-day per week. Round daily with attending. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Leiserowitz

471. Ambulatory Gynecology and Obstetrics (6-8)
Clinical activity—full time (4-6 weeks). Prerequisite: third- and fourth-year medical students who have completed course 430; consent of instructor. Student to participate in following clinics each week: General Gynecology, New and Return Obstetrics, Post-Partum, High-Risk Obstetrics, Pre-Operative Clinic, other specialty clinics as assigned. Student will conduct examinations, present patients to staff and will be able to discuss treatment regimens. Night call in Labor and Delivery Suite every third night. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

480. The Birthing Process (1)
Lecture/discussion—1 hour. Open only to UC Davis medical students. Training to assist in the birthing process as a Doula. Topics not covered in the summer course. (S/U grading only.)—I. Towner

494. Shifa Clinic (1-6)
Clinical activity—8 hours; lecture—1-2 hours; project—1-2 hours; discussion—1 hour. Prerequisite: medical student in good standing. Interaction with patients from multiple ethnic and cultural backgrounds under the direct supervision of a physician/preceptor. Women's health issues and primary care issues in a diversely mixed population. May be repeated up to 3 times for credit. (P/F grading only.)—I, II, III, IV. Yasmeen

499. Research in Obstetrics and Gynecology (4-18)
Prerequisite: medical student with consent of instructor. Student will pursue a research problem of her/his own choosing, selected with help of the faculty. Integration with ongoing faculty research projects recommended. (H/P/F grading only.)

Ophthalmology (OPT)

Upper Division Courses

192. Research Internship (1-12)
Internship—3-36 hours. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in ophthalmology research. Research staff in Ophthalmology have programs in cell biology, electron microscopy, biochemistry, immunology and visual psychophysics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Course

299. Basic Research in Visual Science (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

440. Ophthalmology Required Clerkship (3)
Clinical activity—full time (2 weeks). Prerequisite: consent by Committee on Student Evaluation and Promotion. Fundamental knowledge of ophthalmic diagnosis and principles; basic ophthalmic instruments ; understanding of treatment for eye problems manageable by a primary care physician; knowledge of what patients should be referred for ophthalmic care. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) J. Brandt

442. Ophthalmology Clerkship (3)
Clinical activity—40 hours. Prerequisite: fourth-year medical student or third-year medical student with completed clerkships in medicine and surgery and consent of instructor and adviser. Ocular disease diagnosis and management relevant to the clinical practice of future primary care physicians and others. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

461. Basic Clinical Ophthalmology (4.5)
Clinical activity—to be arranged (2 weeks). Prerequisite: medical students who have completed either Medical Sciences 430 or course 440 (in third or fourth year); consent of instructor. Provides an acquaintance with the fundamentals of routine clinical ophthalmology. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) J. Brandt

465. Advanced Subspecialty Ophthalmology (6 or 9)
Clinical activity—to be arranged (4 weeks off campus or 6 weeks at UCD Medical Center). Prerequisite: medical students who have completed Internal Medicine 430 (in third or fourth year); consent of instructor. Participation in disciplines of neuro-ophthalmology/pediatric ophthalmology, diseases of the cornea and external eye, glaucoma and retina. Rotations at UCD Medical Center may be arranged in 6-week units of one service alone, or in combination, as arranged with instructors. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Mannis, Keltner, J. Brandt

480. Insights in Ophthalmology (1-3)
Clinical activity—3 to 9 hours. Prerequisite: first- and second-year medical students in good academic standing; consent of instructor. Clinical exposure in ophthalmology including slide-tape program, patient exposure, and department conferences (i.e., grand rounds and subspecialty conference). (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

498. Group Study (1-3)
Prerequisite: medical students with consent of instructor. Directed reading and discussion. (H/P/F grading only.)

499. Research in Ophthalmology (1-12)
To be arranged—3-36 hours. Prerequisite: medical students with consent of instructor. Individual re-search on selected topics in optics and visual physiology, cornea and external disease. (H/P/F grading only.)

Orthopaedic Surgery (OSU)

Lower Division Course

99. Special Studies for Undergraduates (1-4)
Prerequisite: lower division standing and consent of instructor. (P/NP grading only.)

Upper Division Course

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)

Professional Courses

421. The Musculoskeletal System (2.5)
Lecture/discussion—6 hours. Prerequisite: consent of Committee on Student Progress. Basic and clinical science of orthopaedic surgery and rheumatology. (P/F grading only.)—I. Martin

428. Ambulatory and Emergency Room Orthopaedics (3-6)
Clinical activity—full time (2-4 weeks). Prerequisite: 4th-year medical student in good academic standing and consent of instructor. Introduction to general orthopaedic problems and trauma and their management in an outpatient environment, including the emergency room. Student will conduct orthopaedic examinations, present patients to staff rotating through trauma, hand, pediatrics, adult and foot clinics. Orthopaedic physical examination and interpretation of x-rays. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Moehring

462. Community Preceptorship (3-6)
Clinical activity—full time (2-4 weeks). Prerequisite: fourth-year medical student in good academic standing with consent of instructor. Acquaints student with private practice of orthopaedics in the community setting. Opportunity to observe and assist private practitioners in office, emergency room, operating room and inpatient environment. Student must provide own transportation. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Pinney

464. Acting Internship (6)
Clinical activity—full time (4 weeks). Prerequisite: fourth-year medical student in good academic standing and consent of instructor. Rotation designed to increase basic knowledge of musculoskeletal abnormalities at clinical level. Attention focused on selective case material. For those students who demonstrate proficiency, responsibility will be similar to that of intern. Limited enrollment. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Pinney

480. Insights in Orthopaedic Surgery (1-3)
Clinical activity—3-9 hours. Prerequisite: first- and second-year medical students in good academic standing; consent of instructor. Exposure to aims, methods and procedures in orthopaedic surgery via attendance at grand rounds, patient care conferences, and group discussions. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Szabo

481. History of Medicine for Medical Students (1.5)
Lecture/discussion—2.5 hours (for six weeks). Prerequisite: third- or fourth-year students in the School of Medicine or second-year students with consent of instructor. Overview of the history of medicine throughout the world to introduce medical students to landmark accomplishments and key figures in the development of health care and to provide an expanded philosophical perspective on the ever-changing field of modern medicine. (H/P/F grading only.)—I. (I.) Benson

499. Orthopaedics Research (1-12)
Clinical activity—3 hours to full time (to be arranged with individual faculty). Prerequisite: third- or fourth-year medical student in good academic standing; consent of instructor. Laboratory or clinical investigation on selected topics. May be repeated for credit. (H/P/F grading only.)

Otolaryngology (OTO)

Lower Division Courses

192. Internship in Otolaryngology (1-12)
Internship—3 to 36 hours. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in otolaryngology and related fields. Final project report. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study in Otolaryngology for Advanced Undergraduates (1-5)
Prerequisite: advanced undergraduate with consent of instructor. (P/NP grading only.)

Graduate Courses

290C. Research Conference in Otolaryngology (1)
Lecture/discussion—1 hour. Prerequisite: graduate students; medical students; advanced undergraduates with consent of instructor. Presentation and discussion of faculty and student research in otolaryngology. (S/U grading only.)—I, II. (I, II.)

291. Principles of Speech, Hearing and Equilibrium (3)
Lecture/discussion—3 hours. Prerequisite: graduate students; medical students; advanced undergraduates with consent of instructor. Presentations by faculty and guest lecturers on anatomy, physiology, and behaviors involved in speech production, hearing, and equilibrium. Each student will be expected to make one class presentation.—II. (II.)

298. Group Study (1-5)
(S/U grading only.)

299. Individual Study in Otolaryngology for Advanced Graduate Students (1-12)
Prerequisite: advanced graduate student with consent of instructor. (S/U grading only.)

Professional Courses

401. Clinical Examinations in Otolaryngology (1)
Lecture—1 hour; laboratory—1 hour; practical—1 hour total. Prerequisite: second-year medical students with consent of instructor; open to graduate students. Approved for graduate degree credit. Obtaining the history, applied anatomy of the regions, and the art of the examination. Head mirror required.—I, II, III, IV. (I, II, III, IV.) Kendall

402. Otolaryngology in Family Practice (1)
Lecture—10 hours total. Prerequisite: fourth-year medical students and family practitioners with consent of instructor; open to graduate students. Approved for graduate degree credit. Planned as a refresher course for those already possessing a background of knowledge in the specialty.—I, II, III, IV. (I, II, III, IV.)

403. Basic Principles of Reconstructive Surgery (1)
Lecture—four 2-hour sessions; laboratory—one 2-hour session (4 weeks). Prerequisite: third- or fourth-year medical student with consent of instructor. Formal presentations covering basic principles of reconstructive surgery, including wound healing, treatment of lacerations, skin and bone grafts, flaps, Z-plasties and revision of scars. Laboratory session utilizing animal tissues.—II. (II.) Donald

440. Otolaryngology Required Clerkship (3)
Clinical activity—full time (2 weeks). Prerequisite: consent by Committee on Student Evaluation and Promotion. To provide fundamental knowledge of otorhinolaryngologic diagnosis and principles, develop facility with basic ENT instruments, provide an understanding of treatment for ear, nose and throat problems and provide knowledge of what patients should be referred for otorhinolaryngologic care.—I, II, III, IV. (I, II, III, IV.) Strong

450. Fourth Year Otolaryngology Elective (6)
Clinical activity—35 hours; lecture—2 hours; film-viewing—0.25 hours; discussion—1 hour. Prerequisite: 3rd or 4th year medical student. Participation in Otolaryngology Clinic and operating room. Evaluation and management of common Otolaryngologic diseases. (P/F grading only.)—I, II, III, IV. Strong

460. Clinical Otolaryngology Elective (3-18)
Clinical activity—full time. Prerequisite: third- and fourth-year medical students with consent of instructor; open to graduate students. Approved for graduate degree credit. Total involvement in clinical activities of the department. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Strong

480. Insights in Otolaryngology (1-3)
Clinical activity—3 to 9 hours. Prerequisite: first- and second-year medical students in good academic standing; consent of instructor. Individualized activities (depending upon time available and previous exposure to Ear, Nose and Throat) including observing patient exams, ward rounds and attendance at lectures and grand rounds. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Strong

490. Journal Seminar (1)
Lecture/discussion—10 hours total (course given three times per quarter). Prerequisite: fourth-year medical students with consent of instructor; open to graduate students. Approved for graduate degree credit. Monthly review of current otolaryngologic and related literature and recent advances. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Donald

498. Individual or Group Study (1-5)
Lecture/discussion—1-2 hours; laboratory—1-4 hours. Prerequisite: consent of instructor. Introduction to basic research in Otolaryngology. Lectures, discussion and laboratory study of sensory and motor systems. (H/P/F grading only.)

499. Research (1-12)
Prerequisite: medical students with consent of instructor; open to graduate students. Approved for graduate degree credit. Participation in ongoing projects. (H/P/F grading only.)

Pathology (PMD)

Upper Division Courses

192. Internship in Human Pathology (1-12)
Internship—3-36 hours; final project report. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in pathology and related fields. (P/NP grading only.)

199. Special Study in Pathology for Advanced Undergraduates (1-5)
Prerequisite: advanced undergraduates and consent of instructor. (P/NP grading only.)

Graduate Courses

210. Introduction to Human Pathology (4.5)
Lecture/discussion—8 hours; laboratory—4 hours (5 weeks). Prerequisite: graduate or upper division students with background in gross and microscopic anatomy, physiology and biochemistry. Lectures, laboratory, and computer-assisted learning. Introduces basic human disease processes. Stresses mastery of pathophysiology and vocabulary. Examining gross and microscopic tissue sections is taught. (Course given second five weeks of spring and taken with first-year medical students enrolled in course 410A.) Course not intended for veterinary or medical students.—III. (III.)

298. Advanced Group Study (1-5)
Prerequisite: consent of instructor.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

404. Forensic Pathology (2)
Laboratory—3-10 hours. Prerequisite: medical student or consent of instructor. Systematic study of current forensic cases with emphasis on differential diagnosis, preservation of evidence, and medical-legal procedures. Introduction to histopathologic diagnosis, ballistics, and toxicology. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Finkbeiner

405. Brain Cutting Conference (1-4)
Seminar—1-4 hours. Prerequisite: third- and fourth-year medical students or consent of instructor. Current specimens are sectioned, discussed, and clinical correlations proposed. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Ellis

407. Advanced Neuropathology (1-12)
Discussion and laboratory. Prerequisite: consent of instructor. Study of pathologic reaction in human central and peripheral nervous systems and skeletal muscle by microscopic, light and electron microscopic examination of current and archival material. Discussions of clinical correlations and current medical literature. Individualized experience in neuropathologic techniques. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Ellis

410A. General Pathology (2)
Lecture—4 hours; laboratory/discussion—4 hours. Prerequisite: approval of Committee on Student Progress. Pathophysiologic mechanisms of human disease. Gross organ and microscopic materials are utilized to illustrate morphology and concepts. (P/F grading only.)—III. (III.) Gandour-Edwards, Jensen

410B. Systemic Pathology (1.5)
Lecture—8 hours; laboratory/discussion—12 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Concepts of general pathologic processes, i.e., cell death, inflammation and neoplasia in the context of specific organ systems and human diseases in a clinical context. (Deferred grading only, pending completion of sequence. P/F grading only.)—IV. Gandour-Edwards, Jensen

410C. Systemic Pathology (2)
Lecture—1 hour; discussion—2 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Anatomic and clinical pathology of organ system human disease with an emphasis on integration with clinical medicine. Topics include hematopathology, gynecologic pathology, endocrine pathology, and musculoskeletal pathology. (Deferred grading only, pending completion of sequence. P/F grading only.)—I. Gandour-Edwards, Jensen

410D. Systemic Pathology (2.5)
Lecture—1 hour; discussion—2 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Anatomic and clinical pathology of organ system human disease with an emphasis on integration with clinical medicine. Course content closely parallels concurrent clinical courses with integration of lectures and discussions sections. Topics include gastrointestinal pathology, hepatopathology, nutritional pathology. (Deferred grading only, pending completion of sequence. P/F grading only.)—II. Gandour-Edwards, Jensen

410E. Systemic Pathology (1)
Lecture—1 hour; discussion—2 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Anatomic and clinical pathology of organ system human disease with an emphasis on integration with clinical medicine. Course content closely parallels concurrent clinical courses with integration of lectures and discussion sections. Topics include molecular pathology, cardiac pathology, renal pathology, pulmonary pathology, neuropathology, pathology of the lower urinary tract. (P/F grading only.)—III. Gandour-Edwards, Jensen

464. Anatomic Pathology (3-12)
Clinical activity—40 hours. Prerequisite: third- or fourth-year medical student or consent of instructor. Anatomic pathology with an emphasis in surgical pathology and application to clinical practice. Specimen grossing, frozen sections, microscopic sign-out and conferences. Exposure to autopsy, cytopathology, hematopathology, and clinical pathology are available. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Ramsamooj

465. Applied Clinical Laboratory Medicine (6-9)
Clinical activity—full time (4-6 weeks). Prerequisite: consent of instructor. Emphasis upon laboratory techniques, procedures, and interpretation of laboratory results. Students will be expected to participate fully and in all laboratory operations including bench techniques, laboratory management and quality control. (H/P/F grading only.)—II, III, IV. (II, III, IV.) Kost

497T. Tutoring in Pathology (1-5)
Tutoring—3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/P/F grading only.)

498. Advanced Group Study (1-5)
Prerequisite: medical student and consent of instructor. Group study in variety of advanced topics in general, special, experimental, or comparative pathology. (H/P/F grading only.)

499. Research (1-18)
Prerequisite: medical student with consent of instructor. Research in experimental, molecular, comparative, and applied pathology. Limited enrollment. (H/P/F grading only.)

Pediatrics (PED)

Upper Division Course

199. Special Study in Pediatric Research (1-5)
Prerequisite: undergraduate student with consent of instructor based upon adequate preparation as determined by instructor. (P/NP grading only.)

Graduate Course

299. Pediatric Research (1-12)
Prerequisite: graduate students who are candidates for a degree in some area of biology or behavioral sciences; consent of instructor. (S/U grading only.)

Professional Courses

401. Preceptorship in Pediatrics (2)
Preceptorship—half time. Prerequisite: second-year medical student or first-year medical student with consent of instructor. Opportunity to observe and participate in primary medical care in a practicing pediatrician's office. Participation in history-taking and physical examination will be at discretion of preceptor and dependent on student's experience. Evaluation by student. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

402. Clinical Experience in Private Practice (1-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: third-or fourth-year medical student; course 430; consent of preceptor and Chairperson. Opportunity to participate in practice of preceptor, performing such tasks as history taking, physical examination, and patient management. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

430. Pediatric Clerkship (12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Eight week clinical clerkship providing students with the opportunity to learn fundamentals of caring for the pediatric patient by participating in nursery, ambulatory and inpatient services at UCDMC and affiliated clinical sites. Rounds, conferences, student presentations ongoing. (H/P/F grading only.)—I, II, III, IV. Wold

460A. Acting Internship: General Inpatient Pediatric Clerkship (6-18)
Clinical activity—full time (4 to 12 weeks). Prerequisite: completion of course 430 with grade of B or better; letter of recommendation from Pediatrics faculty member. The Ward Acting Intern functions in a manner similar to that of a pediatric intern. The Acting Intern takes admissions in the regular sequence and is expected to take night call. The Acting Intern can expect to manage between six and ten patients at a time. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Connors

460B. Acting Internship: Outpatient Pediatrics (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: completion of course 430 with grade of B or better; letter of recommendation from Pediatrics faculty member. Supervised experience in pediatric care on outpatient service at UCDMC. Student functions as "Acting Intern" with appropriate supervision by residents and attending faculty. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

461. Elective in Hematology/Oncology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Inpatient and outpatient experience in diagnosis and management of hematologic disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Ducore

462. Elective in Pediatric Endocrinology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: completion of second-year study or the equivalent; consent of instructor. Inpatient and outpatient experience in diagnosis and management of endocrine disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

464. Acting Internship in Neonatology (6-18)
Clinical activity—full time (4 to 12 weeks). Prerequisite: completion of course 430 with grade of B or better; letter of recommendation from Pediatrics faculty member. Diagnostic and therapeutic aspect of the medical and surgical high-risk neonate. Student expected to take night call. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Merritt

465. Pediatric Specialty Clinic Elective (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Supervised experience in a variety of pediatric subspecialty clinics. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

466. Elective in Pediatric Cardiology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430. Inpatient and outpatient experience in diagnosis and management of cardiologic disorders in children. Laboratory experience and participation in clinical investigation may be arranged. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Parrish

467. Elective in Pulmonary Medicine (3-18)
Clinical activity—full time (2 to 12 weeks); daily rounds, two weekly half-day clinics. Prerequisite: pediatric clerkship. Inpatient and outpatient management of pediatric patients with pulmonary diseases. These will include but will not be limited to cystic fibrosis, asthma, and other forms of chronic pulmonary diseases as well as congenital abnormalities. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) McDonald, Joad

468. Elective in Pediatric Nephrology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Inpatient and outpatient experience in diagnosis and management of renal disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Makker

469. Elective in Pediatric Infectious Disease (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Inpatient and outpatient experience in diagnosis and treatment of infectious disease of infants and children. Laboratory and clinical investigation may be arranged. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Wenman

470. Elective in Pediatric Neurology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430, Internal Medicine 430, Obstetrics and Gynecology 430, and Pediatrics 430 and consent of instructor. Inpatient and outpatient experience in diagnosis and management of neurological disorders in children. Students will also participate in other pediatric subspecialty clinics which serve children with neurological disorders. This course does not satisfy the fourth year neurology requirement. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Gospe

471. Elective in Pediatric Gastroenterology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Inpatient and outpatient experience in diagnosis and management of gastroenterology disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

476. Acting Internship in Pediatric Intensive Care (6-18)
Clinical activity—full time (4 to 12 weeks). Prerequisite: completion of course 430 with grade of A or consent of instructor of record; letter of recommendation from Pediatrics faculty member. Evaluation and support of critically ill infants and children. In general, student expected to take night call every third night during rotation. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Dimand

499. Research Topics in Pediatrics (1-18)
Prerequisite: student in Medical School with consent of instructor. Individual research project in pediatric subspecialty areas (cardiology, endocrinology, hematology, metabolism, newborn physiology and others) may be arranged with faculty member. Independent research by student will be emphasized and long-term projects are possible. (H/P/F grading only.)

Physical Medicine and Rehabilitation (PMR)

Upper Division Courses

100. Research Approaches to Disability and Rehabilitation (2)
Lecture/discussion—2 hours. Discussion and evaluation of research approaches to medical rehabilitation, community integration, and quality of life of disabled persons, with a focus on the progressive disabilities associated with neuromuscular diseases. Intent is to encourage interest in professions that serve the disabled community and increase awareness of rehabilitation goals.—II. Devereaux

198. Directed Group Study (1-5)
Prerequisite: advanced standing and consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: advanced standing and consent of instructor. (P/NP grading only.)

Graduate Course

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

440. Rehabilitation Medicine Clerkship (3)
Clinical activity—full time (2 weeks). Prerequisite: third- or fourth-year medical student; approval by Committee on Student Evaluation and Promotion. Rehabilitation medicine and geriatrics relating to comprehensive care of the physically disabled and the physical medicine management of neurologic and musculoskeletal disorders. Physiological effects, indications and contraindications of the therapeutic modalities and their application to common musculoskeletal disorders. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) McDonald

461. Rehabilitation Medicine Clinical Elective (5-18)
Clinical activity—full time. Prerequisite: completion of third year in Medical School; Internal Medicine 430, Surgery 430. Intended for non-UC medical students. Emphasis on evaluation of patients with neurological or orthopaedic problems requiring rehabilitative techniques for their management. Introduction to management of such patients. Fourth-year student may function as acting intern on Physical Medicine and Rehabilitation service. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Kilmer

462. Rehabilitation Medicine Clinical Elective (5-18)
Clinical activity—full time. Prerequisite: Internal Medicine 430, Surgery 430; completion of third year in Medical School. Emphasis on evaluation of patients with neurological or orthopaedic problems requiring rehabilitative techniques for their management. Introduction to management of such patients. Physical Medicine and Rehabilitation at off-campus facility must be approved by Chairperson. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Kilmer

498. Advanced Group Study (1-5)
Prerequisite: consent of instructor. Study and experience for medical students in any of a number of areas in physical medicine and rehabilitation. (H/P/F grading only.)

499. Research for Medical Students (1-12)
Prerequisite: consent of instructor. Research on any of a variety of topics in physical medicine and rehabilitation. (H/P/F grading only.)

Plastic Surgery (PSU)

Professional Courses

460. Clinical Plastic Surgery Elective (1-18)
Clinical activity—full time (approximately 40 hours per week). Prerequisite: third- or fourth-year medical students; Surgery 430; consent of instructor. Total involvement in patient care involving surgical preparation, treatment, operative care, and follow-

up. Developing and understanding reconstruction and aesthetic plastic surgery. Microvascular surgery included. Student rotation. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Stevenson

461. Dentistry for Future Physicians and Surgeons (6-8)
Discussion/seminar—3 hours; laboratory—2 hours; clinical activity—full time (4-6 weeks). Prerequisite: third- or fourth-year medical students. General practitioners must recognize dental-related problems, have the ability to alleviate potential pain, and be able to refer these problems for further definitive evaluation and treatment. Students will have basic knowledge of dentistry; recognize potential dental problems; provide emergency care; have knowledge of where to refer these problems. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Thailer

Psychiatry (PSY)

Upper Division Courses

198. Directed Group Study (1-5)
Prerequisite: advanced standing and consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: advanced standing and consent of instructor. (P/NP grading only.)

Graduate Courses

298. Directed Group Study For Graduate Students (1-5)
Prerequisite: graduate standing and consent of instructor.

299. Special Study for Graduate Students (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Courses

401. Medicine and the Mind: An Introduction to Psychiatry (2)
Lecture/discussion--2.5 hours. Prerequisite: consent of Committee on Educational Progress. Concepts and clinical applications of psychiatry throughout the human life cycle. Biological, psychological, social, cultural and spiritual factors influencing health and illness. (P/F grading only.)—I. (I.) Servis

403. Fundamentals of Clinical Psychiatry (3)
Discussion—2 hours; lecture—3 hours. Prerequisite: approval of Committee on Student Progress. Psychiatric interviewing, Mental Status Exam and diagnosis. Major child and adult disorders, including substance abuse and dependence. Weekly student interviews of psychiatric patients in small group format. (P/F grading only.)—II. Leamon

412. Psychiatry Grand Rounds (1)
Lecture—1 hour. Prerequisite: medical students or staff or other qualified mental health professionals with consent of instructor. Weekly conference at UCDMC for presentation of selected clinical cases, presentation of lecture and research reports. (H/P/F grading only.)—II, III, IV. (II, III, IV.)

413. Outpatient Psychiatry Clerkship (6-12)
Clinical activity—full time (4 to 8 weeks). Prerequisite: course 430 (Psychiatry Core Clerkship) and/or consent of coordinator. Experience in clinical management/treatment of adult outpatients with psychiatric and substance abuse disorders; crisis management/intervention, evaluation/development of diagnosis and treatment plan; emphasis on outpatient psychopharmacology/brief psychotherapy; observation of group therapy. Individual supervision by faculty/residents. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

414. Consultation-Liaison Clerkship (6-12)
Clinical activity—full time (4 to 8 weeks). Prerequisite: course 430 (Psychiatry Core Clerkship) and/or consent of instructor. Student functions as member of the team in evaluation, management, and psychiatric liaison with other medical specialties. Intensive supervision from senior staff and psychiatric residents. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

415. Substance Abuse: Diagnosis and Treatment (3)
Clinical activity—20 hours; independent study—15 hours; lecture/discussion—5 hours. Prerequisite: medical student with consent of instructor. Two-week selective offering supervised contact with patients addicted to alcohol, opioids, cannabis, or psychostimulants. Sites: Travis Air Force Base and regional Methadone and Alcohol Treatment Programs. Pharmacological, psychosocial, "12-step" and behavioral treatments will be demonstrated. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

416. Child Psychiatry Clerkship (6-12)
Clinical activity—full time (4 to 8 weeks). Prerequisite: course 430 (Psychiatry Core Clerkship) and/or consent of instructor. Didactic and clinical inpatient, outpatient, and consultation-liaison experiences with children, adolescents and families. Clinical observations, diagnostic assessment, and treatment will be undertaken with close supervision. Literature review and case conferences presented on a regular basis. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

417. Jail Psychiatric Clerkship (6 or 12)
Clinical activity—full time (4 to 8 weeks). Prerequisite: course 430 (Psychiatry Core Clerkship) and/or consent of course coordinator. Students gain experience, under close faculty supervision, assessing acute and chronic mentally ill inmates in both inpatient and clinic settings. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

418. Off-Campus Clinical Experience (6 or 12)
Clinical activity—full time (4 or 8 weeks). Prerequisite: fourth-year medical students; consent of instructor. Clinical or research elective in off-campus medical school or mental health setting. To be arranged with advance approval of instructor and individual in charge of off-campus setting. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

420. Acting Internship in Psychiatry (6-12)
Clinical activity—full time (4 to 8 weeks). Prerequisite: course 430 (Psychiatry Core Clerkship) and/or consent of course coordinator. Acting intern position with close faculty supervision with emphasis on biological psychiatry, psychopharmacology and psychodynamic aspects appropriate to diagnostic and long-term patient management. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

422. Readings in Psychiatry (1-3)
Readings/discussion—3-9 hours. Independent reading of a selected topic in psychiatry. Supervision and discussion with a psychiatry faculty member. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

430. Psychiatry Clinical Clerkship (12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Assigned to clinical settings, students build upon the skills gained in preclinical years; emphasis on diagnostic, therapeutic and interpersonal skills. Areas of focus include patient management, interviewing skills, mental status exam, differential diagnosis, basic psychopharmacology, crisis assessment, intervention and case referrals. (H/P/F grading only.)—I, II, III, IV. Cox

480. Insights in Psychiatry (1-3)
Clinical activity—3–9 hours. Prerequisite: first- or second-year medical student in good academic standing; consent of instructor. On individual basis, student provided with an opportunity for gaining insight into various clinical activities in the practice of psychiatry. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Cox

498. Directed Group Study (1-5)
Prerequisite: consent of instructor. Approved for graduate degree credit. Medical students desiring to explore particular topics in depth. (H/P/F grading only for graduate or medical students.)

499. Research (1-12)
Prerequisite: consent of instructor. Approved for graduate degree credit. Individual research on selected topics or research projects. (H/P/F grading only for graduate or medical students.)

Radiation Oncology (RON)

Upper Division Courses

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Course

299. Independent Study and Research (1-12)
Clinical activity—full time (2-8 weeks). Prerequisite: enrollment with Biomedical Engineering Group for Ph.D. candidacy and consent of Group Advisor and Sponsor. Research under supervision of Radiation Oncology faculty. Work must be appropriate to fulfill the requirements for the Ph.D. degree. (S/U grading only.)—Kubo

Professional Courses

463. Radiation Oncology Clerkship (3-9)
Clinical activity—full time (2-6 weeks). Prerequisite: completion of Medical Sciences 430, 431; third-year clinical clerkship, consent of instructor required. Introduction to radiation oncology. Students will participate in workup and treatment planning for radiation oncology patients and will be introduced to the concepts involved in clinical radiation oncology, radiation biology, and radiation physics. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Ryu

498. Group Study in Therapeutic Radiology (1-12)
Prerequisite: consent of instructor. Approved for graduate degree credit. (H/P/F grading only for medical students.)

499. Research in Radiobiology (3-12)
Clinical activity—full time (2-8 weeks). Prerequisite: consent of instructor. Laboratory investigation on selected topics involving response of biological molecules, cells, tissues or animals to ionizing radiation. (H/P/F grading only.)—Leigh

Radiology—Diagnostic (RDI)

Professional Courses

413. Radiological Diagnosis II (Physics of Diagnostic Radiology) (5)
Lecture—49 hours total; laboratory—6 hours total. Prerequisite: consent of instructor. Physics of diagnostic imaging; x-ray production and interaction; image formation; modulation transfer function; fluoroscopy; cine fluoroscopy; stereoscopy; xeroradiography; computerized and geometrical tomography; magnetic resonance and ultrasound. Principles of radiation protection in imaging will be covered. (H/P/F grading only.)—I. (I.) Seibert, Boone

414. Medical Radiation Biology (3)
Lecture—27 hours total. Prerequisite: consent of instructor. Medical radiation biology; molecular cellular and organ system response to acute and chronic irradiation; radiation carcinogenesis and genetic effects; radiation risk assessment; diagnostic ultrasound and magnetic resonance imaging health effects. Medical/legal considerations of radiation exposure. Offered in alternate years. (H/P/F grading only.)—III. Bushberg

420. Fundamentals of Radiobiology (1)
Lecture—3-4.5 hours; term paper. Prerequisite: Biological Sciences 1A, Mathematics 12, Physics 1A. Major topics in radiation biology. The experimental basis of our current understanding of therapeutic radiation to cancer and normal tissue; and the translation of basic radiobiologic knowledge into clinical usage. May be repeated twice for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Chen, Thelen

461. Clinical Clerkship in Diagnostic Radiology (1-18)
Clinical activity—full time (3 days per unit). Prerequisite: completion of third year of Medical School; consent of instructor. Student works with radiologists at UCD Medical Center in film reading sessions and radiological procedures; includes fluoroscopy, vascular radiology and special investigations. Includes daily individual teaching sessions with faculty radiologists, radiology learning laboratory, and all radiol-

ogy conferences and seminars. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) McFall

462. Diagnostic Imaging of Acquired and Congenital Heart Disease (2)
Lecture/discussion—5 hours (for 3 weeks). Prerequisite: fourth-year medical student in good academic standing and course 461 (may be taken concurrently). Main emphasis on radiology of acquired and congenital heart disease, but also on magnetic resonance, nuclear medicine, and echocardiography of heart diseases. (H/P/F grading only.)—III. (III.) Bogren

498. Group Study in Diagnostic Radiology (1-12)
Prerequisite: consent of instructor. (H/P/F grading only.)

499. Research in Diagnostic Radiology (1-12)
Prerequisite: consent of instructor. Approved for graduate degree credit. (H/P/F grading only for medical students.)

Radiology—Nuclear Medicine (RNU)

Upper Division Courses

198. Directed Group Study (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Course

299. Research: Special Study for Graduate Students (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Courses

401. Biomedical Radiochemistry (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: open to graduate and medical students; consent of instructor. Approved for graduate degree credit. Course is designed to combine basic nuclear physics, chemistry, and biology into a comprehensive and vigorous lecture-laboratory experience in biomedical nuclear chemistry. Subjects include choice and purification of appropriate gamma and beta radioisotopes, compounding biological pharmacodynamics and radioimmunoassay. (H/P/F grading only.)—III. (III.)

411. Radiological Physics I (Physics of Nuclear Medicine) (5)
Lecture—43 hours total; laboratory—12 hours total. Prerequisite: consent of instructor. Physics of diagnostic and therapeutic nuclear medicine, nuclear physics, radioactive decay; interaction of ionizing radiation; dosimeters; attenuation; internal and external dosimetry; health physics; radiation detection and imaging, scintillation cameras, computerized planar and tomographic imaging. Offered at UC Davis Medical Center. Offered in alternate years. (H/P/F grading only.)—(I.) Bushberg, Vera

463. Clinical Clerkship in Nuclear Medicine (3-8)
Clinical Activity—full time (2-6 weeks). Prerequisite: satisfactory completion of second-year medical school; Radiology—Diagnostic 461 recommended; consent of instructor. Clerkship correlates radioisotopic methods with clinical, pathophysiological, and other diagnostic aspects of the patient's care. Each patient reviewed with student by faculty member. Reading assignments, informal projects, and research techniques available. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Shelton

498. Group Study in Nuclear Medicine (1-12)
Prerequisite: consent of instructor. Approved for graduate degree credit. (H/P/F grading only for medical students.)

499. Research in Nuclear Medicine (1-12)
Prerequisite: consent of instructor. Approved for graduate degree credit. (H/P/F grading only for medical students.)

Surgery (SUR)

Upper Division Courses

192. Internship in General Surgery (1-12)
Internship—3-36 hours. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in general surgery and related fields. (P/NP grading only.)

199. Special Study in General Surgery for Advanced Undergraduates (1-5)
Prerequisite: advanced undergraduate student with consent of instructor. (P/NP grading only.)

Graduate Course

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Courses

430. Surgery Clerkship (12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Eight week general surgery clerkship includes GI, Burn, Oncology, Plastics, Vascular Cardiothoracic, consult, transplant and trauma. Clerkship assignments are at UCDMC. Daily core material presentations and reading assignments. Student involvement includes work-up and care of surgical patients. (H/P/F grading only.)—I, II, III, IV. Owings

460A. Clinical Surgical Elective (6-18)
Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Rotation through Surgery Specialty Clinics: Vascular, GI, GU, Thoracic, Plastic, Radiotherapy. Student works up one new and two return visit patients. Presents consult to on-site faculty. Weekly review with preceptor and course director. Reading assignments to add perspective for in-depth discussions. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Follette

461. Surgery Burn Unit Clerkship (6 or 9)
Clinical activity—full time (4 or 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Externship in the eight-bed Burn Unit, and the 80 bed Shriners Hospital for Children. Principles of critical care, fluid and electrolyte resuscitation and management of surgical wounds in both adults and children. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

462. Surgery Trauma Service Clerkship (6 or 9)
Clinical activity—full time (4 or 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Student works as an extern on one of the two general surgery Trauma teams, participating in resuscitation and management of critically injured patients. Team hours consist of 24 hours on, and 24 hours off. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

463. Surgery Intensive Care Unit (6 or 9)
Clinical activity—full time (4 or 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Student participates in direct supervision of critically ill surgical patients in a twelve-bed surgery ICU. Each student is closely supervised. Provides in-depth experience with management of critically ill patients. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

464. General Surgery Clerkship: Kaiser Hospital (6 or 9)
Clinical activity—full time (4 or 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Student participates with University residents on the teaching services at Kaiser Hospital, Sacramento. Opportunity to see larger number of practical, general surgical problems and participate in their care. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

467. Surgical Oncology (3-9)
Clinical activity—full time (2 to 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Students actively participate in management of patients requiring surgery for cancer, endocrine disease and selected general surgical problems. Cases include malignant melanoma, sarcomas, gastrointestinal cancer, head and neck pathology, and metastatic malignancies. Attending rounds daily. Four teaching conferences weekly. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

468. Cardiothoracic Surgery Clerkship (6-9)
Clinical activity—full time (4 to 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Student works as an extern on the Cardiothoracic Surgical Service, participating in perioperative management and operations on the heart, lungs, mediastinum, and other thoracic structures. Regularly scheduled teaching conferences are conducted. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Benfield

469. Trauma Service: East Bay (6-9)
Clinical activity—full time. Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430 and Internal Medicine 430. Student works as an extern on the Trauma Service at Highland General Hospital (Oakland) participating in resuscitation and management of critically injured patients. Team hours consist of 24 hours on and 24 hours off. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

470. General Surgery: East Bay (6-9)
Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Student will work as an extern on one of the two general surgery services and participate in the pre-operative evaluation, intra-operative management, and post-operative care of surgical patients. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Organ

471. Gastrointestinal Surgery (3-9)
Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430, Internal Medicine 430 and Pediatrics 430. Student participates on the GI Surgery Service, working under the immediate supervision of the faculty and surgical housestaff, involving the full spectrum of gastrointestinal diseases performed by the medical student. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Wolfe

472. Vascular Surgery (3-9)
Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430, Internal Medicine 430 and Pediatrics 430. Student participates on the vascular surgery service and in the management and operations of arterial and venous system, exclusive of diseases that require cardiopulmonary bypass for treatment. Includes patient care responsibilities with appropriate supervision. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Holcroft

473. Surgical Intensive Care Unit–East Bay (6-9)
Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430 and Internal Medicine 430. Externship on surgical ICU service, clinical management of critically ill patients in the SICU, ICU procedures with appropriate supervision. An eight-lecture didactic series. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Organ

474. Breast Disease (6)
Clinical activity—full time (4 weeks). Prerequisite: third-year surgery clerkship, Medical Sciences 430. Students focus on aspects of benign and malignant breast disease working in the surgical oncology clinics, observing needle localization procedures, following patients to the O.R., working with radiologists in mammography, working in hematology-oncology clinics, and with pathologists reviewing histology. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Goodnight

475. Pediatric Surgery (6-9)
Clinical activity—full time (4-6 weeks). Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Care of patients with neonatal congenital surgical problems. Fluid and electrolyte management in infants. General experience with acquired surgical diseases in children. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Marr, Clifford

476. Surgical Consult Service (6-9)
Clinical activity—full time (4-6 weeks). Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Students function as acting interns working in parallel with the interns on the service. They consult on all nontrauma patients in the emergency room and on the wards and also participate in the operating room. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Blaisdell

477. Clinically Oriented Anatomy (3)
Clinical activity—40 hours. Prerequisite: completion of three years of medical school. Anatomy of selected regions of the body using cadaver dissection, prosections and interactive CD-ROMs. Anatomical relationships relevant to common surgical procedures. Surgical and interventional radiology procedures. (H/P/F grading only.)—II. Khatri, Kumari

478. Surgical Preceptorship: Off Campus (6-18)
Clinical activity—full time. Prerequisite: fourth-year medical student and consent of instructor. Student participates in the preoperative, operative and postoperative care of surgical patients under the supervision of attending staff. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Holcroft

480. Insights in Surgery (1-3)
Clinical activity—3 to 9 hours. Prerequisite: medical student in good academic standing and consent of instructor. Individualized activities, including ward rounds, subspecialty clinics and conferences, grand rounds, and observation of a variety of surgical procedures. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

494H. Fourth-Year Surgical Honors Program (18)
Prerequisite: completion of third year of medical school with superior performance on course 430; consent of instructor. To provide intensive and comprehensive training in surgery to students interested in a postgraduate surgical career, that would enable them to succeed during the internship and residency training. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Holcroft

498. Group Study (1-5)
Prerequisite: medical student; consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

499. Laboratory Research (1-12)
Laboratory—3-36 hours. Prerequisite: completion of second year of medical school; consent of instructor. Laboratory research on surgically related problems. Participation in projects to include the following: burn, nutrition, oncology, transplant and others. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.)

Urology (URO)

Upper Division Course

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)—deVere White

Professional Courses

400. Office Urology (1)
Clinical activity—4 hours in afternoons (6 weeks). Prerequisite: fourth-year medical students with consent of instructor. Introduction to ambulatory care of urologic patients including basic therapeutic and diagnostic procedures from case material referred to private clinic. Management of urinary tract infection will be emphasized. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) deVere White

460. Urology Clinical Clerkship (5-18)
Clinical activity—full time. Prerequisite: second-year medical student; physical diagnosis or the equivalent; consent of instructor. Clinical experience in diagnosis and treatment of urologic disease. Student will work closely with house staff, participate in conferences and surgery, and perform initial patient evaluation on new patients. May be repeated for credit. Limited enrollment. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) deVere White

461. Externship in Urology (5-18)
Clinical activity—full time. Prerequisite: fourth-year medical students with consent of instructor. Under supervision, student acting as intern will assume full inpatient responsibility including admission history, physical examination, management of hospitalization, and participate in surgical procedures, outpatient clinic and learning diagnostic and therapeutic procedures. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) deVere White

499. Research in Urology (1-12)
Research—3-36 hours. Prerequisite: medical or veterinary medical students with consent of instructor. Research in oncology, male infertility, urodynamics, neurogenic bladder. Unique opportunity to apply recent technologies (nuclear medicine resonance, flow cytometry, recombinant DNA) in investigation, diagnosis and treatment of GU cancer, infectious disease, male infertility and development of genitourinary bioprosthetics. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV.) deVere White

Medicine and Epidemiology

See Veterinary Medicine, School of

Medieval and Early Modern Studies

(College of Letters and Science)

Marijane Osborn, Ph.D., Program Director

Program Office, 176 Voorhies Hall (530-752-2257)

http://medieval.ucdavis.edu

Committee in Charge

Joan Cadden, Ph.D., *(History)*
Seeta Chaganti, Ph.D., *(English)*
Frances Dolan, Ph.D., *(English)*
Margaret W. Ferguson, Ph.D., *(English)*
Deborah E. Harkness, Ph.D., *(History)*
Adrienne Martín, Ph.D., *(Spanish and Classics)*
Winder McConnell, Ph.D., *(German and Russian)*
Marijane Osborn, Ph.D., *(English)*
Larry Peterman, Ph.D., *(Political Science)*
Kevin Roddy, Ph.D., *(Medieval and Early Modern Studies), Academic Federation Excellence in Teaching Award*
Brenda Schildgen, Ph.D., *(Comparative Literature), Academic Federation Excellence in Teaching Award*
Kathleen Stuart, Ph.D., *(History)*
David Traill, Ph.D., *(Spanish and Classics)*
Georges Van Den Abbeele, Ph.D., *(French, Italian)*
Claire Waters, Ph.D., *(English)*

The Major Program

The Major in Medieval Studies examines the intellectual, political, and cultural forces that shaped modern European civilization during the period from the end of Ancient Rome (fifth century) to the beginning of the Enlightenment (mid-eighteenth century). An interdisciplinary and interdepartmental program, the major includes studies in history, art, philosophy, literature, drama, music, national languages, religion, rhetoric, and political theory.

The Program. The major requires interdisciplinary work, while allowing the student to focus on the early Middle Ages, the High Middle Ages, the Renaissance, or the Baroque. The series of Medieval and Early Modern courses in the program provides the foundation for the major and prepares students for advanced work within the individual disciplines. On the upper-division level, students may choose course work in specific areas of History, Comparative Literature, English, French, German, Italian, Spanish, and Latin, philosophy and religion, arts and language, and political thought. In addition, each student may elect to complete a senior thesis on a selected aspect of Medieval and/or Early Modern culture.

Career Alternatives. The major in Medieval Studies is a liberal arts degree providing excellent preparation for the rigors of professional schools as well as careers in law, museology, journalism, and teaching.

Medieval Studies

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 24
Medieval Studies 20A, 20B, 20C..... 12
Three additional courses chosen from: Art 1B, 1C; Comparative Literature 2, 10A, 10B, 10C, 10D, 10E; English 46A; German 47, 48; History 4A, 4B; Humanities 1*, 9; Philosophy 21, 22 12
Language proficiency is a desideratum. Courses in Latin and other European languages are strongly recommended, particularly for students planning to pursue graduate studies in the medieval or early modern field.

Depth Subject Matter..... 44
In consultation with the undergraduate adviser, students select a total of eleven courses from the following disciplines with at least three courses each from the Medieval and Early Modern periods.
Art History 178A, 178B, 178C, 179B, 190B, 190C
Classics 110
Comparative Literature 139, 164A, 164B, 164C, 166A, 180*
Dramatic Art 156A
English 111, 113A, 113B, 115, 117A, 117B, 117C, 118, 122, 150A, 153*, 165*, 185A*, 188*, 189*
French 115, 116, 117A, 118B, 141*
German 101A, 112*, 117, 120, 121, 122A, 122B, 124*, 131, 134*, 140, 160, 165, 166, 167
History 102B, 102D, 121A, 121B, 121C, 122, 125, 130A, 130B, 131A, 131B, 132, 135, 136, 139A, 144A, 148A, 151A, 151B
History and Philosophy of Science 130A
Italian 105, 112, 113, 114, 115A, 115B, 115C, 115D, 118, 139B, 140, 141
Latin 101, 102, 103, 104, 105, 106, 108, 109, 112, 114, 115, 116, 125
Medieval Studies 120A, 120B, 120D, 120E, 130A, 130B, 190
Music 121*, 124A, 124B
Philosophy 105, 132, 145, 190*
Political Science 115, 116, 118A
Religious Studies 102, 115, 130*, 142
Spanish 130, 132N, 133N, 134N, 142*
Dramatic Art 156A

Total Units for the Major 68

* Prior approval by Undergraduate Adviser necessary.

Major Adviser. K. Roddy.

Minor Program Requirements:

Medieval Studies 24
The minor in Medieval Studies is a coherent program of interdisciplinary study. Medieval Studies units may be taken in one or more of the traditional fields of concentration, including art, history, literature, music, national languages, philosophy, political theory, and religious studies. Courses must be upper-division with at least two courses each from the Medieval and Early Modern periods. Students may also select a minor with a thematic emphasis.

Although there is no foreign language requirement for the minor, knowledge of Latin or a modern European language is recommended.

The minor must be designed in consultation with the Undergraduate Adviser.

Minor Adviser. K. Roddy.

Courses in Medieval Studies (MST)

Lower Division Courses

20A. Early Medieval Culture (4)
Lecture—3 hours; discussion—1 hour. Readings (in translation) in early medieval culture, such as the Codes of Justinian, the *Confessions of Saint Augustine*, *The Consolation of Philosophy* of Boethius, *Beowulf*, the *Nibelungenlied*, and *The Song of Roland*. GE credit: ArtHum, Wrt.—I. (I.) Roddy

20B. The Culture of the High Middle Ages (4)
Lecture—3 hours; discussion—1 hour. Readings (in translation) in the culture of the high Middle Ages, such as the *Summa Theologica* of Thomas Aquinas, *The Chronicles of Froissart, The Canterbury Tales* of Chaucer, and *The Divine Comedy* of Dante. GE credit: ArtHum, Wrt.—(II.) Roddy

20C. The Late Medieval and Early Modern Period (4)
Lecture—3 hours; discussion—1 hour. The great transformations that created the modern world: Constitutional Government, the Hundred Years' War, the Black Death, and the Peasants' Revolts, the Renaissance, Reformation and Counter-Reformation, and the Baroque. GE credit: ArtHum, Wrt.—II

98. Directed Group Study (1-5)
(P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

120A-E. The Medieval World (4)
Lecture—3 hours: discussion—1 hour; term paper. Course deals with selected themes from the Middle Ages: the Fall of Rome to the beginning of the Renaissance. Subjects will vary from year to year and cover such topics as

- **(A)** The Monastic Orders;
- **(B)** Origins of Universities;
- **(D)** Family and Society;
- **(E)** Chivalry.

GE credit for 120A or 120D or 120E: ArtHum, Wrt.—III.

121. Jewish/Christian/Islamic Relations 700–1400 (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing; one course from the 20 series recommended. Examination of the relationships among Islam, Judaism, and Christianity between 700-1400. Topics include politics, geography and travel, architecture and art, philosophy, science, theology, mysticism, and literature. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(III.) Schildgen

130A. Special Themes in Medieval Cultures (4)
Lecture—3 hours; discussion—1 hour. Each offering concentrates on an interdisciplinary aspect of medieval culture in the Middle East and Europe: the idea of the hero, mysticism, urban development. Extensive readings focused on medieval source material. May be repeated for credit. GE credit: ArtHum, Wrt.—Schildgen

130B. Special Themes in Renaissance Culture (4)
Lecture—3 hours; discussion—1 hour. Each theme illuminates an interdisciplinary aspect of Renaissance culture in the eastern and western hemispheres: exploration, medical pathology, daily life, baroque culture. Immersion in source material from 1500-1650. May be repeated for credit. GE credit: ArtHum, Wrt.—Schleiner

190. Senior Thesis (4)
Seminar—4 hours. Prerequisite: senior standing and major in Medieval Studies. Preparation of a research paper dealing with a selected aspect of medieval culture, under supervision of three members of the Committee in Charge.—I, II, III. (I, II, III.)

197T. Tutoring in Medieval Studies (1-4)
Seminar—2 hours. Prerequisite: courses 20A and 20B; upper division standing; consent of instructor and chairperson of curriculum committee. Tutoring in Medieval Studies 20A and 20B, including leadership in small discussion groups affiliated with the course. May be repeated for credit for a total of 6 units. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Mexican-American (Chicano) Studies

See Chicana/Chicano Studies

Microbiology

See Microbiology; Medical Microbiology (Medicine, School of); Microbiology (A Graduate Group); and Pathology, Microbiology and Immunology (Veterinary Medicine)

Microbiology

John R. Roth, Ph.D., Chairperson of the Section
Section Office, 357 Briggs Hall (530-754-7361)
http://microbiology.ucdavis.edu

Faculty

Primary Section Members
Stanley W. Artz, Ph.D., Professor
Paul Baumann, Ph.D., Professor
Wolf-Dietrich Heyer, Ph.D., Professor
Neil Hunter, Ph.D., Assistant Professor
Michele M. Igo, Ph.D., Associate Professor
Stephen C. Kowalczykowski, Ph.D., Professor
Su-Ju Lin, Ph.D., Assistant Professor
JaRue S. Manning, Ph.D., Professor
John C. Meeks, Ph.D., Professor
Douglas C. Nelson, Ph.D., Professor
Rebecca Parales, Ph.D., Assistant Professor
Martin L. Privalsky, Ph.D., Professor
John R. Roth, Ph.D., Professor
Kazuhiro Shiozaki, Ph.D., Associate Professor
Mitchell H. Singer, Ph.D., Associate Professor
Valley J. Stewart, Ph.D., Professor
Mark L. Wheelis, Ph.D., Senior Lecturer

Secondary Section Members
Sean Burgess, Ph.D., Assistant Professor
Jodi Nunnari, Ph.D., Associate Professor
Ted Powers, Ph.D., Assistant Professor
Irwin H. Segel, Ph.D., Professor

Emeriti Faculty

Robert E. Hungate, Ph.D., Professor Emeritus
John L. Ingraham, Ph.D., Professor Emeritus
Allen G. Marr, Ph.D., Professor Emeritus
David Pratt, Ph.D., Professor Emeritus
Merna R. Villarejo, Ph.D., Professor Emerita

Affiliated Faculty

Karen L. Gerhart, Ph.D., Lecturer
Eric D. Mann, Ph.D., Lecturer

The Major Program

Microbiology is the branch of biology that deals with bacteria, yeasts and other fungi, algae, protozoa, and viruses. These microorganisms are ubiquitous in nature and play a crucial role in areas such as agriculture, biotechnology, ecology, medicine, and veterinary science. The field of microbiology contributes to areas of fundamental inquiry such as biochemistry, cell biology, evolution, genetics, molecular biology, pathogenesis, and physiology. The ease and power of simultaneous genetic and biochemical analysis of microbes led to the emergence of the new disciplines of molecular biology and molecular genetics, and spawned the new industry of biotechnology.

The Program. Both undergraduate major programs provide a balance of studies in microbiology, with appropriate courses in mathematics and physical sciences. The A.B. degree program emphasizes the biology of bacteria, while the B.S. degree program includes more biochemistry and related course work. Either program, with judicious course selection, is appropriate for students contemplating a career in medicine or various allied health professions including medical technology, or teaching. The B.S. program is especially well suited for students who want a professional career in microbiology, or who wish to pursue graduate education in a biological science discipline. The choice of a major program and its suitability for particular career options should be discussed with a major adviser.

Career Alternatives. A bachelor's degree in microbiology is excellent preparation for a career in biotechnology, pharmacology, agriculture, and the food industry. It also provides a strong background for students wishing to continue on to professional studies in medicine and the other health sciences.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**43-57**
Biological Sciences 1A-1B-1C	15
Chemistry 2A-2B	10
Chemistry 8A-8B or 118A-118B-118C	6-12
Mathematics 16A-16B or 21A-21B	6-8
Physics 1A-1B or 7A-7B-7C	6-12
Depth Subject Matter	**37-44**
Biological Sciences 101, 102, 103	10
Microbiology 102, 102L, 105, 140	15
Microbiology 162 or Pathology, Microbiology and Immunology 128	3-4
Three additional courses from Food Science and Technology 104; Microbiology 120, 150, 155L, 160, 170; Molecular and Cellular Biology 120L; Pathology, Microbiology and Immunology 127; Soil Science 111; Statistics 100, 102	9-15
Total Units for the Major	**80-101**

B.S. Major Requirements:

	UNITS
Preparatory Subject Matter	**60-67**
Biological Sciences 1A-1B-1C	15
Chemistry 2A-2B-2C	15
Chemistry 8A-8B or 118A-118B-118C	6-12
Mathematics 16A-16B-16C	9
Physics 7A-7B-7C	12
Statistics 13, 32, 100 or 102	3-4

Depth Subject Matter.....46-50
Biological Sciences 101, 102, 103, 104... 13
Molecular and Cellular Biology 120L 6
Microbiology 102, 102L, 105..... 12
Two courses from Microbiology 140, 150, or 170 6
Microbiology 162 or Pathology, Microbiology, and Immunology 128 3-4
Two courses from Food Science and Technology 104; Microbiology 120, 140, 150, 155L, 160, 170, Pathology, Microbiology and Immunology 127; Soil Science 111 6-9

Total Units for the Major 106-117

Master Adviser. M.L. Wheelis, 2202 Storer Hall.

Honors and Honors Program. M.L. Wheelis.

Teaching Credential Subject Representative. M.L. Wheelis. See also the Teacher Education Program.

Graduate Study. The Graduate Group in Microbiology offers programs of study and research leading to the M.S. and Ph.D. degrees.

Strong preference is given to doctoral applicants. The group offers study in general microbiology, microbial physiology, microbial genetics, molecular mechanisms of microbial regulation, molecular mechanisms of microbial pathogenesis, immunology, virology, and recombinant DNA technology. For information on the graduate study and undergraduate preparation for the program contact a graduate adviser or the Chairperson of the Group.

Related Courses. The offerings of the Section of Microbiology are augmented by courses and faculty of Evolution and Ecology; Food Science and Technology; Land, Air, and Water Resources; Medical Microbiology; Medicine and Epidemiology; Molecular and Cellular Biology; Pathology, Microbiology and Immunology; Plant Biology; Plant Pathology; Viticulture and Enology.

Faculty of the Section of Microbiology also teach or participate in the following courses: Biological Sciences 1A, 10, 101 and 104.

Courses in Microbiology (MIC)

Lower Division Courses

10. Natural History of Infectious Diseases (3)
Lecture—3 hours. Topics in the natural history of infectious diseases principally affecting humans. Introduction to infectious microbial agents, ecology, epidemiology, and induction of disease. Focus on diseases of a contemporary nature. For students not majoring in the biological sciences. GE credit: SciEng.—III. (III.) Manning

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

100. Chemical and Biological Weapons (3)
Lecture/discussion—3 hours. Prerequisite: upper division standing. Ancient and modern history of chemical and biological weapons; mechanism of action; tactical and strategic uses; riot-control agents; international legal constraints; disarmament and nonproliferation; genomics and the future. GE credit: SciEng or SocSci.—III. (III.) Wheelis

102. General Bacteriology (4)
Lecture—4 hours. Prerequisite: Biological Sciences 1A and Chemistry 8B or Chemistry 118B (may be taken concurrently). Survey of the biology of bacteria and viruses, including bacterial structure, metabolism, physiology, genetics, and evolution; viral structure and replication; the role of bacteria in global element cycles; and the role of microbes in infectious disease.—I, II, III. (I, II, III.)

102L. General Bacteriology Laboratory (3)
Lecture/laboratory—7 hours. Prerequisite: course 102 (may be taken concurrently). Introduction to principles and laboratory methods employed in working with microorganisms. For students planning to continue the study of microbiology or to use microorganisms as tools for the study of genetics and biochemistry.—I, II, III. (I, II, III.)

105. Bacterial Diversity (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: courses 102, 102L, Biological Sciences 102 and consent of instructor; Biological Sciences 103 recommended. Survey of the major groups of bacteria emphasizing diversity of energy metabolism, morphology and natural history. Includes methods for determination of evolutionary relationships among groups. Isolation and characterization of bacterial strains from various habitats.—II. (II.) Nelson, Parales, Wheelis

120. Microbial Ecology (3)
Lecture—3 hours. Prerequisite: course 105, Biological Sciences 102. Interactions between nonpathogenic microorganisms and their environment, emphasizing physiological and metabolic characteristics of various groups and their adaptation to and modification of specific habitats.—III. (III.) Meeks

120L. Microbial Ecology Laboratory (2)
Laboratory—6 hours; one optional overnight weekend field trip. Prerequisite: course 120 (may be taken concurrently); consent of instructor. Study of prokaryotic microorganisms from certain habitats. One-half of laboratory effort will consist of organized experiments on ecologically important microbial activities. For remaining one-half, research projects will be done on student selected specific habitats of microorganisms. Limited enrollment. Not offered every year.

140. Bacterial Physiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 103 (may be taken concurrently); course 102 recommended (may be taken concurrently). Fundamentals of bacterial growth and bacterial responses to environmental stresses. Topics will include carbon and nitrogen regulation, growth rate control, post-exponential growth, and motility and chemotaxis. Not open for credit to students who have completed course 130A.—I. (I.) Singer, Meeks

150. Bacterial Genetics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, Biological Sciences 103 or course 140; course 102 recommended (may be taken concurrently). Molecular genetics of enterobacteria and their viruses. Isolation of mutants; genetic exchange and mapping; complementation; suppression; transposons; gene expression and regulation; and genomics. Examples illustrate applications to molecular cloning of recombinant DNA, and to the study of bacterial pathogenesis.—II. Roth

155L. Bacterial Physiology Lab (4)
Lecture/discussion—1 hour; laboratory—8 hours. Prerequisite: course 140 or 150, 102L, consent of instructor. Physiology and genetics of bacteria. Isolation and characterization of mutant strains. Mapping of mutations by conjugation and transduction studies of control of enzyme synthesis by induction, repression, and catabolite repression.—III. Singer

160. Bacterial Regulatory Mechanisms (3)
Lecture—3 hours. Prerequisite: course 140 or 150 recommended. Fundamentals of bacterial regulatory mechanisms. Topics will include control of DNA, RNA, and protein synthesis, global regulatory mechanisms, recombination, DNA repair systems, and cell cycle control with emphasis on bacterial systems. Not open for credit to students who have taken course 130B. (Former course 130B.) Not offered every year.

162. General Virology (4)
Lecture—4 hours. Prerequisite: Biological Sciences 1A, 102. Integrated presentation of the nature of animal, bacterial, and plant viruses, including their structure, replication and genetics.—II. (II.) Manning, Falk

170. Yeast Molecular Genetics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101 and 102; course 102 or 140 (may be take concurrently) strongly recommended. Survey of the genetics, cell biology and technologies in yeasts and related lower eukaryotes. Topics include diversity of yeasts; cell structure; metabolism; cell cycle; genetic approaches and genomics; gene expression; yeasts as models to study higher eukaryotes; and contemporary techniques.—III. (III.) Shiozaki

190C. Undergraduate Research Conference (1)
Discussion—1 hour. Prerequisite: upper division standing and consent of instructor, course 199 concurrently. Presentation and critical discussion of staff research activities: designed for advanced undergraduate students. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship (1-12)
Internship—3-36 hours. Technical and/or professional experience on or off campus. Supervised by a member of the Microbiology Section faculty. (P/NP grading only.)

194H. Microbiology Honors Research (2)
Independent study—6 hours. Prerequisite: senior standing; eligibility for college honors; completion of six units of 199 in microbiology; consent of section. Continuation of an individual microbiological research project culminating in writing of a senior thesis under a faculty director. (P/NP grading only.)

197T. Tutoring in Microbiology (1-12)
Prerequisite: upper division standing and consent of instructor. Assisting the instructor in one of the section's regular courses by tutoring individual or small groups of students in a laboratory, in voluntary discussion groups, or other voluntary course activities. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200A. Biology of Prokaryotes (3)
Lecture—3 hours. Prerequisite: course 102 or the equivalent. Intended for first year graduate students in microbiology and closely related fields. Overview of prokaryotic biology, with emphasis on phylogeny, physiology, and diversity of bacteria.—I. (I.)

200B. Advanced Bacteriology (3)
Lecture—3 hours. Prerequisite: course 200A. Intended for first year graduate students in microbiology and closely related fields. Advanced topics in phylogeny, physiology, and diversity of bacteria. Not offered every year.—II.

201L. Advanced Microbiology Laboratory Rotations (5)
Laboratory—15 hours. Prerequisite: course 200A (may be taken concurrently). Two five-week assignments in microbiology research laboratories. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated twice for credit.—I, II. (I, II.)

210. Molecular Mechanisms in Microbial Pathogenesis (3)
Lecture—3 hours. Prerequisite: course 105 or Veterinary Microbiology 127 and course 162 or Veterinary Microbiology 128 or the equivalent. Study of the molecular mechanisms involved in cytopathogenesis of higher eukaryotic organisms. Emphasis on the alteration or inhibition of cellular metabolism and function by bacteria and animal viruses. Not offered every year.

215. Recombinant DNA (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 103 or the equivalent. Application of recombinant DNA technology to modern problems in biology, biochemistry, and genetics, emphasizing molecular cloning strategies, choice of vectors, preparation of insert DNA, and selection procedures.—I. (I.) Privalsky

250. Biology of Yeasts (5)
Lecture—3 hours; discussion—2 hours. Prerequisite: Biological Sciences 102, 103; course 102, 102L; course 215 recommended. Survey of the genetics, physiology, metabolism, regulatory mechanisms, structure, cell biology, ecology and diversity of yeasts and related organisms. Offered in alternate years.—(II.) Bisson

260. Bacterial Genetic Regulatory Mechanisms (3)
Lecture/discussion—3 hours. Prerequisite: general knowledge of nucleic acid biochemistry and bacterial genetics. Analysis at the molecular level of genetic regulation in selected bacterial systems. Specific systems discussed will include the following types of regulation: control of transcription initiation and termination; translational controls; tRNA modification effects; autoregulation; control circuits in bacterial viruses; supercontrols. Not offered every year.

262. Advanced General and Molecular Virology (3)
Lecture—3 hours. Prerequisite: graduate standing. Advanced integrated presentation of animal, bacterial, and plant viruses, including their structure, modes of regulation, expression and replication, and effects on host cells and organisms.—(III.) Luciw, Bruening

263. Principles of Protein–Nucleic Acid Interactions (3)
Lecture—3 hours. Prerequisite: advanced graduate standing and completion of one year of basic graduate course work in biochemistry, biophysics, chemistry, genetics, microbiology, or molecular biology. Physical basis of protein–nucleic acid interaction. Topics include nucleic acid recognition by proteins, thermodynamics of protein–nucleic acid stability, and kinetics of binding process for both non-specific and sequence-specific nucleic acid binding proteins. Emphasis on systems that represent paradigms in protein–nucleic acid interactions. Offered in alternate years.—(III.) Kowalczykowski

274. Seminar in Genetic Recombination (1)
Seminar—1 hour. Prerequisite: graduate standing; consent of instructor. Biochemical and genetic aspects of genetic recombination in prokaryotes and eukaryotes. Mechanisms of recombination and biochemical and genetic characteristics of recombination proteins. Proteins include DNA strand exchange, DNA helicases, and Holliday junction resolving proteins. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Kowalczykowski

275. Seminar in DNA Repair and Recombination (1)
Seminar—1 hour. Prerequisite: consent of instructor; graduate standing in Microbiology or closely related field. Review and discussion of current research and literature in DNA repair and recombination with presentations by individual students and invited speakers. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Heyer

290C. Advanced Research Conference (1)
Discussion/conference—1 hour. Prerequisite: graduate standing and/or consent of instructor. Presentation and critical discussion of staff research activities. Designed for advanced graduate students. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291. Selected Topics in Microbiology (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Current progress in microbiology and cellular and molecular biology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

292. Seminar in Bacterial Physiology and Genetics (1)
Seminar—1 hour. Prerequisite: consent of instructor, graduate standing in microbiology or closely related field. Review and discussion of current research and literature in bacterial physiology and genetics, with presentations by individual students. (S/U grading only.)—I, II, III. (I, II, III.)

296. Seminar in Animal Virology (1)
Seminar—1 hour. Prerequisite: consent of instructor. Discussion of current topics in animal virology. (Same course as Pathology, Microbiology and Immunology 292A.) May be repeated for credit. (S/U grading only.)—II. Manning

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Microbiology (A Graduate Group)

Linda F. Bisson, Ph.D., Chairperson of the Group
Group Office, 3143 Tupper Hall (Medical Microbiology and Immunology), (530-752-0262)

Faculty

Stanley W. Artz, Ph.D., Professor *(Microbiology)*
Enoch P. Baldwin, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Peter A. Barry, Ph.D., Assistant Professor *(Comparative Medicine)*
Stephen W. Barthold, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Paul Baumann, Ph.D., Professor *(Microbiology)*
Blaine L. Beaman, Ph.D., Professor *(Medical Microbiology and Immunology)*
Charles L. Bevins, Ph.D., Professor *(Medical Microbiology and Immunology)*
Linda F. Bisson, Ph.D., Professor *(Viticulture and Enology)*
Richard M. Bostock, Ph.D., Professor *(Plant Pathology)*
George E. Bruening, Ph.D., Professor *(Plant Pathology)*
Sean M. Burgess, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Robert D. Cardiff, Ph.D., Professor *(Medical Pathology)*
Carol Cardona, Ph.D., Assistant Professor *(Veterinary Medicine)*
James R. Carlson, Ph.D., Professor *(Medical Pathology)*
R. Holland Cheng, Ph.D., Professor *(Molecular and Cellular Biology)*
Anthony T. W. Cheung, Ph.D., Professor *(Medical Pathology)*
Bruno B. Chomel, Ph.D., Professor *(Population Health and Reproduction)*
Ronald Y. Chuang, Ph.D., Professor *(Medical Pharmacology and Toxicology)*
Dean O. Cliver, Ph.D., Professor *(Population Health and Reproduction)*
Patricia A. Conrad, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
James S. Cullor, Ph.D., Associate Professor *(Population Health and Reproduction)*
Michael E. Dahmus, Ph.D., Professor *(Molecular and Cellular Biology)*
Satya Dandekar, Ph.D., Professor *(Medical Microbiology and Immunology)*
Roy H. Doi, Ph.D., Professor *(Molecular and Cellular Biology)*
Laurel J. Gershwin, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
M. Eric Gershwin, Ph.D., Professor *(Rheumatology)*
Bruce D. Hammock, Ph.D., Professor *(Entomology)*
Ronald P. Hedrick, Ph.D., Professor *(Medicine and Epidemiology)*
John W. B. Hershey, Ph.D., Professor *(Biological Chemistry)*
Wolf-Dietrich Heyer, Ph.D., Professor *(Microbiology)*
Michael J. Holland, Ph.D., Professor *(Biological Chemistry)*
Neil Hunter, Ph.D., Assistant Professor *(Microbiology)*
Michele M. Igo, Ph.D., Associate Professor *(Microbiology)*
Clarence I. Kado, Ph.D., Professor *(Plant Pathology)*
Kenneth B. Kaplan, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Stephen C. Kowalczykowski, Ph.D., Professor *(Microbiology)*
Hsing-Jien Kung, Ph.D., Professor *(Biological Chemistry)*
Rance B. LeFebvre, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Patrick S. C. Leung, Ph.D., Associate Adjunct Professor *(Internal Medicine)*
Su-Ju Lin, Ph.D., Assistant Professor *(Microbiology)*
Paul Luciw, Ph.D., Associate Professor *(Medical Pathology)*
N. James MacLachlan, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
JaRue S. Manning, Ph.D., Professor *(Microbiology)*
Karen A. McDonald, Ph.D., Professor *(Chemical Engineering and Material Science)*
John C. Meeks, Ph.D., Professor *(Microbiology)*
Christopher J. Miller, Ph.D., Associate Professor *(Pathology, Microbiology, and Immunology)*
David A. Mills, Ph.D., Assistant Professor *(Viticulture and Enology)*
Douglas C. Nelson, Ph.D., Professor *(Microbiology)*
Thomas W. North, Ph.D., Professor *(Center for Comparative Medicine)*
Jodi Nunnari, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
David M. Ogrydziak, Ph.D., Professor *(Food Science and Technology)*
Bennie I. Osburn, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Demosthenes Pappagianis, Ph.D., Professor *(Medical Microbiology and Immunology)*
Rebecca E. Parales, Ph.D., Assistant Professor *(Microbiology)*
Niels C. Pedersen, Ph.D., Professor *(Medicine and Epidemiology)*
Donald A. Phillips, Ph.D., Professor *(Agronomy and Range Science)*
Edmund R. Powers, Ph.D., Assistant Professor *(Molecular and Cellular Biology)*
Martin L. Privalsky, Ph.D., Professor *(Microbiology)*
Kathryn Radke, Ph.D., Associate Professor *(Animal Science)*
Gary H. Rhodes, Ph.D., Associate Adjunct Professor *(Pathology)*
John R. Roth, Ph.D., Professor *(Microbiology)*
Dewey D. Y. Ryu, Ph.D., Professor *(Chemical Engineering and Material Science)*
Michael A. Savageau, Ph.D., Professor *(Biomedical Engineering)*
Kate M. Scow, Ph.D., Associate Professor *(Land, Air, and Water Resources)*
Irwin H. Segel, Ph.D., Professor *(Molecular and Cellular Biology)*
Barbara L. Shacklett, Ph.D., Assistant Professor *(Medical Microbiology and Immunology)*
Kazuhiro Shiozaki, Ph.D., Assistant Professor *(Microbiology)*
Mitchell H. Singer, Ph.D., Associate Professor *(Microbiology)*
Jay V. Solnick, Ph.D., Assistant Professor *(Internal Medicine)*
Jeffrey L. Stott, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Michael Syvanen, Ph.D., Professor *(Medical Microbiology and Immunology)*
Jose V. Torres, Ph.D., Assistant Professor *(Medical Microbiology and Immunology)*
Tilahun D. Yilma, Ph.D., Professor *(Pathology, Microbiology, and Immunology)*
Glenn M. Young, Ph.D., Assistant Professor *(Food Science and Technology)*

Affiliated Faculty

Marta L. Marthas, Ph.D., Assistant Adjunct Professor *(California Regional Primate Research Center)*

Earl T. Sawai, Ph.D., Assistant Adjunct Professor *(Medical Pathology)*
Ellen E. Sparger, Ph.D., Adjunct Professor *(Medicine and Epidemiology)*

Graduate Study. The Graduate Group in Microbiology offers study and research leading to the M.S. and Ph.D. degrees. Strong preference is given to doctoral applicants. The group offers study in general microbiology, microbial physiology, microbial genetics, molecular mechanisms of microbial regulation, molecular mechanisms of microbial pathogenesis, immunology, virology, and recombinant DNA technology. For information on the graduate study and undergraduate preparation for the program contact a graduate adviser or the Chairperson of the Group.

Graduate Advisers. L.F. Bisson *(Viticulture and Enology),* R.B. LeFebvre *(Pathology, Microbiology and Immunology),* K. Shiozaki *(Microbiology),* K.M. Scow *(Land, Air and Water Resources).*

Courses in Microbiology (MIB)

Graduate Courses

290C. Advanced Research Conference (1)
Discussion/conference—1 hour. Prerequisite: graduate standing and/or consent of instructor. Presentation and critical discussion of staff research activities. Designed for advanced graduate students. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

299. Research (1-12)
Research under the guidance of dissertation committee. (S/U grading only.)

Military Science

(College of Letters and Science)

Reserve Officers' Training Corps (ROTC), Army

John V. Scudder, Lt. Col., Chairperson of the Department

Department Office, 125 Hickey Gymnasium (530-752-5211)

Faculty

Major Sandra L. Fusco, Associate Professor
Major Paul S. Ague, Assistant Professor
Captain Todd E. Kramer, Assistant Professor

Program of Study

The Military Science Department offers hands-on training in management and leadership. The program stresses the following leadership dimensions: oral and written communications, oral presentations (formal briefings), initiative, sensitivity, influence, planning and organizing, delegation, administrative control, problem analysis, judgement, decisiveness, physical stamina, mission accomplishment, and followership. Also stressed are current events, national and international politics, military affairs, ethics training, and human relations with emphasis on eliminating racial and gender discrimination. Management and leadership are taught using the U.S. Army as a model. Military skills (such as drill and ceremonies, map reading, and squad tactics) are taught to the extent necessary to create an environment where students can enter leadership positions and apply theories taught in the classroom. Students learn by doing. The program assists students in all academic fields to prepare for positions of leadership in military or civilian careers.

The department offers two program tracks: *(1)* a purely academic track, and *(2)* a precommissioning track for those desiring a commission in the U.S. Army. The academic track entails no obligation to the military and is open to all students. Students pursuing the academic track do not wear a uniform or otherwise participate in extra-curricular activities designed as part of the precommissioning process. Activities for all students include the Ranger Club (a club designed for adventure activites such as rappelling, white-water rafting, orienteering, and patrolling) and intramural sports teams.

Students who desire a commission in the U.S. Army participate in both the academic portion of the program and in the leadership laboratories and extra-curricular activities designed to enhance their leadership and technical skills. They wear uniforms to leadership laboratories and selected classes and become ROTC cadets. Students may be cadets in the lower division courses without incurring a military obligation. Students participating in the upper division precommissioning program incur a military obligation. See below for details. Extra-curricular activites for cadets include an intercollegiate sports team (Ranger Challenge), the university color guard, a military honor society, and opportunities to participate in field training exercises.

Department Programs

Students are enrolled in military science under one of two programs.

Four-Year Program

Students are enrolled in the basic course (lower division) for the first two years on a voluntary basis. **There is no military obligation associated with attendance in lower division courses.** Admission to the advanced course (upper division) is by application from second-year lower division students who meet the academic, physical, and military aptitude requirements. Qualified veterans can enter the advanced course immediately because of their military service experience, upon approval by the Department Chairperson.

Upper division students receive $200 subsistence per month after executing a contract agreeing to complete the course and **accept a commission if offered.** During the course, all military science text books, uniforms and equipment are provided without cost. Students are given leadership development experience at summer camp (advanced camp) between their third and fourth years of the course. Emphasis is on individual participation, leadership development and the capability to function effectively in positions of significant responsibility.

Two-Year Program

The two-year program is for students who have not attended lower division Military Science classes. In lieu of lower division courses an applicant attends a six-week summer camp (basic camp) which is voluntary and carries no military obligation. Applicants are paid for camp attendance and transportation costs. Applications are accepted during the winter and spring terms of the year preceding enrollment in the two-year program. All other provisions explained above for the upper division course apply to the two-year program.

Scholarship Program

The U.S. Army offers four-, three-, and two-year Active Duty and two-year Reserve Forces Duty scholarships to students planning to attend or attending UC Davis. The U.S. Army ROTC scholarship package pays tuition and educational fees. Also included in all scholarships is a flat rate of $510 per year for textbooks, up to $400 per year for miscellaneous fees such as laboratory, student activity, transcript, and graduation fees, and a subsistence allowance of $200 a month for 10 months for each year that the scholarship is in effect.

The Army Reserve Officers' Training Corps four-year Active Duty merit scholarships are awarded to qualified high school seniors in a national competition each year. There are two cycles available for submission of the four-year scholarship application. High school juniors can compete for an Early Cycles scholarship by submitting their application complete and postmarked by July 15 between their junior and senior years. As high school seniors, students compete for the Regular Cycle scholarship by submitting their application complete and postmarked by December 1. Those applicants not selected in the Early Cycle are considered in the Regular Cycle competition. Interested applicants should apply online (www.monroe.army.mil) or contact UC Davis, Department of Military Science at (530) 752-7682.

The three-year Active Duty and two-year Reserve Forces Duty scholarships are awarded to college students who are already attending UC Davis or transferring from a junior college to UC Davis, and have three or two years remaining before graduating with a baccalaureate. Students interested in competing for these scholarships can submit their application beginning in November of each school year. The deadline for submission of an application is April 15 for the two-year scholarship and March 1 for the three-year scholarship. Students apply for and are awarded these Army scholarships through the Military Science Department.

Leadership Laboratory

During the course of the school year, several weekends and two hours per week are spent in the conduct of practical exercises. Classes emphasize adventure activities including offense, defense and patrolling techniques, weapons familiarization, rappelling, rope bridging, obstacle courses, leadership reaction course, and land navigation. All cadets are required to attend leadership laboratories for practical leadership experience and to prepare for attendance at the Army ROTC Advanced Camp, held at Fort Lewis, Washington.

Academic Credit

College of Letters and Science. The Bachelor of Arts degree requires the completion of 180 units. Military Science courses are counted in the allowance for electives.

College of Agricultural and Environmental Sciences. The Bachelor of Science degree in agriculture requires the completion of 180 units. Military Science courses are counted in the unit allowance for electives.

College of Engineering. Military Science units are acceptable toward the requirements for the Bachelor of Science degree to the extent of the unrestricted elective units available in the curriculum being followed.

School of Veterinary Medicine. The number of Military Science units acceptable toward the Bachelor of Science degree in Veterinary Medicine is on an individual program basis approved by the Dean of the School. Graduates with the D.V.M. degree may apply for direct commission in the United States Army Veterinary Corps.

Courses in Military Science (MSC)

Lower Division Courses

11. Roles and Organization of the U.S. Army (1)
Lecture—1 hour. Prerequisite: lower division standing. Constitutional and legal basis of the Army, organization and strategic roles in times of war and peace, and "total Army" concept. Impact of civil-military relations and Soviet military power on role of Army studied in context of current problems.—I. (I.)

12. Introduction to Military Leadership (2)
Lecture—2 hours. Prerequisite: lower division standing, and consent of instructor. Introduction to leadership theories used in military organizations. Course surveys the duties and responsibilities of junior Army officers, the general environment in which they work, and leadership roles performed. Introduces military map reading skills.—I. (I.)

13. Introduction to Basic Military Operations (1)
Lecture—1 hour. Prerequisite: lower division standing. Basic military tactical theories and their application at the individual and squad level. Course

introduces military tactical operations, and covers military first aid. Principles of war as introduced in course 11 are applied to offensive and defensive tactics.—III. (III.)

14A. Introduction to Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: lower division standing and consent of instructor; completion of all previous laboratories. Personal and organizational leadership skills introduced in leadership laboratory. Extensive supervised leadership experiences conducted in a military environment. Basic military skills necessary to function in a leadership role are also covered. (P/NP grading only.)—I. (I.)

14B. Introduction to Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: lower division standing and consent of instructor; completion of all previous laboratories. Development of leadership and military skills introduced in course 14A is continued with emphasis on the individual's role in the squad, the basic organizational element of the Army. As students gain capabilities, supervisory controls are reduced. (P/NP grading only.)—II. (II.)

14C. Introduction to Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: lower division standing and consent of instructor; completion of all previous laboratories. Students demonstrate skill levels required for promotion to non-commissioned officer level. Use of chain of command from company through individual levels emphasized. Interrelationship of squad and platoon organizations is explored. (P/NP grading only.)—III. (III.)

21. Military History (2)
Lecture—2 hours. Prerequisite: lower division standing; course 11 or consent of instructor. Survey of military history from 1900 to present, focusing on World War I, World War II, the Korean War, and the Vietnam War.—III. (III.)

22A. Intermediate Military Leadership and Operations I (2)
Lecture—2 hours. Prerequisite: lower division standing; course 12 or consent of instructor. Develops and exercises personal military leadership skills in extensive supervised leadership laboratories. Intermediate level military skills necessary for leadership roles as junior non-commissioned officers are developed. Students perform in role of junior non-commissioned officers.—I. (I.)

22B. Intermediate Military Leadership and Operations II (2)
Lecture—2 hours. Prerequisite: lower division standing; course 22A or consent of instructor. Continuation of course 22A. Individual leadership traits identified in course 22A are studied in more depth enabling each student to improve on targeted weaknesses. Instruction is presented in intermediate defensive tactics at the squad level.—II. (II.)

24A. Individual Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: lower division standing; courses 14A, 14B, 14C and 21, or consent of instructor. Develops and exercises personal military leadership skills in extensive supervised leadership laboratories. Intermediate level military skills necessary for leadership roles as junior non-commissioned officers are developed. Students perform in role of junior non-commissioned officers. (P/NP grading only.)—I. (I.)

24B. Individual Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: lower division standing; courses 14A, 14B, 14C and 21, or consent of instructor. Personal supervisory and leadership styles are developed in a supervised laboratory environment. Students are rotated through squad and team-level supervisory positions, given responsibility concomitant with positions. (P/NP grading only.)—II. (II.)

24C. Individual Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: lower division standing; courses 14A, 14B, 14C and 21, or consent of instructor. Students are prepared for transition from junior leader to senior non-commissioned officer. Chain of command and hierarchical responsibilities and reporting requirements are demonstrated in a laboratory setting. (P/NP grading only.)—III. (III.)

Upper Division Courses

131. Advanced Military Leadership and Management (2)
Lecture—2 hours. Prerequisite: upper division standing; course 22A or consent of instructor. Course addresses different types of power and influence a military leader may use, reviews counseling techniques, and introduces basic management skills. Instruction provided on the various branches in which a commissioned officer may serve.—III. (III.)

132A. Advanced Military Operations (2)
Lecture—2 hours. Prerequisite: upper division standing; course 22B or consent of instructor. First phase of advanced military tactical operations. Advanced work on topographical maps, navigation, and orienteering techniques. Instruction is also provided on resource planning techniques and military intelligence.—I. (I.)

132B. Advanced Military Operations (2)
Lecture—2 hours. Prerequisite: upper division standing; course 132A or consent of instructor. Continuation of course 132A. Military tactical theories and their application in offense and defense are presented at the platoon and company level. Course covers in-depth analysis of the principles of war related to offensive and defensive operations.—II. (II.)

134A. Military Organizational Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing; courses 24A-24B-24C or consent of instructor. Students develop interpersonal and management skills by practical application of leadership of military organizations in a supervised leadership laboratory. Advanced-level military skills presented. Students fulfill the roles of senior non-commissioned officers. (P/NP grading only.)—I. (I.)

134B. Military Organizational Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing; courses 24A-24B-24C or consent of instructor. As more complex material is presented in classroom, the laboratory environment becomes more challenging. Students serve as senior non-commissioned officers in squad, platoon and company levels, given appropriate authority and responsibility. (P/NP grading only.)—II. (II.)

134C. Military Organizational Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing; courses 24A-24B-24C or consent of instructor. Students prepared for advanced summer training experience by extensive requirements to plan, organize and conduct military operations in field environments; individual leadership potential is closely assessed in the laboratory environment. (P/NP grading only.)—III. (III.)

141. U.S. Army Management Systems (2)
Lecture—2 hours. Prerequisite: upper division standing and course 131. Army decision making, personnel and equipment management. Includes command and staff functions, training, intelligence gathering, techniques for the conduct of meetings, and logistics management procedures at unit level.—III. (III.)

142. Military Law (2)
Lecture—2 hours. Prerequisite: upper division standing and course 141. Analysis of the American Military Justice System, the Uniform Code of Military Justice, the Hague and Geneva Conventions, and customary law of war. Includes detailed study of selected procedures of military justice system.—II. (II.)

143. Military Ethics and Professionalism (2)
Lecture—2 hours. Prerequisite: upper division standing and course 142. Profession of arms, its characteristics, uniqueness, roles, and responsibilities. Discussion topics include the professional soldier's responsibilities to the Army and the Nation, and the need for ethical conduct. Case studies are used to develop ethical decision making skills.—I. (I.)

144A. Military Training Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing; courses 134A, 134B, 134C, and 141. Develops and exercises the leadership skills necessary to plan, coordinate and conduct a training program through practical application under supervision. Emphasis on analysis of objectives, instructor planning, media utilization and evaluation of learning. Students perform as cadet officers. (P/NP grading only.)—I. (I.)

144B. Military Training Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing; courses 134A, 134B, 134C, and 141. Requirements for training of all other levels of the cadet corps are given to students for conduct in laboratory environment (under supervision). Students placed in realistic role of junior officer with appropriate level of responsibility. Students perform as cadet staff officers. (P/NP grading only.)—II. (II.)

144C. Military Training Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing; courses 134A, 134B, 134C, 141. Final laboratory in military science sequence; students are prepared for final testing and certification prior to commissioning as officers. Students will demonstrate all leadership skills necessary to commissioned officers. Students perform leadership tasks at platoon, company, and battalion levels. (P/NP grading only.)—III. (III.)

191. Special Studies in Military Science (2)
Independent study—6 hours. Prerequisite: consent of department chair, and courses 131, 132A, 132B, 141, 142, 143. Intensive examination of one or more special problems in military science. Possible areas of study include leadership dimensions, principles of war, air-land battle imperatives, military strategy, the operational art and professional ethics, May be repeated twice for credit when topic differs. (P/NP grading only.)

Aerospace Studies (Air Force)

The Air Force Reserve Officer's Training Corps (AFROTC) is an educational program providing training in leadership, management, communications and military proficiency on college and university campuses. It also provides an opportunity to obtain a commission as a second lieutenant in the Air Force and enter the active duty forces after you complete a bachelor's or a graduate degree. The skills you acquire will become valuable assets for any subsequent career you choose.

The program is normally four years long, but a flexible design allows students to complete the curriculum in as little as two years. Undergraduate scholarships are available, but are not necessary for participation. Until you accept a scholarship or enter your junior year of the program, you have no obligation to join the Air Force. There are no costs for AFROTC uniforms, books, or classes.

UC Davis students have the option of taking the Air Force program on the UC Berkeley or CSU Sacramento campus.

Qualifications

Freshmen/Sophomore applicants must:

- be full-time college students in good academic standing
- have good moral character
- be in strong physical condition
- be at least 14 years old

Additionally, Juniors/Seniors/Scholarship recipients must:

- be United States citizens or in the process of applying for citizenship
- be 18 years old (or 17 years old with consent of parent or guardian)
- pass the Air Force Officer Qualifying Test
- pass a medical examination
- be under the age of 30 at time of graduation (may be waived)

Scholarships

Opportunities for four-year and three-year undergraduate scholarships are better than ever. Scholarships cover the full cost of tuition, books and required fees at the University of California and are available for eligible high school seniors. It also includes $150 monthly stipend during the school year. If you are a junior or senior in high school and plan on attending a college or university in Northern California, you can write, call or visit the local AFROTC detachments for a scholarship application. Applications are also available from local Air Force recruiters or your high school guidance counselors.

All scholarships are merit-based and consider a variety of factors: cumulative GPA, class standing, SAT/ACT scores, academic awards/achievements, leadership ability, athletic involvement, extracurricular activities, community service and letters of recommendation. All scholarship recipents must graduate and be commissioned before their 27th birthday (may be waived for prior military personnel). A personal interview with an Air Force officer is also part of the application process. Prior to activating a scholarship, students must meet AFROTC medical and physical fitness standards. All scholarships must be used at an accredited college or university that offers AFROTC on campus or through cross-registration. The program is available at more than 700 universities and colleges nationwide.

If you are already in college, contact our office directly and apply for enrollment into AFROTC as a cadet. Three- and two-year full tuition scholarships are available for all academic majors, especially scientific and technical majors such as engineering, atmospheric science, math, computer science, and physics. GPA Scholarship requirements for nontechnical majors are slightly higher. Applicants are primarily evaluated on their leadership ability and academic performance. Scholarship boards meet throughout the year for scientific and technical majors and in July for all academic majors. Scholarships also include a $150 monthly stipend throughout the school year, required books and fees. Other loans and grants may be used towards room and board costs.

Challenging Careers

All commissioned officers enter the Air Force as second lieutenants for a 4-year active duty service commitment. Pilots and navigators serve longer commitments, based on training requirements. Once on active duty, you'll be given instant responsibility in one of 32 primary career fields. Opportunities to fly are better than ever. Whether you are piloting the F-22 fighter, supervising 150 aircraft maintainers on the flightline, or caring for sick personnel in the emergency room, you will be rewarded knowing that you are making a difference.

AFROTC at UC Berkeley

AFROTC Detachment 85
176 Hearst Gym, Berkeley, CA, 94720-3610
(1-800-852-5747 or 510-642-3572);
e-mail: brown@uclink4.berkeley.edu
http://airforcerotc.berkeley.edu

To receive hands-on leadership and management practice, freshmen and sophomores take a one-hour academic course and a two-hour Leadership Laboratory each week; juniors and seniors take a three-hour course plus the lab. All units can be used as elective credit towards graduation. See the Military Sciences course listings in the UC Berkeley catalog. Classes are held during the fall and spring semesters and the curriculum includes the history of airpower, leadership and management topics, communication skills, and national security issues.

Between the sophomore and junior years, cadets compete to attend a four- or six-week field training program at a designated Air Force base. This competitive program consists of physical conditioning, outdoor survival training, career and aircraft orientations and an evaluation of leadership potential. Additional optional training opportunities are available during the summer months and include the Royal Air Force Exchange Program, Pentagon Internships, Jump School and Glider Training at the Air Force Academy, and summer job shadowing. Students are also encouraged to participate in optional orientation flights, base visits, and community service projects throughout the school year.

AFROTC at CSU Sacramento

California State University Sacramento
Public Service Building, Room 208
6000 J Street
Sacramento, CA 95819-6094
(916-278-7315)

The CSUS Department of Aerospace Studies offers two-, three-, or four-year programs leading to a commission in the U.S. Air Force. About 30 percent of the corps commute to CSUS from UC Davis. All course work (12 or 16 semester units) is completed on the CSUS campus. Drills and courses are normally offered on Tuesdays, Wednesdays, and Thursdays. Field training is conducted at an active Air Force base during part of the summer, normally between the student's sophomore and junior years.

Upon completion of the program (integrated with UC Davis' quarter system) and all requirements for a bachelor's degree, cadets are commissioned as second lieutenants in the Air Force and serve a minimum of four years on active duty. Graduates who are qualified and are selected may enter pilot or navigator training after graduation, or serve in a specialty consistent with their academic major, individual goals, and existing Air Force needs. Graduates may request a delay of entry to active duty to continue their education or may apply for Air Force sponsored graduate study to begin immediately upon entry to active duty. Due to firm scheduling requirements for the AFROTC program, students are encouraged to work closely with their academic advisers in planning their academic program.

AFROTC offers 3-year and 2-year scholarships to qualified students. Applications are accepted in any academic discipline. Express scholarships are currently available for qualified students majoring in electrical engineering and meteorology. Express scholarships pay up to $15,000 annually in tuition and fees, $480 per year in textbooks, and $150 per month stipend.

Applications should normally be no later than the first quarter of a student's sophomore year. Juniors, seniors, and graduate students may also apply under certain conditions. Contact the Unit Admissions Officer in the Aerospace Studies Department at CSUS (916-278-7315) for information.

Naval ROTC

Department of Naval Science
152 Hearst Gymnasium, UC Berkeley
Berkeley, CA 94270-3640
(510-642-3551);
http://navyrotc.berkeley.edu

UC Davis students may participate in the Navy and Marine Corps ROTC program at UC Berkeley. The program is 4 years long and includes courses and weekly professional development laboratories (drill) at UC Berkeley. Students normally compete for national scholarships as high school seniors, although interested students may enroll as freshmen or sophomores and compete for scholarships based on successful participation in the program. A student who satisfactorily completes an ROTC program and is awarded a degree from UC Davis receives an active duty commission as a Second Lieutenant in the U.S. Marine Corps or an Ensign in the U.S. Navy.

Navy option students take the following courses:

Freshman year:
- NS 1 Introduction to Naval Science
- NS 2 Sea Power and Maritime Affairs

Sophomore:
- NS 3 Leadership and Management
- NS 10 Naval Ship Systems I

Junior:
- NS 12A Navigation and Naval Operations I
- NS 12B Navigation and Naval Operations II

Senior year:
- NS 401 Naval Ship Systems II
- NS 412 Leadership and Ethics

In lieu of NS401, NS10, NS12A and NS12B, Marine Corps students participate in Marine Seminars and complete MA154, History of Littoral Warfare and MA20, Evolution of Warfare (or a designated equivalent).

Scholarship students are required to complete a number of other courses at Davis, including one year each of calculus, physics, and English, and one quarter each of computer science, and military history or national security policy.

Interested students should contact the Department of Naval Science at UC Berkeley at the address above to obtain information and apply.

Molecular Biosciences

See Veterinary Medicine, School of

Molecular and Cellular Biology

Michael E. Dahmus, Ph.D., Chairperson of the Section
Section Office, 149 Briggs Hall (530-752-3611)
http://www-mcb.ucdavis.edu

Faculty

Primary Section Members
Peter B. Armstrong, Ph.D., Professor
Enoch Baldwin, Ph.D., Assistant Professor
Ronald J. Baskin, Ph.D., Professor
Sean M. Burgess, Ph.D., Assistant Professor
Kenneth C. Burtis, Ph.D., Professor
Judy Callis, Ph.D., Professor
Frederic L. Chedin, Ph.D., Assistant Professor
R. Holland Cheng, Ph.D., Professor
James S. Clegg, Ph.D., Professor
John H. Crowe, Ph.D., Professor
Michael E. Dahmus, Ph.D., Professor
Roy H. Doi, Ph.D., Professor
JoAnne Engebrecht, Ph.D., Associate Professor
Carol A. Erickson, Ph.D., Professor
Marilynn E. Etzler, Ph.D., Professor
Andrew Fisher, Ph.D., Associate Professor *(Chemistry)*
Charles S. Gasser, Ph.D., Professor
Kenneth B. Kaplan, Ph.D., Assistant Professor
John A. Kiger, Ph.D., Professor
J. Clark Lagarias, Ph.D., Professor
Francis J. McNally, Ph.D., Associate Professor
Richard W. Michelmore, Ph.D., Professor *(Vegetable Crops; Medical Microbiology and Immunology)*
Diana G. Myles, Ph.D., Professor
Jeanette E. Natzle, Ph.D., Associate Professor
Jodi Nunnari, Ph.D., Associate Professor
Edmund R. Powers, Ph.D., Assistant Professor
Raymond L. Rodriguez, Ph.D., Professor
Lesilee S. Rose, Ph.D., Associate Professor
Carl W. Schmid, Ph.D., Professor *(Chemistry)*
Jonathan M. Scholey, Ph.D., Professor
Irwin H. Segel, Ph.D., Professor
Henning Stahlberg, Ph.D., Assistant Professor
Daniel A. Starr, Ph.D., Assistant Professor
David K. Wilson, Ph.D., Associate Professor

Secondary Section Members
Leslie D. Gottlieb, Ph.D., Professor
John J. Harada, Ph.D., Professor
Wolf-Dietrich Heyer, Ph.D., Professor

Stephen C. Kowalczykowski, Ph.D., Professor
William J. Lucas, Ph.D., Professor
Brian Mulloney, Ph.D., Professor
Sharman O'Neill, Ph.D., Professor
Pamela A. Pappone, Ph.D., Professor
Martin L. Privalsky, Ph.D., Professor
Steven M. Theg, Ph.D., Professor
Larry N. Vanderhoef, Ph.D., Professor
Martin Wilson, Ph.D., Professor

Emeriti Faculty

Don M. Carlson, Ph.D., Professor Emeritus
Sterling Chaykin, Ph.D., Professor Emeritus
Eric E. Conn, Ph.D., Professor Emeritus, Academic *Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement*
Richard S. Criddle, Ph.D., Professor Emeritus
David W. Deamer, Ph.D., Professor Emeritus
Gordon J. Edlin, Ph.D., Professor Emeritus
Richard H. Falk, Ph.D., Professor Emeritus
Melvin M. Green, Ph.D., Professor Emeritus
Robert D. Grey, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
Jerry L. Hedrick, Ph.D., Professor Emeritus
Mark G. McNamee, Ph.D., Professor Emeritus
Che-Kun J. Shen, Ph.D., Professor Emeritus
Larry R. Sprechman, Ph.D., Senior Lecturer Emeritus
Paul K. Stumpf, Ph.D., Professor Emeritus
Robert M. Thornton, Ph.D., Senior Lecturer Emeritus, *Academic Senate Distinguished Teaching Award*

Affiliated Faculty

Benjamin F. Edwards, Ph.D., Lecturer
Kenneth L. Hilt, Ph.D., Lecturer
Parisa Jazbi, Ph.D., Lecturer
Deborah A. Kimbrell, Ph.D., Lecturer
Judith A. Kjelstrom, Ph.D., Academic Coordinator/ Lecturer
Leann L. Lindsay, Ph.D., Lecturer
Larry Z. Morand, Ph.D., Lecturer
Carol M. Rubin, Ph.D., Lecturer
Mark F. Sanders, Ph.D., Lecturer
Leigh D. Segel, Ph.D., Lecturer

The section of Molecular and Cellular Biology offers three major programs: Biochemistry and Molecular Biology, Cell Biology, and Genetics.

The Biochemistry and Molecular Biology Major Program

The Biochemistry and Molecular Biology major introduces students to the chemistry of living organisms and the experimental techniques that are used to probe the structures and functions of biologically important molecules. Students who enjoy both chemistry and biology and who are comfortable with quantitative approaches to problem solving will find this major a rewarding field of study.

The Program. The biochemistry and molecular biology program begins with the four-course, upper division common curriculum that provides an introduction to the principles of biochemistry, genetics, and cell biology. Majors then take a comprehensive and rigorous laboratory course to familiarize them with the most important aspects of biochemical research. Additional upper division courses in biochemistry and molecular biology examine detailed aspects of these subjects. Students are also required to take courses in other biological sciences and a full year of physical chemistry.

Career Alternatives. The biochemistry and molecular biology program provides a solid scientific background for students seeking a research, teaching, or service career in the life sciences. Positions are open to biochemists in bio-medical, bio-technological, pharmaceutical, agricultural research and chemical industries. Also, university-affiliated research laboratories, hospital laboratories, and government-sponsored research facilities provide employment opportunities. The major provides excellent preparation for advanced study in graduate or professional schools.

B.S. Major Requirements:

	UNITS
Preparatory Subject Matter	**54-58**
Biological Sciences 1A-1B-1C	15
Chemistry 2A-2B-2C	15
Mathematics 16A-16B-16C or 21A-21B-21C	9-12
Physics 7A-7B-7C	12
Statistics 13, 32, 100 or 102	3-4
Depth Subject Matter	**53-54**
Biological Sciences 101, 102, 103, 104	13
Chemistry 118A-118B-118C or 128A-128B-128C, 129A-129B	12-13
Chemistry 107A-107B, 108	9
Molecular and Cellular Biology 120L, 121, 122, 123	15
Restricted Electives	4
Upper division courses in biological sciences or chemistry. Students are encouraged to obtain additional laboratory experience; however, no more than 3 units of 192, 193 or 199 may be counted toward Restricted Elective units.	
Total Units for the Major	**107-112**

Master Adviser. R.H. Doi

Advising Center for the major is located in 156 Briggs (530-752-9032).

Graduate Study. See Biochemistry and Molecular Biology (A Graduate Group); and the Graduate Studies chapter of this catalog.

The Cell Biology Major Program

The Cell Biology major program provides students with a comprehensive understanding of the cell, the basic structural and functional unit of all living organisms.

The Program. To understand living organisms, the biologist must understand the cell. Hence, cell biology lies at the core of the biological sciences. Students taking this major gain a solid foundation in biological principles. The major emphasizes how cellular organization and function contribute to the development, maintenance and reproduction of adult organisms. The major illustrates the ways in which principles derived from the physical sciences, genetics, biochemistry, molecular biology and physiology are integrated in the study of living cells and emphasizes the experimental nature of the study of cell biology.

Career Alternatives. The major provides an excellent background for students wishing to enter post-graduate and professional programs in biological, health sciences or veterinary sciences; for students pursuing careers involving teaching or research in the biological sciences; for students interested in careers in the biotechnological or pharmaceutical industries; or for students interested in careers related to the administrative, legal or commercial aspects of biomedical science.

B.S. Major Requirements:

	UNITS
Preparatory Subject Matter	**61-67**
Biological Sciences 1A-1B-1C	15
Chemistry 2A-2B-2C	15
Mathematics 16A-16B-16C	9
Physics 7A-7B-7C	12
Statistics 13 or 100 (recommended)	4
Chemistry 8A-8B or 118A-118B-118C	6-12
Depth Subject Matter	**45-47**
Biological Sciences 101, 102, 103, 104	13
Molecular and Cellular Biology 140L, 150, 150L	9
Two courses from Molecular and Cellular Biology 143, 144, or 145	6
Molecular and Cellular Biology 121 or 161	3
One additional upper division laboratory course from: Molecular and Cellular Biology 120L, 160L; Pathology, Microbiology and Immunology 126 and 126L	4-6
Select at least 10 units from the following: Chemistry 107A, 107B, 108; Molecular and Cellular Biology 120L, 138, 142, 148, 158, 160L, 163, 178; Neurobiology, Physiology, and Behavior 103; Pathology, Microbiology, and Immunology 126, 126L; no more than 4 units of research (193, 194H, 199) can be used for credit in this category	10
Total Units for the Major	**106-114**

Master Adviser. D.G. Myles

Advising Center for the major is located in 156 Briggs (530-752-0202).

The Genetics Major Program

The Genetics major provides a broad background in the biological, mathematical, and physical sciences basic to the study of heredity, gene expression and evolution. The major is sufficiently flexible to accommodate students interested in the subject either as a basic discipline in the biological sciences or in terms of its applied aspects such as biotechnology, medicine, and agriculture.

The Program. The genetics program begins with the four-course, upper division core curriculum that provides an introduction to the principles of genetics, biochemistry, and cell biology. Students then take additional upper division courses in specialized areas of modern genetics including gene expression, evolution, development, human genetics and genomics, as well as a laboratory course in the principles of genetics. Additional upper division courses in biological sciences , as well as internship/ research coursework can be chosen to fulfill required elective units.

Career Alternatives. The genetics degree provides suitable preparation for a wide variety of careers, including teaching, research, work with biotechnology companies, medicine, and all the health sciences. It is also an excellent background for students wishing to continue their education in a graduate program, a teacher-training program, medical school, veterinary school, or other professional schools.

B.S. Major Requirements:

	UNITS
Preparatory Subject Matter	**57-66**
Biological Sciences 1A-1B-1C	15
Chemistry 2A-2B-2C or 2AH-2BH-2CH	15
Chemistry 8A-8B or 118A-118B-118C	6-12
Mathematics 16A-16B-16C or 21A-21B-21C	9-12
Physics 7A-7B-7C	12
Depth Subject Matter	**48-49**
Biological Sciences 101, 102, 103, 104	13
Molecular and Cellular Biology 160L, 164	7
Evolution and Ecology 100	4
One course from Molecular and Cellular Biology 161 (recommended) or 121	3
Two courses from Molecular and Cellular Biology 162, 163, 182 or Evolution and Ecology 102	6-7
Statistics 100	4
Restricted Electives	11
Upper division courses in genetics or other fields relevant to the student's interest chosen in consultation with the adviser. No more than 4 units of 192, 193, 198, or 199 can be used for credit in this category.	
Total Units for the Major	**105-115**

Master Adviser. J.E. Natzle

Advising Center for the major is located in 156 Briggs Hall (530-752-0202).

Graduate Study. The Graduate Group in Genetics offers study and research leading to the M.S. and Ph.D. degrees in Genetics.

Courses in Molecular and Cellular Biology (MCB)

Lower Division Courses

10. Introduction to Human Heredity (4)
Lecture—3 hours; discussion—1 hour. Topics in human heredity and human gene structure and function, including the genetic basis of human development, causes of birth defects, mental retardation, genetic diseases, sexual determination, development, and behavior. GE credit: SciEng.—III. (III.) Sanders

99. Special Study (1-5)
Independent study—3-15 hours. Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

120L. Biochemistry Laboratory (6)
Laboratory—10 hours; lecture—2 hours; laboratory/discussion—1 hour. Prerequisite: Biological Sciences 103 (may be taken concurrently). Introduction to laboratory methods and procedures employed in studying biochemical processes. Designed for students who need experience in the use of biochemical techniques as laboratory tools.—I, II, III. (I, II, III.) Fairclough, Hilt, J.C. Lagarias, Lindsay, L. Morand, Rubin, L. Segel

121. Molecular Biology of Eukaryotic Cells (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101 and 103. Structure, expression, and regulation of eukaryotic genes. Chromosome structure and replication; gene structure, transcription, and RNA processing; protein synthesis and translation control; development, immune system, and oncogenes. Not open for credit to students who have completed Molecular and Cellular Biology 161.—II, III. (II, III.) Dahmus, Gasser, Harmer

122. Structure and Function of Proteins (3)
Lecture—3 hours. Prerequisite: course 120L, Biological Sciences 103. Correlation of structure and biological function. Molecular models of enzymes that explain their physiological functioning. Physical and chemical methods used in determining protein structure. Function as measured by kinetic and binding models and as affected by physiological considerations.—I, II. (I, II.) Baldwin, Sprechman, Stahlberg

123. Behavior and Analysis of Enzyme and Receptor Systems (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103. Introduction to the principles of enzyme kinetics and receptor-ligand interactions with emphasis on metabolic regulation and data analysis. Topics include simultaneous equilibria, chemical and steady-state kinetics, allosteric enzymes, mulitreactant systems, enzyme assays, membrane transport and computer-assisted simulations and analyses.—I, III. (I, III.) I. Segel, Wilson

126. Plant Biochemistry (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1C or the equivalent, and Biological Sciences 103. The biochemistry of important plant processes and metabolic pathways. Discussion of methods used to understand plant processes, including use of transgenic plants. (Same course as Plant Biology 126.)—III. (III.) Abel, Callis

138. Undergraduate Seminar in Biochemistry (1)
Seminar—1 hour. Prerequisite: Biological Sciences 103. Discussion of the historical developments of modern biochemistry or current major research problems. May be repeated twice for credit when topic differs. (P/NP grading only.)—I, II, III. (I, II, III.) Baldwin, Callis, Etzler, Gasser

140L. Cell Biology Laboratory (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 104 (may be taken concurrently). Exercises illustrating the principles of cell biology with emphasis on light microscopy.—II. (II.) Edwards, Nunnari

142. Advanced Cell Biology: Contractile and Motile Systems (4)
Lecture—3 hours; term paper. Prerequisite: Biological Sciences 102, 104 (may be taken concurrently); Mathematics 16B. Advanced cell biology with emphasis on molecular, biophysical and cellular properties of contractile and motile systems.

143. Cell Biophysics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 103, 104. Physical principles underlying observations and mechanisms of cell motility. Organization of biomolecules into higher order subcellular structures that function as macromolecular machines. Examples include cytoskeletal filaments, polymer-motor systems, neurites, axonemes and mitotic spindles.—I. (I.) Scholey

144. Mechanisms of Cell Division (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 104. The molecules and mechanisms that allow eukaryotic cells to coordinate cell growth, DNA replication, segregation of chromosomes and cell division.—II. (II.) McNally

145. Assembly and Function of Cell Signaling Machinery (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 104. Molecular basis of cell signaling, including positioning of cellular machinery, components of various signaling pathways, and downstream effects of signaling on cell adhesion, cell differentiation, and programmed cell death.—(III.) Erickson

148. Undergraduate Seminar in Cell Biology (2)
Seminar—2 hours. Prerequisite: upper division standing in the biological sciences or a related discipline. Student reports on current topics in cell biology with emphasis on integration of concepts, synthesis, and state-of-the-art research approaches. Reviews of literature and reports of undergraduate research may be included. May be repeated for credit. (P/NP grading only.)

150. Embryology (4)
Lecture—4 hours. Prerequisite: Biological Sciences 101 and concurrent enrollment in course 150L. The events and mechanisms of embryonic development, including fertilization, morphogenesis, cell differentiation and organogenesis, with emphasis on vertebrates.—I, III. (I, III.) Armstrong, Edwards

150L. Laboratory in Vertebrate Embryology (1)
Laboratory—3 hours. Prerequisite: concurrent enrollment in course 150. The comparative analysis of the embryonic development of vertebrates. (P/NP grading only.)—I, III. (I, III.) Edwards

158. Undergraduate Seminar in Developmental Biology (2)
Seminar—2 hours. Prerequisite: upper division standing in the biological sciences or a related discipline. Student reports on current topics in cell biology with emphasis on integration of concepts, synthesis, and state-of-the-art research approaches. Reviews of literature and reports of undergraduate research may be included. May be repeated for credit. (P/NP grading only.)

160L. Principles of Genetics Laboratory (4)
Laboratory—6 hours; lecture—2 hours. Prerequisite: Biological Sciences 101. Laboratory work in basic and molecular genetics including gene mapping and isolation of mutants. Not open for credit to students who have completed Genetics 100L.—I, II, III. (I, II, III.) Britt, Burtis, Jazbi, Kiger, Natzle, Rose, Sanders

161. Molecular Genetics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, Biological Sciences 102 may be taken concurrently. Molecular mechanisms for propagation and expression of the genome in eukaryotic and prokaryotic model organisms. How genetic and molecular tools, both classical and modern, are applied to the study of gene structure, function, and regulation. Not open for credit to students who have completed course 121.—II. (II.) Powers

162. Human Genetics (3)
Lecture—3 hours. Prerequisite: course 161 (preferred) or 121, 164. Human molecular genetic variation, molecular basis of metabolic disorders, chromosome aberrations and consequences, analysis of the human genome, and computational techniques of genetic analysis.—I. (I.) Sanders

163. Developmental Genetics (3)
Lecture—3 hours. Prerequisite: course 161 (preferred) or 121, course 164. Current aspects of development genetics. Historical background and current genetic approaches to the study of development of higher animals.—II. (II.) Natzle

164. Advanced Eukaryotic Genetics (3)
Lecture—3 hours. Prerequisite: course 161 or 121. The five basic operations of genetic analysis: mutation, segregation, recombination, complementation, and regulation. Emphasis on the theory and practice of isolating and analyzing mutations, as well as understanding mechanisms underlying both Medelian and epigenetic inheritance.—III. (III.) Burgess

178. Undergraduate Seminar in Molecular Genetics (1)
Seminar—1 hour. Prerequisite: upper division standing, completion of Biological Sciences 101, course 160L, and completion or concurrent enrollment in course 161. Discussion of current topics in molecular genetics to show advanced applications of basic principles and to highlight professional career opportunities. May be repeated for credit. (P/NP grading only.)—I. (I, II, III.) Rodriguez

182. Principles of Genomics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, course 121 or 161. Fundamentals of genomics, including structural genomics, functional genomics, proteomics, and bioinformatics, focusing on the impact of these disciplines on research in the biological sciences. Social impacts of genomic research.—III. (III.) Burtis

190C. Undergraduate Research Conference (1)
Discussion—1 hour. Prerequisite: upper division standing and consent of instructor; concurrent enrollment in course 193 or 199. Presentation and discussion of current research by faculty and students. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

191. Introduction to Research (1)
Seminar—1 hour. Prerequisite: Biological Sciences 102 (may be taken concurrently) or consent of instructor. Various topics in molecular and cellular biology including biochemistry, genetics, and cell biology will be discussed, along with ways undergraduates can participate in research projects of faculty members. May be repeated for credit. (P/NP grading only.)—I, III. (I, II.) L. Segel

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Technical and/or practical experience on and off campus, supervised by a member of the Section of Molecular and Cellular Biology faculty. (P/NP grading only.)

193. Advanced Research (3)
Laboratory—6 hours; discussion—1 hour. Prerequisite: upper division standing, completion of an upper division Molecular and Cellular Biology laboratory course and consent of instructor. Research project carried out under the supervision of a faculty sponsor. Discussion and analysis of results and proposed experiments on a weekly basis with faculty sponsor. May include presentation of a seminar to a research group. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

194H. Research Honors (3)
Independent study—9 hours. Prerequisite: 6 units of course 193 and/or 199 with faculty director; senior standing; GPA of at least 3.25; consent of Section. Honors project. Continuation of an intensive, individual laboratory research project in biochemistry, genetics, or cell biology culminating with the presentation of the work in a written thesis and in a seminar. (P/NP grading only.)

197T. Tutoring in Molecular and Cellular Biology (1-5)
Tutorial—2-6 hours. Prerequisite: upper division standing, completion of course to be tutored, and consent of instructor. Assisting the instructor in one of the section's regular courses by tutoring individual

or small groups of students in a laboratory, in voluntary discussion groups, or other voluntary course activities. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III,)

198. Directed Group Study (1-5)
Variable—1-5 hours. Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Independent study—3-15 hours. Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200A. Current Techniques in Cell Biology (2)
Lecture—2 hours. Prerequisite: graduate standing; Biological Sciences 104 and course 141 or the equivalent courses. Current techniques used in cell biology research including microscopy, spectroscopy, electrophysiology, immunochemistry, histology, organelle isolation, calorimetry, tissue culture and gel electrophoresis. Lectures are presented by experts on each technique, with an emphasis on pitfalls to avoid when using the technique. (Same course as Cell and Developmental Biology 200.) (S/U grading only.)—I. (I.) Beck

200B. Current Techniques in Biochemistry (2)
Lecture—2 hours. Prerequisite: Biological Sciences 103 and course 120L or the equivalent. Current techniques used in biochemical research including protein and carbohydrate analyses, immunochemistry, recombinant DNA methods, electrophoretic and chromatographic methods. (S/U grading only.)—II. (II.) Kaplan, Schmid

200C. Current Techniques in Biophysics (2)
Lecture—2 hours. Prerequisite: graduate standing; Biological Sciences 102 or 104 or the equivalent. Current techniques in biophysics research including diffraction, magnetic resonance spectroscopy, calorimetry, optical spectroscopy, and electrophysiology. (Same course as Biophysics Graduate Group 200.) (S/U grading only.)—III. (III.)

220L. Advanced Biochemistry Laboratory Rotations (5)
Laboratory—15 hours. Prerequisite: course 221A (may be taken concurrently) and 120L or the equivalent. Two five-week assignments in biochemistry research laboratories. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated twice for credit.—I, II, III. (I, II, III.) Hunter, Kaplan, S. Lin

221A. Physical Biochemistry (4)
Lecture—4 hours. Prerequisite: Biological Sciences 103, Chemistry 107B, 108, and 128C, 129C, or 118C or the equivalent or consent of instructor. Chemical and physical properties of biomacromolecules emphasizing the interrelationship of molecular interactions and thermodynamic properties as determinants of higher order structure. The use of NMR and crystallography in determining macromolecular structure.—I. (I.)

221B. Mechanistic Enzymology (3)
Lecture—3 hours. Prerequisite: undergraduate level organic and biological chemistry, one course in physical chemistry recommended. Analysis of organic enzyme reaction mechanisms and the exploration of enzyme catalyzed reactions.—I. (I.) Toney

221C. Molecular Biology (4)
Lecture—4 hours. Prerequisite: course 221A or the equivalent. Pass 1 restricted to graduate students in biochemistry and molecular biology, microbiology, or genetics. Structure and organization of DNA and chromatin; DNA replication, repair and recombination; transcription and RNA processing; protein biosynthesis and turnover; transcriptional and post-transcriptional control mechanisms; examples from eukaryotic and eubacterial cells, and viruses. (Same course as Genetics 201C.)—III. (III.) Baldwin, Burgess, H. Chen, Heyer, Powers, Stewart

221D. Cellular Biochemistry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 102, course 221A or the equivalent or consent of instructor. Molecular structure and biophysical properties of cell membranes; organelle biogenesis and trafficking; signal transduction, metabolism and metabolic regulation; cytoplasmic organization, biophysics of the cytoskeleton and force-generating mechanisms, mechanism of intracellular transport and mitosis; cell reproduction and the cell cycle.—II. (II.)

241. Membrane Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 102, 103, 104 or consent of instructor. Advanced topics on membrane biochemistry and biophysics. Relationship of the unique properties of biomembranes to their roles in cell biology and physiology. (Same course as Biophysics 241.)—III. (III.) Crowe, Longo, Voss

242. Muscle Biophysics (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: Biological Sciences 102, 103 and Mathematics 16B or 21B; or consent of instructor. The physical and chemical aspects of muscle function.

248. Seminar in Cell Biology (2)
Seminar—2 hours. Prerequisite: consent of instructor. Discussion of recent literature on the physical and chemical aspects of organization and function of living systems, topics of current interest in ultrastructure and function of cells. Organizational and functional properties of the molecular and cellular levels of biological systems. May be repeated for credit.—I. (I.) Myles

251. Biology of Fertilization (3)
Lecture—2 hours; term paper. Prerequisite: Biological Sciences 104 or the equivalent, and consent of instructor. The morphology, physiology, and biochemistry of gametes, and the mechanism and consequences of their union. Offered in alternate years.—(I.) Myles

252. Cellular Basis of Morphogenesis (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 150. Development of form and structure; morphogenetic movement, mechanisms of cellular motility, cell adhesion, intercellular invasion, interaction of cells and tissues in development. Offered in alternate years.—(II.) Armstrong

255. Molecular Mechanisms in Animal Development (3)
Lecture—1.5 hours; seminar—1.5 hours. Prerequisite: graduate standing or consent of instructor; introductory background in developmental biology and molecular genetics recommended. Analysis of the molecular mechanisms that control animal development, with a special focus on multiple levels of gene regulation. Experimental systems including Drosophila, amphibians, C. elegans, and mice will be discussed. Readings will be taken from current literature. Offered in alternate years.—III. Natzle, L. Rose

256. Cell and Molecular Biology of Cancer (2)
Lecture—1 hour; term paper. Prerequisite: course in cell or developmental biology (e.g., course 150, 141, 163, or Biological Sciences 104). Analysis at the cellular and molecular levels of the regulation of normal and neoplastic tissue growth; tumor dissemination; identification and characterization of oncogenic agents; characterization of oncogenes and tumor-suppressor genes.—I. (I.) Armstrong

257. Cell Proliferation and Cancer Genes (3)
Lecture—1.5 hours; seminar—1.5 hours. Prerequisite: course 221C and 221D or the equivalent. Genetic and molecular alterations underlying the conversion of normal cells to cancers, emphasizing regulatory mechanisms and pathways. Critical reading of the current literature and development of experimental approaches.—I. (I.) Radke

258. Seminar in Development (2)
Seminar—2 hours. Prerequisite: consent of instructor. Reports and discussion on embryology, morphogenesis, and developmental mechanisms. May be repeated for credit.—II. (II.) Armstrong, Erickson, Myles

259. Literature in Developmental Biology (1)
Seminar—1 hour. Prerequisite: consent of instructor. Critical presentation and analysis of recent journal articles in developmental biology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Armstrong, Erickson, Myles

262. Transgenic Expression Systems (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101 and course 161 or consent of instructor. The molecular biology underlying current transgenic expression systems. Strategies for achieving regulated expression and secretion of proteins. Survey of bacterial, yeast, insect cell, mammalian cell, plant and animal expression systems. Offered in alternate years.—Rodriguez

263. Biotechnology Fundamentals and Application (2)
Lecture—2 hours. Prerequisite: Biological Sciences 101, 102, Microbiology 102, graduate student in good standing. To train graduate students interested in a biotechnology career track; to learn recombinant DNA, rate processes of biological systems, optimization of bioreactor performance, practical issues in biotechnology, and some case studies of the development of biotechnology products and processes. Offered in alternate years.

282. Biotechnology Internship (7-12)
Internship—21-36 hours. Prerequisite: graduate standing and consent of instructor. Research at a biotechnology company or interdisciplinary cross-college lab for a minimum of 3 months as part of the Designated Emphasis in Biotechnology Program. (S/U grading only.)—I, II, III. (I, II, III.) Dandekar

290C. Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Presentations and critical discussions of faculty and graduate student research in molecular and cellular biology including biochemistry, genetics, and cell biology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291. Current Progress in Molecular and Cellular Biology (1)
Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Seminars presented by guest lecturers on subject of their own research activities. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Burgess

294. Current Progress in Biotechnology (1)
Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Seminars presented by guest lecturers on subjects of their own research activities. May be repeated for credit. (Same course as Chemical Engineering 294.) (S/U grading only.)—I, II, III. (I, II, III.) Doi, Kjelstrom, Ryu

295. Literature in Molecular and Cellular Biology (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Critical reading and evaluation of current literature in molecular and cellular biology disciplines. Papers will be presented and discussed in detail. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Baldwin, Fisher, Myles, Privalsky, Radke, Wilson

298. Group Study (1-5)
Variable—1-5 hours. Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
Independent study—3-36 hours. (S/U grading only.)

Professional Course

390. Methods of Teaching (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Practical experience in the methods and problems of teaching biochemistry/genetics/cell biology. Includes analysis of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion and laboratory sections, formulating examinations under supervision of instructor. Participating in the teaching program required for Ph.D. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Molecular, Cellular, and Integrative Physiology (A Graduate Group)

Martha E. O'Donnell, Ph.D., Chairperson of the Group

Group Office, 310 Life Sciences Addition (530-752-9092)

http://biosci.ucdavis.edu/ggc/pgg

Faculty

Thomas E. Adams, Ph.D., Professor *(Animal Science)*
Gary B. Anderson, Ph.D., Professor *(Animal Science)*
Joseph F. Antognini, M.D., Professor *(Anesthesiology and Pain Medicine)*
Hilary P. Benton, Ph.D., Associate Professor *(Anatomy, Physiology and Cell Biology)*
Trish J. Berger, Ph.D., Professor *(Animal Science)*
Sue Bodine, Ph.D., Professor *(Exercise Science)*
Ann C. Bonham, Ph.D., Professor *(Medical Pharmacology and Toxicology)*
Michael L. Bruss, D.V.M., Ph.D., Professor *(Anatomy, Physiology and Cell Biology)*
Peter M. Cala, Ph.D., Professor *(Physiology and Membrane Biology)*
C. Christopher Calvert, Ph.D., *(Animal Science)*
Richard C. Carlsen, Ph.D., Professor *(Physiology and Membrane Biology)*
Earl E. Carstens, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Joseph J. Cech, Jr., Ph.D., Professor *(Wildlife, Fish, and Conservation Biology)*
Leo M. Chalupa, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Ernest S. Chang, Ph.D., Professor *(Bodega Marine Laboratory)*
Tsung-Yu Chen, Ph.D., Assistant Professor *(Neurology)*
Gary N. Cherr, Ph.D., Professor *(Bodega Marine Laboratory)*
Nipavan Chiamvimonvat, M.D., Associate Professor *(Cardiovascular Medicine)*
Alan J. Conley, D.V.M, Ph.D., Professor *(Population Health and Reproduction)*
Carroll E. Cross, M.D., Professor *(Internal Medicine, Human Physiology)*
John H. Crowe, Ph.D., Professor *(Molecular and Cellular Biology)*
Fitz-Roy E. Curry, Ph.D., Professor *(Physiology and Membrane Biology)*
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J. David Furlow, Ph.D., Assistant Professor *(Neurobiology, Physiology, and Behavior)*
Dorothy W. Gietzen, Ph.D., Professor *(Anatomy, Physiology and Cell Biology)*
Jack M. Goldberg, Ph.D., Senior Lecturer *(Neurobiology, Physiology, and Behavior)*
Michael N. Goodman, Ph.D., Professor *(Endocrinology)*
Thomas P. Hahn, Ph.D., Assistant Professor *(Neurobiology, Physiology and Behavior)*
Barbara A. Horwitz, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Andrew T. Ishida, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Lynelle R. Johnson, D.V.M., Ph.D., Assistant Professor *(Medicine and Epidemiology)*
James H. Jones, D.V.M., Ph.D., Professor *(Surgical and Radiological Sciences)*
Thomas Jue, Ph.D., Professor *(Biological Chemistry)*
C. Tissa Kappagoda, M.D., Professor *(Internal Medicine)*
Marc P. Kaufman, Ph.D., Professor *(Internal Medicine, Physiology and Membrane Biology)*
George A. Kaysen, M.D., Professor *(Internal Medicine)*
Nguyen D. Kien, Ph.D., Professor *(Anesthesiology and Pain Medicine)*
Mark Kittleson, Ph.D., Professor *(Medicine and Epidemiology)*
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Roger B. McDonald, Ph.D., Professor *(Nutrition)*
James R. Millam, Ph.D., Professor *(Animal Science)*
Gabrielle A. Nevitt, Ph.D., Associate Professor *(Neurobiology, Physiology, and Behavior)*
Martha E. O'Donnell, Ph.D., Professor *(Physiology and Membrane Biology)*
Anita M. Oberbauer, Ph.D., Professor *(Animal Science)*
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John A. Payne, Ph.D. Associate Professor *(Physiology and Membrane Biology)*
Isaac N. Pessah, Ph.D., Professor *(Molecular Biosciences)*
Helen E. Raybould, Ph.D., Professor *(Anatomy, Physiology and Cell Biology)*
Michael P. Remler, M.D., Professor *(Neurology)*
Janet F. Roser, Ph.D., Professor *(Animal Science)*
John C. Rutledge, M.D., Professor *(Internal Medicine)*
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Espen E. Spangenburg, Ph.D., Assistant Professor *(Exercise Biology)*
Charles L. Stebbins, Ph.D., Professor *(Internal Medicine, Physiology and Membrane Biology)*
Eugene P. Steffey, V.M.D., Ph.D., Professor *(Surgical and Radiological Sciences)*
Judith S. Stern, Sc.D., Professor *(Nutrition, Internal Medicine)*
Alice F. Tarantal, Ph.D., Professor *(Pediatrics)*
Amparo Villablanca, M.D., Associate Professor *(Internal Medicine)*
Peter C. Wainwright, Ph.D., Professor *(Evolution and Ecology)*
W. Jeffrey Weidner, Ph.D. Professor *(Neurobiology, Physiology, and Behavior)*
Robert H. Weiss, M.D., Professor *(Internal Medicine)*
Jonathan Widdicombe, Ph.D., Professor *(Physiology and Membrane Biology)*
Barry W. Wilson, Ph.D., Professor *(Animal Science)*
Martin Wilson, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Phyllis M. Wise, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Dorothy E. Woolley, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Reen Wu, Ph.D., Professor *(Anatomy, Physiology and Cell Biology)*
Clare E. Yellowley, Ph.D., Assistant Professor *(Anatomy, Physiology and Cell Biology)*

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Edmund M. Bernauer, Ph.D., Professor Emeritus
Irwin Feinberg, M.D., Professor Emeritus
Sarah D. Gray, Ph.D., Professor Emeritus
John M. Horowitz, Ph.D., Professor Emeritus

Affiliated Faculty

Steven E. Anderson, Ph.D., Associate Researcher *(Physiology and Membrane Biology)*
Chao-Yin Chen, Ph.D., Assistant Research Physiologist *(Medical Pharmacology and Toxicology)*
Peter J. Havel, D.V.M., Ph.D., Associate Researcher *(Nutrition)*
Marta D. Van Loan, Ph.D., Associate Adjunct Professor *(Nutrition)*
Catherine A. VandeVoort, Ph.D., Associate Adjunct Professor *(Obstetrics and Gynecology)*

Graduate Study. The Graduate Group in Molecular, Cellular and Integrative Physiology offers programs of study and research leading to the M.S. and Ph.D. degrees and participates in joint Ph.D./M.D. and Ph.D./D.V.M. programs. The programs emphasize broad training in the fundamental principles of cellular, molecular, and integrative physiology. For information regarding these programs, address the Program staff person at the group office.

Graduate Advisers. *A. Conley (Population Health and Reproduction),* D. Gietzen *(Anatomy, Physiology and Cell Biology),* J. Goldberg *(Neurobiology, Physiology, and Behavior), V. Kumari (Cell Biology and Human Anatomy),* A. Oberbauer *(Animal Science).*

Courses in Molecular, Cellular, and Integrative Physiology (MCP)

(Formerly courses in Physiology)

Graduate Courses

200L. Animal Cell Culture Laboratory (4)
Discussion—2 hours; laboratory—6 hours. Prerequisite: courses in undergraduate biochemistry, cell biology, or general physiology, or consent of instructor. Techniques of cell culture, with emphases on cell physiology and the actions of drugs and toxicants on cultured somatic cells. Design, performance and interpretation of experiments with animal cells in vitro.—II. (II.) B. Wilson, R. Wu

210A-210B-210C. Advanced Physiology (4-6-6)
Lecture—3 hours (210A) or 5 hours (210B and 210C); discussion—1 hour. Prerequisite: graduate student in the Physiology Graduate Group Ph.D. program, or consent of instructor. Advanced course on general principles of physiology, surveying homeostasis, cellular and selected topics, and neurophysiology. (Physiology 210A is the same course as Human Physiology 210A.)—I-II-III. (I-II-III.)

214. Neurophysiology (4)
Lecture—4 hours. Prerequisite: Neurobiology, Physiology and Behavior 111B, 112; consent of instructor. Electrical activity of neurons and neuroeffector junctions; physiology of the nervous system as studied by its electrical activity.

216. Neurophysiology Literature (3)
Lecture—1 hour; discussion—2 hours. Lectures covering experimental and theoretical methods in studying cell membrane ion channels and the resulting characterization of the physiological functions and structure/function relationships of some of the most important channel types. Discussion of classical and current original papers.—I. (I.) Pappone

218. Topics in Circulatory Pathophysiology (3)
Lecture—1 hour; discussion—2 hours. Prerequisite: graduate standing. Selected topic in circulatory or cardiopulmonary physiology will be addressed each offering. Topics will include pathophysiology. Lecture and discussion based on current research literature in the field. May be repeated with consent of instructor. Offered in alternate years.—II. Weidner

219. Muscle Growth and Development (3)
Lecture—2 hours; seminar—1 hour. Prerequisite: Biological Sciences 103, Biological Sciences 104 or Molecular and Cellular Biology 150, or consent of instructor. Integration of growth and development of skeletal muscle; morphology, biochemistry, neural control mechanisms, circulatory and nutritional factors. Prenatal and neonatal differentiation of fiber

types. Experimental and hereditary myopathies. Offered in alternate years.—III. Bodine, Carlsen

220. General and Comparative Physiology of Reproduction (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology and Behavior 110, 110L; Biological Sciences 101, 103. Basic phenomena of sexual and asexual reproduction and comparisons of processes in a wide variety of animals; gamete formation, structure, and metabolism; fertilization; neuroendocrine mechanisms in maturation and reproductive cycles; behavioral aspects.—III. (III.) Anderson, Conley, Lasley

222. Mammalian Gametogenesis and Fertilization (3)
Lecture/discussion—3 hours. Prerequisite: Neurobiology, Physiology and Behavior 121 or the equivalent. Course will emphasize our current understanding of events in mammalian gametogenesis and the fertilization process. Published results, conclusions drawn from these results, and their contribution to our understanding will be discussed.—III. (III.) Berger

230. Advanced Endocrinology (2)
Lecture—2 hours. Prerequisite: Neurobiology, Physiology and Behavior 130 or the equivalent, and graduate standing. Focus on timely topic of endrocrine research. Critical review of current literature and discussion of future research strategies in the area. May be repeated for credit when topic differs.

231. Neuroendocrinology (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology and Behavior 110 or the equivalent course in systemic physiology; Neurobiology, Physiology and Behavior 130 or the equivalent course in endocrinology. Neural-endocrine interactions; neural regulation of the endocrine system, especially in relation to reproduction; the role of hormones and growth factors in sexual differentiation of the brain.

234. Neurophysiological Basis of Neurotoxicology (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology and Behavior 110 or the equivalent; basic understanding of neurophysiology. Mechanisms of action at the cellular and systemic level of a number of different neurotoxins and toxicants. Examples of ways toxins may act on the nervous system and techniques for study of neurotoxicology. (Same course as Environmental Toxicology 234.)—I. (I.) Woolley

242. Biological Rhythms (3)
Lecture—2 hours; lecture/discussion—1 hour. Prerequisite: Neurobiology, Physiology and Behavior 110 or the equivalent. General aspects and basic mechanisms of biological rhythms; the importance of rhythm desynchronization in areas of pharmacology and space medicine; telemetry; mathematical methods; chronometry; daily, reproductive, and annual periods; shift-work, jet lag and sleep disorders. Offered in alternate years.—(I.) Fuller

261A. Topics in Vision: Eyes and Retinal Mechanisms (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing, Neurobiology, Physiology, and Behavior 100 or 112 or the equivalent. Structure and function of the visual system, with emphasis on the eye and retina, including optics, anatomy, transduction, retinal synapses, adaptation, and parallel processing. (Same course as Neuroscience 261A and Neurobiology, Physiology, and Behavior 261A.) (S/U grading only.)—II. (II.) Ishida

261B. Topics in Vision: Systems, Psychophysics, Computational Models (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor; course 261A recommended. Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system. (Same course as Neuroscience 261B and Neurobiology, Physiology, and Behavior 261B.) (S/U grading only.) Offered in alternate years.—II. Olshausen

261C. Topics in Vision: Clinical Vision Science (2)
Lecture/discussion—2 hours. Prerequisite: courses 261A and 261B, or consent of instructor. Causes and mechanistic bases of major blinding diseases. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system related to disease. (Same course as Neuroscience 261C and Neurobiology, Physiology, and Behavior 261C.) (S/U grading only.) Not offered every year.—III. Werner

275. Neurohumoral Regulatory Mechanisms of Thermogenesis (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Biological Sciences 104 or the equivalent; Biological Sciences 102 or the equivalent; consent of instructor. Designed for graduate and advanced undergraduate students, this course will examine thermogenic systems in homeotherms (primarily mammals) with respect to regulation (hormonal and central nervous control) and effector mechanisms (basis of heat generation at the target cell).

290. Seminar (1)
Seminar—1 hour. Discussion and critical evaluation of advanced topics and current trends in research. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Conference in Physiology (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Presentation and discussion of faculty and graduate student research in physiology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291B. Seminar in Cellular Mechanisms of Adaptation (1)
Discussion—0.5 hour; seminar—0.5 hour. Prerequisite: Neurobiology, Physiology and Behavior 100B; Biological Sciences 103; consent of instructor. Review and evaluation of current literature and research in cellular adaptations to the environment. May be repeated for credit when topic differs. (S/U grading only.)

291D. Research Approaches in Physiology (2)
Seminar—2 hours. Prerequisite: graduate standing in Graduate Group in Physiology or consent of instructor. Current research in physiology. Overall design of experiments and particular research areas. (S/U grading only.)—II. (II.) Eiserich, Raybould

293. Current Progress in Physiology (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Seminars presented by guest lecturers describing their current research activities. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Professional Courses

300A-300B. Pedagogical Aspects of Physiology in Higher Education (3-3)
Lecture, discussion, or laboratory, or combination. Prerequisite: meet qualifications for teaching assistant in physiology. Participation as a teaching assistant for one quarter in a designated physiology course. Instruction in methods of leading discussion groups, leading laboratory sections, writing and grading quizzes, operation and use of laboratory equipment, and reading and grading laboratory reports. Course meets teaching requirements for Ph.D. program in Physiology. (S/U grading only.)—I, II, III. (I, II, III.)

390. The Teaching of Physiology (1)
Discussion—1 hour. Prerequisite: Teaching Assistant assignment to a physiology lecture course and consent of instructor. Practical experience in methods and problems of teaching physiology lecture courses. May include analyses of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion sessions, and formulation of topics and questions for examinations under supervision of instructor. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Music

(College of Letters and Science)
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Phebe Craig, M.M., Lecturer
Andrew D. Frank, M.A., Professor
Sandra Graham, Ph.D., Assistant Professor
D. Kern Holoman, Ph.D., Professor, *Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement*
Beth Levy, Ph.D., Assistant Professor
Samuel Nichols, Ph.D., Lecturer
David A. Nutter, Ph.D., Professor
Pablo Ortiz, D.M.A., Professor
Christopher A. Reynolds, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Rita Sahai, M.A., Lecturer
Laurie San Martin, Ph.D., Assistant Professor
Jeffrey Thomas, Associate Professor
Amelia Triest, B.A., Lecturer

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Sydney R. Charles, Ph.D., Professor Emeritus
Albert J. McNeil, M.S., Professor Emeritus
Jerome W. Rosen, M.A., Professor Emeritus
Wayne Slawson, Ph.D., Professor Emeritus

Faculty Affiliates in Applied Music

Keith Bohm, D.M.A., Lecturer (saxophone)
Lois Brandwynne, M.A., Lecturer (piano)
Tod Brody, B.A., Lecturer (flute)
Bruce Chrisp, M.M., Lecturer (trombone)
Laura Chrisp, B.M., Lecturer (oboe)
Susan Lamb Cook, M.A., Lecturer (cello)
Phebe Craig, M.M., Lecturer (harpsichord)
Thomas Derthick, B.M., Lecturer (string bass)
Christopher Froh, M.M. (percussion)
David Granger, M.M., Lecturer (bassoon)
Lenore Heinson, Lecturer (voice)
Agnes Lee, M.M. (harp)
Calvin Lymos, B.A., Lecturer (gospel choir)
Michael McMullen, Lecturer (jazz band)
Scott Macomber, M.M., Lecturer (trumpet)
David Newman, M.M., Lecturer (voice)
Peter Nowlen, B.M., Lecturer (french horn)
Ellen Ruth Rose, M.M., Lecturer (viola)
Michael Sand, M.M., Lecturer (violin)
Jerome Simas, M.M. (clarinet)
Marilyn Swan, B.M., Lecturer (piano)

The Empyrean Ensemble

Tod Brody, flute
Peter Josheff, clarinet
Terrie Baune, violin
Ellen Ruth Rosa, viola
Thalia Moore, cello

The Major Program

The Bachelor of Arts degree in music provides both a broad liberal arts education and the skills necessary to explore music through its history, composition, theory, and performance. Students majoring in music may choose from three tracks in the major: composition and theory, music history, or performance. Students in each of these tracks take a common core of courses before taking required specialized courses and choosing from a group of elective courses. Students following the track in Composition and Theory take advanced theory courses and/or seminars in composition; students following the track in Music History take specialized seminars in music history (recent topics

include the music of Berlioz and Film Music); and students following the track in Performance take an increased number of lessons and performance ensemble courses as well as conducting. All majors are expected to complete a substantial project (composition, recital, research presentation) in the senior year. Music majors who intend to pursue graduate studies in music are encouraged to satisfy the requirements of one of the honors programs in music.

Study Abroad and the Music major. The department strongly encourages interested students to pursue a portion of their studies abroad. Within the constraints of the campus and college residence requirements, it is possible for students to complete portions of the Music major at an international institution provided that the student consults with one of the undergraduate advisers and carefully plans a course of study abroad that will complement their coursework at Davis. In recent years, UC Davis Music majors have spent one quarter of a full year during their junior or senior years completing upper division coursework at EAP partner institutions in Italy, Germany, Australia, England, and France.

The Program. A fundamental grounding in music theory, music history, and performance during the first two years of study leads to more specialized study of composition, history, criticism, and performance during the last two years of undergraduate work.

Career Alternatives. Many students who graduate with a degree in music continue on to careers in medicine, law, or business. Students who graduate with a B.A. in music from UC Davis have gone on to graduate programs in music at major universities and conservatories in the country. Some have become professors at distinguished universities or have received teaching credentials to teach at primary or secondary schools; others have become editors or found employment in music advertising or record companies.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 27-45

Music 2A, 2B, 2C, 6A, 6B, 6C, 16A, 16B, 16C, 24A, 24B, 24C* 18-30

Music 7A, 7B, 7C, 17A, 17B, 17C** 9-15

* Note: Students may pass out of one or more quarters of Music 2A-C, and 16A-C through examination

** Note: Students may pass out of one or more quarters of Music 17A-C through examination.

Depth Subject Matter..... 36-37

Choose upper division courses from one of the following tracks:

Track 1: Theory/Composition..... 36-37
- Music 124A, 124B 6
- At least 11 units selected from Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147, 154 11
- Music 101A, 101B 8
- Music 103 or 199 (for composers); or Music 122 (for theorists)*** 3-4
- At least 8 units selected from Music 102, 107A, 107B, 107C, 108A, 108B, 113, 114, 122, 198, 199 8
- *** Note: Music 103 and 199 may be taken only once for credit toward the major.

Track 2: Music History..... 37
- Music 124A, 124B 6
- At least 11 units selected from Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147, 154 11
- Two quarters of Music 121 (on different subjects)..... 8
- At least 12 units selected from Music 101A, 101B, 102, 107A, 107B, 107C, 108A, 108B, 113, 114, 121, 122, 198, 199 12

Track 3: Music Performance..... 37
- Music 124A, 124B 6
- At least 19 units selected from Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147, 154 19
- At least 12 units selected from Music 101A, 101B, 102, 107A, 107B, 107C, 108A, 108B, 113, 114, 121, 122, 198, 199 12

Total Units for the Major 63-82

Honors Programs. Students who wish to pursue particularly intensive studies in music should elect one of the following honors programs in place of one of the tracks above:

Theory/Composition Honors..... 45-49
- Music 124A, 124B 6
- At least 11 units selected from Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147, 154 11
- Music 101A, 101B 8
- Two quarters of Music 194H for a total of at least 6 units resulting in a Senior composition or theory thesis 6
- Select 14-18 units from Music 102, 107A, 107B, 107C, 108A, 108B, 113, 114, 122 14-18

Music History Honors..... 41-45
- Music 124A, 124B 6
- At least 11 units selected from Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147, 154 11
- Music 101A, 101B 8
- Two quarters of Music 194H for a total of at least 6 units resulting in a Senior thesis 6
- Select 10-14 units from Music 108A, 121, 122 10-14

Major Advisers. Y.H. Chang.

Minor Program Requirements:

UNITS

Music 22

A minimum of 16 units of upper division Music courses 16
- Courses chosen from: Music 105, 106, 107, 110, 126, 129

A minimum of six units in upper division music performance courses (Music 140, 141, 142, 143, 144, 145, 146, 147, 154) may count toward the minor..... 6

Foreign Language Requirement. Students contemplating graduate study in music are advised to consider pursuing foreign language study beyond the elementary level.

Diagnostic Exams are given before admission into Music 6A-6B-6C (Music 3A-3B may be recommended as an alternative). Diagnostic exams are also given for Music 16A-16B-16C and 17A-17B-17C at the beginning of each year. Transfer students should take the advisory placement exams in theory and music history given during orientation week.

Beginning and transfer students are required to take Music 2A-2B-2C (Keyboard Competence) unless they can pass out of one or more of the classes by demonstrating proficiency through a diagnostic exam given at the beginning of each quarter. Students learn 1) four-part keyboard harmony in all major and minor keys; 2) moderate fluency with figured bass at the keyboard; 3) major and minor scales with proper fingering; ability to sight read simple piano music and Bach chorales.

Student Performing Activities. The Department of Music presents over 100 concerts each year, offering performance opportunities for both majors and non-majors in the UCD Symphony Orchestra, University Chorus, Concert Band, Early Music Ensemble, Baroque Chamber Orchestra, Chamber Singers, University Jazz Band, Gospel Choir, and numerous chamber ensembles. Also affiliated with the department is the California Aggie Marching Band.

The large groups regularly present three concerts each year, while chamber ensembles perform frequently in the weekly Thursday Noon Concerts. Performance groups have collaborated with the Department of Dramatic Art in productions of musical theater and opera. Study of instruments and voice with professional performers and teachers is required of all majors. Similar opportunities exist for talented non-majors.

Faculty and Facilities. The faculty is noted for its achievements in a variety of areas. The musicologists are active in research, writing, and performance; the music of the composers is performed and recorded nationally and internationally. The journal,19th Century Music, is housed in the department.

The regular faculty is joined during one quarter each year by a visiting Artist-in-Residence, a distinguished performer who gives public concerts and lectures and who works with students informally. The Empyrean Ensemble, a professional new music ensemble, is in residence at UC Davis. The American Bach Soloists, an ensemble of professional singers and instrumentalists specializing in music of the eighteenth and early nineteenth century, is affiliated with the Department of Music.

The department's facilities include a large collection of Renaissance, Baroque, and modern instruments, the Computer and Electronic Music Studio, practice and rehearsal rooms, and an excellent music library with some 20,000 recordings, CDs, laser discs and videos. In addition, the library houses the Jan Popper Collection of opera scores, books, and memorabilia.

Graduate Study. The Department of Music offers programs of study and research leading to the M.A. degree in composition/theory, musicology, ethnomusicology, and conducting, and the Ph.D. degree in composition/theory and musicology, and ethnomusicology. Detailed information regarding graduate study may be obtained from the Graduate Adviser.

Graduate Adviser. D.A. Nutter.

Courses in Music (MUS)

Lower Division Courses

2A. Keyboard Competence, Part 1 (2)
Performance—2 hours. Prerequisite: course 6A and 16A concurrently. Training to meet the minimum piano requirements for the major in music. All music majors will be expected to perform scales and simple harmonic progressions in twelve keys, both major and minor. (P/NP grading only.)—I. Triest

2B. Keyboard Competence, Part 2 (2)
Performance—2 hours. Prerequisite: course 6B and 16B concurrently, course 2A or demonstration of required keyboard proficiency on diagnostic exam. Training to meet the minimum piano requirements for the major in music. The study of scales with both hands, harmonic progressions, and sight reading at the piano. (P/NP grading only.)—II. Triest

2C. Keyboard Competence, Part 3 (2)
Performance—2 hours. Prerequisite: course 6C and 16C concurrently, course 2B or demonstration of required keyboard proficiency on diagnostic exam. Training to meet the minimum piano requirements for the major in music. The study of chord progressions, figured bass, sight reading, and piano repertoire. (P/NP grading only.)—III. Triest

3A. Introduction to Music Theory (4)
Lecture—1 hour; recitation—3 hours. Fundamentals of music theory, ear-training, harmony, counterpoint, and analysis directed toward the development of listening and writing techniques. Intended for the general student.—I, II, III. (I, II, III.)

3B. Introduction to Music Theory (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 3A. Continuation of course 3A. Intended for the general student.—II, III. (II, III.)

6A. Elementary Theory, Part 1 (3)
Lecture—3 hours. Prerequisite: admission by examination given at beginning of fall quarter; course 2A or 16A concurrently or demonstration of required proficiency level on diagnostic exam. Development of music writing and listening skills through the study of music fundamentals, species counterpoint, harmony, analysis of repertory. Intended primarily for music majors. Not open for credit to students who have completed course 4A.—I. Chang

6B. Elementary Theory, Part 2 (3)
Lecture—3 hours. Prerequisite: course 6A; course 2B or 16B concurrently or demonstration of required proficiency level on diagnostic exam. Development of music writing and listening skills through the study of music fundamentals, species counterpoint, harmony, analysis of repertory. Intended primarily for music majors. Not open for credit to students who have completed course 4B.—II. Chang

6C. Elementary Theory, Part 3 (3)
Lecture—3 hours. Prerequisite: course 6B; course 2C or 16C concurrently or demonstration of required proficiency level on diagnostic exam. Development of music writing and listening skills through the study of music fundamentals, species counterpoint, harmony, analysis of repertory. Intended primarily for music majors. Not open for credit to students who have completed course 4C.—III. Chang

7A. Intermediate Theory, Part 1 (3)
Lecture—3 hours. Prerequisite: course 6C. Homophonic music of the Classical era with a focus on analysis of music by Haydn, Mozart, and Beethoven. Composition of pieces in the homophonic forms such as Minuet and Trio, Theme and Variations, Rondo and Sonata. Intended for music majors. Not open for credit to students who have completed course 5B.—I. Frank

7B. Intermediate Theory, Part 2 (3)
Lecture—3 hours. Prerequisite: course 7A. Nineteenth-century harmony and voice leading through the music of the Romantic era. Focus on analysis of music by Chopin, Schumann, Brahms, Wagner, and Wolf. Composition of character pieces and songs. Intended for music majors. Not open for credit to students who have completed course 5C.—II. Frank

7C. Intermediate Theory, Part 3 (3)
Lecture—3 hours. Prerequisite: course 7B. The music of the first thirty years of the twentieth century and the various analytical tools pertaining to it. Works of Debussy, Stravinsky, Schoenberg, Berg, and others are discussed. Composition of small pieces for solo instruments, voice and piano. Intended for music majors. Not open for credit to students who have completed course 104A.—III. Frank

10. Introduction to Musical Literature (4)
Lecture—3 hours; listening section—1 hour. An introduction to composers and major styles of Western music. Lectures, listening sections, and selected readings. For non-majors. GE credit: ArtHum, Wrt.—I, II, III. (I, II, III.) Holoman, Levy, Nutter

16A. Elementary Musicianship, Part 1 (2)
Lecture/laboratory—2 hours. Prerequisite: course 6A concurrently, passing score on short diagnostic exam at the beginning of the quarter. The melodic, rhythmic, and harmonic materials of Western Music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. Recommended for those who intend to major in music.—I. Triest

16B. Elementary Musicianship, Part 2 (2)
Lecture/laboratory—2 hours. Prerequisite: course 6B concurrently, course 6A or required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western Music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. Recommended for those who intend to major in music.—II. Triest

16C. Elementary Musicianship, Part 3 (2)
Lecture/laboratory—2 hours. Prerequisite: course 6C concurrently, course 16B or required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western Music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. Recommended for those who intend to major in music.—III. Triest

17A. Intermediate Musicianship, Part 1 (2)
Lecture/laboratory—2 hours. Prerequisite: course 16C or required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western Music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. Intended for music majors.—I. Craig

17B. Intermediate Musicianship, Part 2 (2)
Lecture/laboratory—2 hours. Prerequisite: course 17A or required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western Music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. Intended for music majors.—II. Craig

17C. Intermediate Musicianship, Part 3 (2)
Lecture/laboratory—2 hours. Prerequisite: course 17B or required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western Music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. Intended for music majors.—III. Craig

24A. Introduction to the History of Music I (3)
Lecture—3 hours. Prerequisite: course 6A (may be taken concurrently). History of music from the late Baroque to Beethoven. Intended primarily for majors in music. GE credit: Wrt.—II. Reynolds

24B. Introduction to the History of Music II (3)
Lecture—3 hours. Prerequisite: course 24A, course 6B (may be taken concurrently). The history of music from the Romantic Period to the nineteenth century. Intended primarily for majors in music. GE credit: Wrt.—III. Reynolds

24C. Introduction to the History of Music III (3)
Lecture—3 hours. Prerequisite: course 24B, course 6C (may be taken concurrently). The history of music of the 20th century. Intended primarily for majors in music. GE credit: Wrt.—I. Levy

28. Introduction to Afro-American Music (4)
Lecture—3 hours; listening and discussion—1 hour. A study of the Afro-American rhythm, field hollers, work songs, spirituals, blues, gospel, and jazz; the contrast between West African, Afro-Caribbean, and Afro-Cubanic musical traditions. GE credit: Div, Wrt.—III. Graham

30A-U. Applied Study of Music: Intermediate (1)
Performance instruction—1 hour. Prerequisite: open to Music majors with ability to perform scales and short compositions from standard repertory; admission by audition and consent of instructor. Class instruction, arranged by section: **(A)** Voice (prerequisite of course 1 or the equivalent); **(B)** Piano; **(C)** Harpsichord; **(D)** Organ; **(E)** Violin; **(F)** Viola; **(G)** Cello; **(H)** Double Bass; **(I)** Flute; **(J)** Oboe; **(K)** Clarinet; **(L)** Bassoon; **(M)** French Horn; **(N)** Trumpet; **(O)** Trombone; **(P)** Tuba; **(Q)** Percussion; **(R)** Classical Guitar; **(S)** Lute; **(T)** Viola da gamba; **(U)** Recorder. May be repeated for credit. Offered as demand indicates.—I, II, III. (I, II, III.)

31A-U. Applied Study of Music: Intermediate (Individual) Performance Instruction (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: open to Music majors only; admission by audition and consent of instructor. Individual instruction in **(A)** Voice (prerequisite of course 1 or the equivalent); **(B)** Piano; **(C)** Harpsichord; **(D)** Organ; **(E)** Violin; **(F)** Viola; **(G)** Cello; **(H)** Double Bass; **(I)** Flute; **(J)** Oboe; **(K)** Clarinet; **(L)** Bassoon; **(M)** French Horn; **(N)** Trumpet; **(O)** Trombone; **(P)** Tuba; **(Q)** Percussion; **(R)** Classical Guitar; **(S)** Lute; **(T)** Viola da gamba; **(U)** Recorder. May be repeated for credit.—I, II, III. (I, II, III.)

47. University Wind Ensemble (2)
Rehearsal—4 hours. Prerequisite: consent of instructor. Open to students in any major. Rehearsal, study, and performance of a full variety of wind ensemble music; and to have students share their work in public performances. May be repeated for credit. (P/NP grading only.)—I. (I.) Nowlen

54. University Gospel Choir (2)
Rehearsal—4 hours. Prerequisite: consent of instructor; open to any student in the university. Rehearsal, study, and performance of Gospel music. May be repeated for credit. (Same course as African American and African Studies 54.) (P/NP grading only.)—I, II, III. (I, II, III.) Lymos

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

101A. Advanced Theory, Part 1 (4)
Lecture—3 hours; lecture/laboratory—1 hour. Prerequisite: course 7C. Twentieth century music from 1930 through 1950 and the various analytical tools pertaining to it. Works of Copland, Sessions, Schoenberg, Bartok, and Stravinsky are discussed. Composition of small pieces for piano and voice. For music majors. Not open for credit to students who have completed course 104B.—I. Bauer

101B. Advanced Theory, Part 2 (4)
Lecture—3 hours; lecture/laboratory—1 hour. Prerequisite: course 101A. Music from 1950 to the present and the various analytical tools pertaining to it. Works of Babbit, Carter, Dallapiccola, Ligeti, Messiaen, Reich and others are discussed. Composition of small pieces for ensemble. Intended for music majors. Not open for credit to students who have completed course 104C.—II. Bauer

102. Tonal Counterpoint (4)
Lecture—3 hours; practice—1 hour. Prerequisite: course 7A and 17A. Imitative tonal counterpoint with an analytical focus on the Two Part Inventions and Fugues (from the Well Tempered Klavier) of J.S. Bach. Composition of exercises and short pieces using contrapuntal techniques. Intended for music majors. Not open for credit to students who have completed course 5A.—III. Ortiz

103. Workshop in Composition (3)
Workshop—3 hours. Prerequisite: course 4C. Workshop in musical composition for undergraduates who are interested in pursuing serious compositional studies. Course will allow students to explore the techniques and materials of musical composition. May be repeated for credit. (P/NP grading only.)—(I, II, III.) Ortiz

105. History and Analysis of Jazz (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3A or 10 or the equivalent. Jazz will be studied in its historical and cultural contexts; the evolution of jazz styles will be analyzed. Lectures, discussion/guided listening sections, and selected readings. Designed for non-majors. GE credit: ArtHum, Div, Wrt.—III. Bauer

106. History of Rock Music (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3A-3B or 10 or consent of instructor. Rock studied in its musical, historical, and cultural contexts; analysis of the evolution of rock styles. Includes guided listening sections and selected readings. Designed for non-majors. GE credit: ArtHum, Wrt.—I. Reynolds

107A. Computer and Electronic Music (3)
Lecture—3 hours; laboratory—1 hour. Prerequisite: consent of instructor. Studies in electronic and computer music composition. The principles and procedures of composition in various electronic media are explored through compositional exercises. Limited enrollment.—I. (I.) Beck

107B. Computer and Electronic Music (3)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 107A and consent of instructor. Continuation of course 107A. Limited enrollment.—(II.) Beck

107C. Computer and Electronic Music (3)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 107B and consent of instructor. Continuation of course 107B. Limited enrollment.—(III.)

108A-108B. Orchestration (2-2)
Lecture—2 hours. Prerequisite: course 5C. Techniques of orchestration from study of basic instrumental techniques to analysis of orchestral scores and scoring for various instrumental combinations.—I, II. San Martin

109. Masterworks in Performance (2)
Lecture—2 hours. Prerequisite: course 10 recommended. Thorough score study of a single masterwork to be performed on campus during the quarter. Guided listening, selected readings, analysis and study of composer's milieu. Recommended especially for members of the performing ensembles scheduled to present the work.

110A. The Music of a Major Composer: Beethoven (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or 3A-3B. The work of Beethoven will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Wrt.—I. Busse Berger

110B. The Music of a Major Composer: Stravinsky (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or 3A-3B. The work of Stravinsky will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Wrt.—II. Frank

110C. The Music of a Major Composer: Bach (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or 3A-3B. The work of Bach will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Wrt.

110D. The Music of a Major Composer: Mozart (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or 3A-3B. The work of Mozart will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Wrt.—III. San Martin

110E. The Music of a Major Composer: Haydn (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or 3A-3B. The work of Haydn in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. Offered in alternate years. GE credit: ArtHum, Wrt.

110F. American Masters (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or 3A-3B. An overview of American concert music by master composers from Charles Ives to the present. Lectures, discussion/guided listening sections, and selected readings. For non-majors. Offered in alternate years. GE credit: ArtHum, Wrt.

113. Introduction to Conducting (2)
Lecture—1 hour; performance—1 hour. Prerequisite: course 6C. Principles and techniques of conducting as they apply to both choral and instrumental ensembles. Not open for credit to students who have completed course 111 or 112. Offered in alternate years.—I.

114. Intermediate Conducting (2)
Lecture—1 hour; performance—1 hour. Prerequisite: course 113. Intermediate conducting with a continued focus on principles and techniques as they apply to both choral and instrumental ensembles. Offered in alternate years.—II.

121. Topics in Music History and Criticism (4)
Seminar—4 hours (includes selected listening). Prerequisite: courses 4A-4B-4C, 24A-24B-24C, and consent of instructor. Sources and problems of a historical period or musical style selected by the instructor and announced in advance. May be repeated for credit. GE credit: Wrt.—II, III. Nutter, Reynolds

122. Topics in Analysis and Theory (4)
Seminar—4 hours (includes selected listening). Prerequisite: courses 5C and 25C. Analysis of works of a composer or musical style selected by the instructor and announced in advance. Consideration of theoretical issues. May be repeated for credit. GE credit: Wrt.

124A. History of Western Music: Middle Ages to 1600 (3)
Lecture—3 hours. Prerequisite: course 6C and 24C. Historical survey of composers and musical styles from the Middle Ages to the beginning of the 17th century. GE credit: Wrt.—II. Busse Berger

124B. History of Western Music: 1600-1750 (3)
Lecture—3 hours. Prerequisite: course 124A. Historical survey of composers and musical styles from the late 1500s to the mid-18th century. GE credit: Wrt.—III. Busse Berger

126. American Music (4)
Lecture—3 hours; listening—1 hour. Prerequisite: course 10 or 3A-3B or consent of instructor. Introductory survey of American musics, including Native American music, Hispanic polyphony, New England psalmody, and selected 20th-century composers and styles. Offered in alternate years. GE credit: Div, Wrt.

127. Music from Latin America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Spanish 24 or 33. Examination of music from Latin America. Characteristic music (i.e., tango, bossa nova, salsa, musica nortena, musica andina) as well as its implications in other musical genres. Taught in Spanish. For non-majors. Offered in alternate years. (Former course 27.) (Same course as Spanish 171.)—Ortiz

129. World Music (4)
Lecture—3 hours; listening—1 hour; selected readings. Prerequisite: course 3A-3B or 10 recommended. Intended for non-majors. Studies in selected areas of non-western music, including appropriate instrumental and performing techniques, analysis of tonal systems, melody, rhythm and musical structures. Emphasis placed on cultural context of the music. GE credit: Div, Wrt.—I. Graham

130A-U. Applied Study of Music: Advanced (1)
Performance instruction—1 hour. Prerequisite: open to Music majors with ability to perform scales and short compositions from standard repertoire; admission by audition and consent of instructor. Class instruction, arranged by section: **(A)** Voice (prerequisite of course 1 or the equivalent); **(B)** Piano; **(C)** Harpsichord; **(D)** Organ; **(E)** Violin; **(F)** Viola; **(G)** Cello; **(H)** Double Bass; **(I)** Flute; **(J)** Oboe; **(K)** Clarinet; **(L)** Bassoon; **(M)** French Horn; **(N)** Trumpet; **(O)** Trombone; **(P)** Tuba; **(Q)** Percussion; **(R)** Classical Guitar; **(S)** Lute; **(T)** Viola da gamba; **(U)** Recorder. May be repeated for credit. Offered as demand indicates.—I, II, III. (I, II, III.)

131A-U. Applied Study of Music: Advanced (Individual) (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: open to Music majors only; admission by audition and consent of instructor. Individual instruction in **(A)** Voice (prerequisite of course 1 or the equivalent); **(B)** Piano; **(C)** Harpsichord; **(D)** Organ; **(E)** Violin; **(F)** Viola; **(G)** Cello; **(H)** Double Bass; **(I)** Flute; **(J)** Oboe; **(K)** Clarinet; **(L)** Bassoon; **(M)** French Horn; **(N)** Trumpet; **(O)** Trombone; **(P)** Tuba; **(Q)** Percussion; **(R)** Classical Guitar; **(S)** Lute; **(T)** Viola da gamba; **(U)** Recorder. May be repeated for credit.—I, II, III. (I, II, III.)

132. Singing for Actors (1)
Performance—1 hour. Prerequisite: consent of instructor. The elements of basic singing techniques, through selected exercises, vocalises, and songs. May be repeated for credit. (P/NP grading only.)

140. University Jazz Band (2)
Rehearsal—4 hours. Prerequisite: consent of instructor. Open to students in any major. Rehearsal, study, and performance of jazz band music and full variety of jazz band styles, including swing, be-bop, and contemporary jazz styles. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.) McMullen

141. University Symphony (2)
Rehearsal—4 hours. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University whose proficiency meets the requirements of concert performance. Sight-reading, rehearsal and performance of music from the orchestral literature. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.) Holoman

142. University Chamber Singers (2)
Rehearsal—3 hours, plus sectionals—at least 1 hour. Prerequisite: admission subject to audition before first class meeting. Rehearsal and performance of works for small choral group. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.) Thomas

143. University Concert Band (2)
Rehearsal—4 hours. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University whose proficiency meets the requirements of concert performance. Rehearsal and performance of music for band. May be repeated for credit. (P/NP grading only.)—II, III. (II, III.)

144. University Chorus (2)
Rehearsal—4 hours. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University. Rehearsal and performance of choral music. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.) Thomas

145. Early Music Ensemble (2)
Rehearsal—4 hours. Prerequisite: admission subject to audition before first class meeting. Rehearsal and performance of Medieval, Renaissance, and Baroque music for vocal ensemble and historical instruments. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.) Nutter

146. Chamber Music Ensemble (1)
Rehearsal—2 hours; student practice—1 hour. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University whose proficiency meets the requirements of concert performance. Study, rehearsal, and performance of ensemble music for strings, winds, voice, piano, harpsichord, and organ. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.) Granger

147. University Wind Ensemble (2)
Rehearsal—4 hours. Prerequisite: consent of instructor. Open to students in any major. Rehearsal, study, and performance of a full variety of wind ensemble music; and to have students share their work in public performances. May be repeated for credit. (P/NP grading only.)—I. (I.) Nowlen

154. University Gospel Choir (2)
Rehearsal—4 hours. Prerequisite: consent of instructor; open to any student in the university. Rehearsal, study, and performance of Gospel music. May be repeated for credit. (Same course as African American and African Studies 154.) (P/NP grading only.)—I, II, III. (I, II, III.) Lymos

192. Internship in Music (1-4)
Internship—3-12 hours. Prerequisite: music major, consent of instructor and department chairperson. Internship outside the university related to music. May be repeated up to 8 units of credit. (P/NP grading only.)—I, II, III.

194HA-194HB. Special Study for Honors Students (2-4)
Independent study—6-12 hours. Prerequisite: course 7C, 124B. Open only to students who qualify for the honors program and admission to Music Senior Honors Program. Preparation and presentation of a culminating project, under the supervision of an instructor, in one of the creative or scholarly areas of music. (Deferred grading only, pending completion of sequence.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

200. Music Research (4)
Seminar—3 hours; term paper. Introduction to problems and techniques of research; practical application of music bibliography to questions about significant issues in musicology, music theory, and performance practice.

202. Notation (4)
Seminar—3 hours; term paper. Study of musical notation; investigation of techniques for editing Medieval and Renaissance music.—I. Busse Berger

203. Music Composition (4)
Seminar—3 hours; term paper. Technical projects that explore compositional problems, the skill and techniques with which to solve them, and free composition. May be repeated for credit.—I, II, III. (I, II, III.) Bauer, Ortiz, San Martin, Chang

204. Advanced Conducting (3)
Tutorial—2 hours; practicum—2 hours. Prerequisite: courses 111, 112, or the equivalent; keyboard skills appropriate to graduate standing. Technical aspects of conducting and the broader issues in music history and analysis that conductors must face before leading a rehearsal or performance.

207. Advanced Electronic and Computer Music (4)
Seminar—2 hours; plus individual student/instructor meeting—2 hours. Prerequisite: courses 107A-107B-107C. Advanced composition of computer and electronic music with the Sun 3-based computer-music system and associated facilities.

210A. Proseminar in Music (Theory and Analysis) (4)
Seminar—3 hours; term paper. Voice-leading analysis of tonal music derived from Schenker and pitch-class set theory. Recent work on compositional design, generalizations of the concept of interval, psychologically oriented music theory, and theories of durational structure and timbre.—I. Bauer

210B. Proseminar in Music (Musicology and Criticism) (4)
Seminar—3 hours; term paper. Issues and concepts of music history, including performance practice questions for specific repertoires and periods; principles, aims, and methods of archival study; historical theory; evolution of musical styles; philosophical debates about goals and aims of the discipline in general.—I. Levy

210C. Proseminar in Music (Ethnomusicology) (4)
Seminar—3 hours; term paper. Intensive examination of major trends in ethnomusicology as exemplified by scholars working in several non-Western cultures. Ethnomusicological theory, ranging from ethnographic description to metamusicological study (Seegar) to analysis of individual genres to sociological study.—II. Graham

212. Ethics of Musical Ethnography (4)
Seminar—3 hours; fieldwork. Prerequisite: course 210C. The role, methodology, perception, and assumptions of the ethnomusicologist in ethnographic scholarship. Examination of complex ethical and political questions in relation to practical fieldwork techniques. Offered in alternate years.—Graham

213. Transcription and Notation (4)
Seminar—3 hours; project. Prerequisite: course 210C. Practical instruction in the transcription and analysis of primarily non-Western musics. Analytical and theoretical issues, the politics of representation, and the cultural values and ideologies implicit in notation. Offered in alternate years.—Graham

221. Topics in Music History (4)
Seminar—3 hours. Studies in selected areas of music history and theory. May be repeated for credit.—I, II, III. Graham, Levy, Holoman

222. Techniques of Analysis (4)
Seminar—3 hours. Analysis and analytical techniques as applied to music of all historical style periods. May be repeated for credit.—III. Chang

223. Ethnomusicology (Pacific Cultures) (4)
Seminar—3 hours; term paper. Court music, religious music, and popular forms of China, Japan, Korea, Melanesia, and Indochina. Issues concerning history, theoretical constructs, performance practice, and cultural settings of the music will be stressed. May be repeated for credit.

299. Individual Study (1-12)
(S/U grading only.)

Teaching Methods Courses

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Native American Studies

(College of Letters and Science)

Stefano Varese, Ph.D., Chairperson of the Department
Department Office, 2401 Hart Hall (530-752-3237)
http://cougar.ucdavis.edu/nas/home.html

Faculty

Steven J. Crum, Ph.D., Professor
Inés Hernández-Ávila, Ph.D., Professor
Martha J. Macri, Ph.D., Professor
Zoila Mendoza, Ph.D., Associate Professor
Victor D. Montejo, Ph.D., Professor
Stefano Varese, Ph.D., Professor

Emeriti Faculty

Jack D. Forbes, Ph.D., Professor Emeritus
George C. Longfish, M.F.A, Professor Emeritus
David Risling, M.A., Senior Lecturer Emeritus

The Major Program

Native American Studies provides a multi-disciplinary introduction to the indigenous cultures of North, Central, and South America. It challenges students to consider issues of cultural diversity, sovereignty, and indigenous knowledge systems in preparation for living in a world of constantly increasing social and cultural complexity.

The Program. Students electing a major in Native American Studies may complete Plan I, Plan II, or Plan III. Plan I enables students to concentrate chiefly upon the Native experience in North America (north of Mexico). Plan II encourages interested students to focus upon Meso-America with, however, some course work integrating Meso-America with North America and South America. Plan III focuses upon South America, with some course work integrating that region with areas to the north.

Career Alternatives. Native American Studies is excellent preparation for a scholarly career or professional career such as teaching, law, human services, health, tribal administration, social work, and interethnic relations. Graduate schools and agencies in these and related areas are looking for students with broad interdisciplinary preparation and who possess knowledge and sensitivity relating to ethnic issues and cultural diversity.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 20
Native American Studies 1, 10..... 8
One or two courses from Native American Studies 32, 33, 46, 55 4-8
One or two courses from African American and African Studies 12, 52, Anthropology 2, 3, Asian American Studies 1, Chicana/o Studies 10, History 17A..... 4-8

Depth Subject Matter..... 16
Native American Studies 130A, 157, 180. 12
One course from Native American Studies 107, 115, 130B, 130C, 133, 156 4
Note: If a course is counted for either Plans I, II, or III (below), it cannot also be counted as part of the 16 units of Depth Subject Matter.

Areas of Specialization (complete one plan)

Plan I—North American Emphasis 28
Two courses from Native American Studies 107, 115, 116, 117, 118, 122, 130C, 156 8
Two courses from Native American Studies 101, 181A, 181B, 181C 8
Two courses from Anthropology 113, 136, 161A, 161B, 165, 166, 172, 173, 174, 175, 176, African American and African Studies 100, 101, 107, 120, 123, 133, 153, 160, American Studies 120, Asian American Studies 100, 101, 110, 111, 112, Chicana/o Studies 100, 110, 111, 154, 156, Sociology 128, Women's Studies 102..... 8
One other upper division Native American Studies course, selected in consultation with adviser 4

Plan II—Mexico-Central America Emphasis ... 28
Native American Studies 107, 133..... 8
Three courses from History 161A, 166A, 166B, Anthropology 134, 145, 146, 174, 175, Chicana/o Studies 130, Native American Studies 122..... 12
Two courses from Spanish 155, 172, Art History 151, Native American Studies 101, 156, 181A, 181B, 181C, or, if student's work is specifically focused upon a Meso-American language or topic, from Native American Studies 188, 191..... 8

Plan III—South American Emphasis..... 28
Native American Studies 107, 120..... 8
Two courses from History 161A, 161B, 162, 163A, 163B, 165..... 8
Three courses from Anthropology 134, 144, 174, 175, Native American Studies 101, 122, 156, 181A, 181B, 181C, or, if student's work is specifically focused upon a South American language or topic, from Native American Studies 188, 191 12

Total Units for the Major 64

Major Adviser. S. Crum.

Minor Program Requirements:

The Native American Studies minor provides an introduction to the Native experience in the Americas by means of exposure to course work dealing with some of the major aspects of Indian life, including history, values, politics, literature, and art.

UNITS

Native American Studies 24
Native American Studies 1 or 10..... 4
Five upper division courses, at least one of which is chosen from each of the following groups 20
Ethno-History:
Native American Studies 130A, 130B, 130C, or 133
Philosophy and values:
Native American Studies 156, 157, or 180
Politics and current affairs:
Native American Studies 115, 116, 117, 118, 120, 122
Art and literature:
Native American Studies 101, 181A, 181B, or 181C
One other upper division course selected in consultation with adviser.

Study Off Campus. Majors have the option of spending one to three quarters elsewhere in the Americas or on or near a reservation as part of the fulfillment of the Area of Specialization. Each

student's plan must be approved by the student's adviser and by the chairperson and may fulfill from 12 to 20 of the 28 units required for the emphasis. The courses or field internship taken elsewhere must be focused upon indigenous peoples or indigenous languages and the institution of study shall be located in an area with substantial indigenous population. Students must have upper division standing and, for Plan I, course 107 or the equivalent should have been completed; for Plan II, courses 107 and 133 should have been completed; and for Plan III, courses 107 and 120 should have been completed prior to departure. Several options may be used for receiving academic credit, including course 195. The department strongly encourages students to participate in the UC Education Abroad Program, Short-Term Programs Abroad.

Graduate Study. The Department offers a program of study leading to the M.A. and Ph.D. degrees in Native American Studies, as well as a designated emphasis in Native American Studies for graduate students in approved programs. Further information regarding graduate study may be obtained at the department office and at Graduate Studies.

Graduate Adviser: M. Macri.

Courses in Native American Studies (NAS)

Lower Division Courses

1. Introduction to Native American Studies (4)
Lecture—3 hours; discussion—1 hour. Introduction to Native American Studies with emphasis upon basic concepts relating to Native American historical and political development. GE credit: SocSci, Div.—I, II, III. (I, II, III.) Montejo, Crum

5. Introduction to Native American Literature (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. Study of selected Native American texts. Intensive focus on analysis of these texts, with frequent writing assignments to develop critical thinking and composition skills. GE credit: ArtHum, Div, Wrt (cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously).—I, II, III. (I, II, III.)

10. Native American Experience (4)
Lecture—3 hours; discussion—1 hour. Introduction to the diverse cultures of Native American peoples from North, Central, and South America. Emphasis on Native American voices in the expression of cultural views and in the experience of conflicting values. GE credit: ArtHum or SocSci, Div, Wrt.—I, II, III. (I, II, III.) Varese, Hernandez-Avila, Macri

32. Native American Music and Dance (4)
Lecture/discussion—4 hours. Introduction to the music and dance of the native peoples of the Americas. Students will study secular native music and dance from a cross-section of regions and tribes. GE credit: Div.—I. (I.) Mendoza

33. Native American Art in the U.S. (4)
Lecture—4 hours. Comprehensive survey of Indian art forms with emphasis upon design, media, and function. Intent is to familiarize the student with a wide range of styles and techniques. GE credit: ArtHum, Div.—I. (I.)

34. Native American Art Workshop (4)
Lecture—1 hour; laboratory—6 hours; 3 hours to be arranged. Prerequisite: consent of instructor; course 33 recommended. Studio projects in Native American art, design, and crafts. (P/NP grading only.)—(II.)

46. Orientation to Research in Native American Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Native American Studies major or minor, or consent of instructor. Introduces students to basic re-search resources pertinent to Native American subjects available in the region, including libraries, archives, museums, etc. Emphasis is upon learning to use documentary resources or other collections of data. Students will carry out individual projects. Limited enrollment. GE credit: SocSci, Div, Wrt.

55. Americanisms: Native American Contributions to World Civilization (4)
Lecture/discussion—4 hours. Prerequisite: course 1 or 10 recommended. American indigenous people's contributions to the contemporary world, with attention to forced participation of Indian societies in the development of Western dominance and resulting appropriation of cultural creations. Responses and initiatives of indigenous peoples will be analyzed. GE credit: SocSci, Div, Wrt.

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

101. Contemporary Indian Art (4)
Lecture—4 hours. Prerequisite: course 33. Historical review of contemporary Indian art from 1900 to the present by looking at the two art centers of Oklahoma and Santa Fe. Social pressures that have influenced the imagery that exists today will be examined. GE credit: ArtHum, Div.—(II.)

107. Special Topics in Native American Languages (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Investigation of various subjects in contemporary and historical Native American language studies. May be repeated for credit when a different topic is studied. GE credit: Div.—II. (III.) Macri

115. Native Americans in the Contemporary World (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 10, or 55. The sociocultural development of American Indian populations in modern times with emphasis upon North America. Attention will be given to contemporary Indian affairs and problems as well as to the background for present day conditions. Not open for credit to students who have completed Anthropology 141B. (Former course Anthropology 141B.) GE credit: SocSci, Div, Wrt.—II. Montejo

116. Native American Traditional Governments (4)
Lecture—4 hours. Prerequisite: course 1; Anthropology 2. Study of selected Native American Tribal Governments, confederations, leagues, and alliance systems. Offered in alternate years. GE credit: SocSci, Div.

117. Native American Governmental Decision Making (4)
Lecture—4 hours. Prerequisite: course 116, Political Science 2; Anthropology 123 recommended. Native American governmental and community decision making with emphasis on federal and state programs, tribal sovereignty, current political trends and funding for tribal services. Offered in alternate years. GE credit: SocSci, Div.

118. Native American Politics (4)
Lecture—4 hours. Prerequisite: course 117. Examination of the various interest groups and movements found among Native people and how they relate to the determination of Indian affairs. Study of political action available to Native groups, and local communities, along with relevant theory relating to underdevelopment. Offered in alternate years. GE credit: SocSci, Div.—II.

120. Ethnopolitics of South American Indians (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 10 or 55. Social, political, cultural movements of indigenous South Americans in response to establishment, expansion of European colonialism, post-colonial nation-states. Ethnopolitical processes developed through interactions between Indians, Euroamericans. Socioethnographic analysis of main indigenous areas and the development of national societies. GE credit: SocSci, Div, Wrt.—I. (I.) Varese

122. Native American Community Development (4)
Lecture—4 hours. Prerequisite: course 1, Community and Regional Development 151. Application of community development theory and techniques to the development problems of Native American communities. Offered in alternate years. (Former course 161.) GE credit: SocSci, Div, Wrt.—I. Varese

125. Performance and Culture Among Native Americans (4)
Lecture—3 hours; listening—3 hours. Prerequisite: upper division standing in division of humanities or social sciences or consent of instructor. Interdisciplinary study of public expressive forms among Native Americans. Comparative analysis of music, dances, rituals, and dramas from throughout the Americas in their social and cultural contexts. Offered in alternate years. Not open for credit to students who have completed Music 125.—III. (III.) Mendoza

130A. Native American Ethno-Historical Development (4)
Lecture—4 hours. Prerequisite: course 1 or 10; History 17A recommended. Study of Native American ethno-history in North America before 1770s. GE credit: SocSci, Div, Wrt.—I. (I.) Crum

130B. Native American Ethno-Historical Development (4)
Lecture—4 hours. Prerequisite: course 1; History 17A-17B recommended. Study of Native American ethno-history in North America, 1770-1890. GE credit: SocSci, Div, Wrt.—II. (II.) Crum

130C. Native American Ethno-Historical Development (4)
Lecture—4 hours. Prerequisite: course 1; History 17A-17B recommended. Study of Native American ethno-history in North America after 1890. GE credit: SocSci, Div, Wrt.—III. Crum

133. Ethnohistory of Native People of Mexico and Central America (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 10 or 55. Ethnohistorical development of pre-colonial, colonial, post-colonial Mexican and Central American indigenous people; the impact of economic and political factors on the process of cultural adaptation. Attention is given to the questions of nation-building, forced assimilation, indigenous resistance, organized political responses. GE credit: SocSci, Div.—III. (III.) Varese

134. Race and Sex: Race Mixture and Mixed Peoples (4)
Lecture—4 hours. Prerequisite: one course chosen from Anthropology 1 or 2, Native American Studies 10, Chicana/o Studies 110, African American and African Studies 100 or Asian American Studies 110. The phenomena of racial, ethnic and interreligious intermixture and marriage, and of multi-ethnic peoples. Emphases on the Americas and upon the sociocultural effects of intermixture and on the lives of bicultural and multi-ethnic persons. (Same course as Anthropology 134.) GE credit: SocSci, Div, Wrt.

156. Native American Ethics and Value Systems (4)
Lecture—4 hours. Prerequisite: upper division standing; course 1. Analysis of Native American systems of values and how these values translate into actual behavior; attention to the problem of implementing traditional values in the twentieth century and the possible impact of native values in modern societies. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. Forbes

157. Native American Religion and Philosophy (4)
Lecture—4 hours. Prerequisite: upper division standing; course 1 or Anthropology 2. Religious and philosophical thinking of Native American people with emphasis upon North America. Offered in alternate years. GE credit: Div.—(II.) Hernández-Ávila

180. Native American Women (4)
Lecture/discussion—4 hours. Prerequisite: course 1 or 10 or Women's Studies 50. Social and cultural foundations of the Native American women's personality, including the development of the Indian girl and the life phases of mature womanhood. Autobiographical and biographical texts are utilized. GE credit: SocSci, Div, Wrt.—II. (II.)

181A-181B-181C. Native American Literature (4-4-4)
Lecture—4 hours. Prerequisite: English 3, Comparative Literature 1, 2, 3, or any course from the General Education Literature Preparation List. Analysis of works by or about Native Americans including novels and autobiographies, analysis of Native American poetry, oral literature, songs, and tales. (A), the novel and fiction; (B), nonfiction works by native authors; (C), traditional literature and poetry. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I, II. (I-II-III.) Hernandez-Avila, Montejo

184. Contemporary Indigenous Literature of Mexico (4)
Lecture—4 hours. Prerequisite: course 1 or 10; course 181A or 181C recommended. Reading knowledge of Spanish required. Contemporary indigenous literature of Mexico, with a focus on the genres (poetry, fiction, drama, essay); analysis of cultural, historical, and spiritual themes, imagery, styles and performances; biographies of and influences on the Native writers themselves. Offered in alternate years.—III. Hernandez-Avila

188. Special Topics in Native American Literary Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing and consent of instructor. Special topics drawn from Native American literature. May be repeated for credit when a different topic is studied. GE credit: Div, Wrt.—I, II. (II.) Hernández-Ávila. Montejo

190. Seminar in Native American Studies (2)
Discussion—2 hours. Prerequisite: senior standing. Seminar of critical issues faced by Native American people. (P/NP grading only.)—II. (II.)

191. Topics in Native American Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing and consent of instructor. Selected topics in Native American ethno-history, development, culture, and thought. May be repeated for credit when a different topic is studied. GE credit: ArtHum, Div.—I, II. (I.)

194HA-194HB. Special Studies for Honors Students (4-4)
Independent study—12 hours. Prerequisite: senior qualifying for honors. Directed reading, research and writing culminating in the completion of a senior honors thesis or project under direction of faculty adviser. (Deferred grading only, pending completion of sequence.)

195. Field Experience in Native American Studies (12)
Field work—36 hours. Prerequisite: senior standing and major in Native American Studies, completion of lower division major requirements, and course 161. Field work with governmental and community groups, under supervision of faculty adviser and sponsor. Knowledge acquired in other courses to be applied in field work. (P/NP grading only.)—I, II, III. (I, II, III.)

196. Senior Project in Native American Studies (4)
Discussion—1 hour; independent study—3 hours. Prerequisite: senior standing and major in Native American Studies, course 195 (may be taken concurrently), and consent of instructor. Guided research project that enables student to apply the theory and research principles from major course work. Final product is to be a major senior project or thesis. (P/NP grading only.)—I, II, III. (I, II, III.)

197TC. Community Tutoring in Native American Studies (1-5)
Tutorial—3-15 hours. Prerequisite: consent of major committee; upper division standing with major in Native American Studies. Supervise tutoring in community. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200. Basic Concepts in Native American Studies (4)
Seminar—4 hours. Prerequisite: graduate standing and consent of instructor. Analysis of the characteristics of the discipline of Native American Studies. Concentration is on both traditional and contemporary native scholarship and thought as well as the theoretical and methodological consequences derived from application of these ideas. Offered in alternate years.—(I.) Hernández-Ávila

202. Advanced Topics in Native American Studies (4)
Seminar—4 hours. Prerequisite: graduate standing. Advanced study of selected topics or themes relevant to the field of Native American studies. Topics will be announced at the time of offering. May be repeated for credit when topic differs.—I. (I, III.) Hernandez-Avila, Montejo, Macri

212. Community Development for Sovereignty and Autonomy (4)
Seminar—4 hours. Prerequisite: graduate standing and consent of instructor. Examines a sample of contemporary indigenous communities from south, central and north America with the goal of understanding and evaluating the strategies adopted by Native American communities to develop and implement forms of sovereignty or autonomous self-management. Offered in alternate years.—II. Varese

213. Native Criminality and "Deviance" in Native Communities (4)
Seminar—4 hours. Prerequisite: graduate standing. Examination of "deviance" in Native communities with focus on Native criminality in North America. Analysis of the concept of deviance from several different world views. Readings from a range of theories to incorporate varying theoretical perspective on criminality and deviance.

220. Colonialism/Racism and Self-Determination (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Study of imperial/colonial systems and their psychosocial impacts upon oppressors and oppressed, of racism as the outgrowth of colonialism, and of nationalism, ethnic conflict and self-determination. Focus on indigenous peoples, but other groups will also be considered. Offered in alternate years.—(II.) Varese

224. Performance in the Americas (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Ethnomusicological and anthropological approaches to study of public performance in the Americas. New ways of looking at music, dance, rituals and other forms of public expressive forms normally called "folklore" or "popular culture." Offered in alternate years. Not open for credit to students who have completed Music 224. (Former course Music 224.)—(II.) Mendoza

250. Indigenous Critique of Classic Maya Ethnographies (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Construction of the Maya world through ethnographic writing during the present century. Deconstruction of ethnographies about the Mayans considering the modern theories and social/anthropological critiques of modern ethnographies. Offered in alternate years.—(II.) Montejo

280. Ethnohistorical Theory and Method (4)
Seminar—3 hours; term paper. Discussion of the ethnohistorical method; the utilization of diverse types of data, especially documentary sources, to reconstruct socio-cultural history. Particular attention to the applied area of ethnohistory in the solution of contemporary social problems. Offered in alternate years.—III. Crum

298. Group Study for Graduate Students (1-5)
Prerequisite: graduate standing, consent of instructor. (S/U grading only.)

299. Special Study for Graduate Students (1-12)
Prerequisite: graduate standing, consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Natural Sciences

(College of Letters and Science)

Advising Center, 174 Physics/Geology Building (530-752-9100)

Committee in Charge

Howard W. Day, Ph.D., Chairperson *(Geology)*
Charles P. Nash, Ph.D. *(Chemistry)*
J. Richard Pomeroy, Ph.D. *(Education)*
Wendell H. Potter, Ph.D. *(Physics)*
Thomas L. Rost, Ph.D. *(Plant Biology)*

The Major Program

Natural Sciences is an interdisciplinary major that provides significant breadth in biology, chemistry, earth sciences, physics and mathematics while offering additional depth in two of the natural sciences. It is especially designed to meet the needs of prospective science teachers, but will also serve students who wish to acquire training in more than one science. The major is sponsored by the Department of Geology.

The Program. The Natural Sciences curriculum offers an unusually broad training in science and mathematics. All students must complete a one year sequence in calculus, a course in statistics and one year sequences in chemistry, earth science, life science and physics. Each student will complete depth courses in two of these sciences. Prospective teachers may use these depth courses as preparation for primary and supplementary teaching credentials in science.

Career Alternatives. The study of natural sciences prepares a student to meet the subject matter requirements for a science teaching credential in California as well as a variety of other careers. Students whose goals include business, journalism, law, or medicine may acquire a broad background in science through this curriculum.

B.S. Major Requirements:

	UNITS
Preparatory Subject Matter	**68**
Chemistry 2A, 2B, 2C	15
Biological Sciences 1A, 1B, 1C	15
Geology 2, 3, 3L, 50L, 60	13
Mathematics 16A, 16B, 16C	9
Physics 7A, 7B, 7C	12
Statistics 100 or 102	4
Depth Subject Matter	**42**
Concentration (chosen from among the four fields of concentration listed below)	27
Supplementary Field (chosen from among the four fields listed below. May not include the same field as the concentration. The same course may not be used to fulfill the requirements for both a Concentration and a Supplementary Field.)	15
Total Units for the Major	**110**

Fields of Concentration:

Chemistry	*27*
Chemistry 105, 107A, 107B, 118A, 118B, 118C, 124A	25
Chemistry 197 or 199	2
Earth Science	*27*
Geology 62, 100, 100L, 105, 108, 109, 109L, 116	20
Soil Science 100	4
Geology 199	3

Quarter Offered: I=Fall, **II**=Winter, **III**=Spring, **IV**=Summer; 2005–2006 offering in parentheses.

Life Science *27-34*
Chemistry 8A, 8B or 118A, 118B, 118C 6-12
Biological Sciences 101 4
Evolution and Ecology 100, 101 8
Neurobiology, Physiology, and Behavior 101 5
Neurobiology, Physiology, and Behavior 101L or Molecular and Cellular Biology 160L 3-4
One 199 course from Biological Sciences, Evolution and Ecology, Molecular and Cellular Biology, or Neurobiology, Physiology, and Behavior 1
Physics *27*
Chemistry 107A, 110A 7
Geology 161, 162 6
Physics 108, 122 7
Physics 137 or 160 3
Physics 199 4

Supplementary Fields:
Chemistry *15*
Chemistry 105, 107A, 118A, 124A ... 14
Approved elective 1
(Other Chemistry or related science courses may be substituted with the prior approval of the major adviser.)
Earth Science *15*
Geology 108, 109, 109L, 116, 138 ... 14
Approved elective 1
(Other Geology or related science courses may be substituted with the prior approval of the major adviser.)
Life Science *15*
Biological Sciences 101* 4
Evolution and Ecology 100 4
Neurobiology, Physiology, and Behavior 101 5
Approved electives 2
(Other Biological Sciences or related science courses may be substituted with the prior approval of the major adviser.)
Physics *15*
Physics 122 3
Chemistry 107A, 110A 7
Geology 161 3
Approved electives 2
(Other Physics or related science courses may be substituted with the prior approval of the major adviser.)

*Note: Students pursuing a concentration in earth science or physics may not have had the necessary prerequisites in organic chemistry.

Major Advisers: C. P. Nash *(Chemistry)*, H. W. Day *(Geology)*, W. H. Potter *(Physics)*, T.L. Rost *(Plant Biology)*.

Nature and Culture

(College of Letters and Science)
Daniel Cox, Ph.D., Program Director
Program Office, 176 Voorhies Hall (530-754-9045)
http://www.english.ucdavis.edu/Nat&Cult/NAC.html

Committee in Charge

Michael Barbour, Ph.D. *(Environmental Horticulture)*
Daniel Cox, Ph.D. *(Physics)*
Laurie Glover, Ph.D. *(English)*
Scott McLean, Ph.D. *(Comparative Literature)*
Timothy Morton, Ph.D. *(English)*
Peter Moyle, Ph.D. *(Wildlife, Fish, and Conservation Biology)*
Ann Savageau *(Nature and Culture)*
Michael Smith, Ph.D. *(American Studies)*
Lenora Timm, Ph.D. *(Linguistics)*
Louis Warren, Ph.D. *(History)*
Michael Ziser, Ph.D. *(English)*

The Major Program

The Nature and Culture major is a coherent interdisciplinary set of studies that offers exploration of the complex relationships existing between human cultures and the natural world.

The Program. This program is the first of its kind in the country, providing a rigorous curriculum that interweaves courses in the natural sciences, the humanities, and the social sciences, supplemented by elective course work in these and other fields of study. There are at present three required core courses in Nature and Culture itself, a principal function of which is to tie together knowledge and experience gained in the various disciplines that students will work in as they progress through their studies.

Career Alternatives. Students completing an A.B. degree in Nature and Culture will be qualified to enter most professional schools, such as medicine and law, and many graduate programs in science and the humanities, especially those with an emphasis on interdisciplinary study. Students expecting to apply for highly specialized fields will need to plan their elective work carefully. The degree program provides excellent preparation for careers in business and government, as well as for the credential program for K-12 teaching. When combined with courses in non-fiction writing, the Nature and Culture curriculum will prepare students for the burgeoning fields of environmental writing and environmental journalism.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 38-41
Nature and Culture 1 4
Geology 3-3L and 50-50L and Geology 36 or Astronomy 2; or Chemistry 2A-2B and Biological Sciences 1A 13-15
Biological Sciences 1B-1C 10
Environmental Science and Policy 30, or Anthropology 2, or Geology 10 3-4
Comparative Literature 1, 2, or 3, or English 3 4
Comparative Literature 20 4
Recommended: Statistics 13, 32, 102, or 103.

Depth Subject Matter 44
Nature and Culture 100 and 180 8
Nature and Culture 120 or 140, or American Studies 157, or Veterinary Medicine 170 4
Environmental Science and Policy 100, or Evolution and Ecology 101 or Plant Biology 147 4
Anthropology/Environmental Science and Policy 101 or 102 4
English 184 or Native American Studies 181A, 181B, or 181C, or Comparative Literature 120 4
Electives, a minimum of 20 units selected in consultation with an adviser from one or two thematic clusters. Possible clusters include Human Evolution and Ecology, Human Culture and Society, Indigenous Peoples, California and the Southwest, Art and Literature, Earth and Environment, The Impact of Humans on the Environment, Environmental Law, Policy and Planning. A representative list of clusters and courses is available from advisers and from the Program Office 20

Total Units for the Major 82-85

Major advisers: Ann Savageau; also consult the program office.

Minor Program Requirements:

UNITS

Nature and Culture 24
Nature and Culture 1 4
Nature and Culture 100 4
Environmental Science and Policy 100, or Evolution and Ecology 101, or Plant Biology 147 4
Nature and Culture 120 or 140, or Veterinary Medicine 170 4
Anthropology/Environmental Science and Policy 101 or 102 4
English 184 or Native American Studies 181A, 181B, or 181C 4

Courses in Nature and Culture (NAC)

Lower Division Courses

1. Intersections of Nature and Culture (4)
Lecture/discussion—3 hours; term paper. Prerequisite: satisfaction of Subject A requirement; Comparative Literature 1, 2 or 3, or English 3 recommended. Nature and culture as human constructs, conditioned by both time and place; importance of nature in human thought, both scientific and spiritual; scientific and literary view of the relation between nature and culture, including forms of observation and methods of analysis. GE credit: ArtHum or SciEng, Wrt.—II. (II.) Cox, Ziser

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Individual Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. The Culture of Nature: Theoretical Frameworks and Case Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1. Problems in nature and culture, with particular attention to integrative theoretical frameworks available for the investigation of specific issues. Case studies will vary with instructor. May be repeated once for credit when topic and instructor differ. GE credit: ArtHum or SciEng, Wrt—III. (III.) Barbour, Smith

120. Environmental Ethics (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1. Ethical issues underlying environmental/ecological controversies, including anthropocentrism vs. ecocentrism, wilderness and species preservation, human population growth, animal rights, deep ecology, and ecofeminism. Emphasis is on critical examination of issues from cross-cultural, theoretical, and applied perspectives. GE credit: ArtHum, Wrt.—(III.) McLean

140. Animal Rights (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Issues surrounding animal rights, including hunting, fishing, industrial husbandry and slaughter, experimentation, and pets. Emphasis on the complexities of human relations to other animals from historical, literary, and cross-cultural perspectives. Offered in alternate years. GE credit: ArtHum, Wrt.—III. McLean

160. Art and the Natural World (4)
Studio—6 hours. Field trips. Exploration of how the people of various cultures, from traditional to contemporary, have expressed their relationship to the natural world in art.

180. Fieldwork in Nature and Culture (4)
Discussion—1 hour; fieldwork—70 hours/quarter; term paper. Prerequisite: course 100 and consent of instructor. Fieldwork: one week prior to the beginning of the quarter, plus two weekends. Natural scientific, social scientific, and literary/artistic approaches to the study of nature and culture in one place, which will vary with instructor.—I. (I.) Savageau

192. Internship in Nature and Culture (1-12)
Internship—3-36 hours. Prerequisite: course 1. Internship in natural sciences, social sciences, or humanities on or off campus in which students use and improve their interdisciplinary skills and perspectives gained through the Nature and Culture curriculum. Supervised by a faculty member. May be repeated for credit. (P/NP grading only.)

197T. Tutoring in Nature and Culture (1-5)
Tutoring—3-15 hours. Prerequisite: consent of instructor. Assist in field trips, lead study sessions with groups and individual students. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Individual Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Nematology

(College of Agricultural and Environmental Sciences)

Edward P. Caswell-Chen, Ph.D., Chairperson of the Department

Department Office, 354 Hutchison Hall (530-752-7567/6905)

http://ucdnema.ucdavis.edu

Faculty

Edward P. Caswell-Chen, Ph.D., Professor
Howard Ferris, Ph.D., Professor
Bruce A. Jaffee, Ph.D., Professor
Harry K. Kaya, Ph.D., Professor *(Entomology)*
Steven Nadler, Ph.D., Professor
Valerie M. Williamson, Ph.D., Professor

Emeriti Faculty

Armand R. Maggenti, Ph.D., Professor Emeritus
Dewey J. Raski, Ph.D., Professor Emeritus

Affiliated Faculty

Becky B. Westerdahl, Ph.D., Professor

Minor Program Requirements:

	UNITS
Nematology	**18-20**
Nematology 100, 110, and Soil Science 100	10
Two or three courses from one of the following areas	8-10
(a) Plant Science: Microbiology 102; Entomology 100, 135, 153, 156, 156L; Evolution and Ecology 112; Plant Pathology 120, 148; Plant Biology 121; Soil Science 111, 112	
(b) Entomology: One upper division Entomology course; Evolution and Ecology 112; Microbiology 102; Plant Biology 121; Plant Pathology 120, 148; Soil Science 102, 111, 112	

Minor Adviser. S. A. Nadler

Graduate Study. Graduate degrees specializing in Nematology are offered through the Departments of Entomology and Plant Pathology, and through various Graduate Groups (Biochemistry, Ecology, Genetics, Plant Protection and Pest Management). Refer also to the Graduate Studies chapter of this catalog.

Courses in Nematology (NEM)

Upper Division Courses

100. General Plant Nematology (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1B or 10. An introduction to the classification, morphology, biology, and control of the nematodes attacking cultivated crops.—I. (I.) Ferris

110. Introduction to Nematology (2)
Lecture—2 hours. Prerequisite: Biological Sciences 1B or the equivalent or consent of instructor. The relationship of nematodes to human environment. Classification, morphology, ecology, distribution, and importance of nematodes occurring in water and soil as parasites of plants and animals.—II. (II.) Caswell-Chen, Nadler

150. Revising Scientific Prose (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in English composition, understanding of English grammar and parts of speech, upper division standing in a science major, or consent of instructor. Principles of detailed revision; close analysis of writing styles in research papers, popular scientific articles, and other scientific reports; use of verb-based and noun-based writing styles. GE credit: Wrt.—II. (II.) Jaffee

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

201. Molecular and Physiological Plant Nematology (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: Biological Sciences 101; Plant Pathology 120, course 100 or 110. Molecular biology and physiology of nematodes using *Caenorhabditis elegans* as a model, but with emphasis on plant-parasitic species. Plant responses to nematodes. Discussion of current literature emphasized. Offered in alternate years.—II. Williamson

203. Ecology of Parasitic Nematodes (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: course 100 or 110 or Entomology 156; Evolution and Ecology 101 or Plant Biology 117. Major concepts in population and community ecology of animal- and plant-parasitic nematodes. Current advances in techniques, theory, and basic information about nematode-host dynamics, and application to management of nematode diseases. Offered in alternate years.—(III.) Caswell-Chen

204. Management of Plant-Parasitic Nematodes (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 100 or 110. Theory, foundation, principles and practices of nematode management. Techniques and equipment used to manage nematodes and methods used to analyze their effectiveness. Offered in alternate years.—III. Westerdahl

205. Insect Nematology and Biological Control (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: courses 100 and 110, Entomology 100 or 110. The biology of insect-parasitic nematodes, their effect on the host, and their potential as biological control agents of insect and other invertebrate pests. Application of ecological theory in classical and augmentative biological control. Offered in alternate years.—(I.) Kaya

206. Nematode Systematics and Evolution (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 100 or 110 or Entomology 156; Evolution and Ecology 100 recommended. Nematode diversity as revealed by morphological and molecular evidence. Laboratory experience focuses on structural features used in taxonomy. Phylogenetic relationships based on morphological and molecular data used to consider patterns of character change among taxa. Offered in alternate years.—(I.) Nadler

210. Molecular Phylogenetic Analysis (3)
Lecture—2 hours; laboratory—3 hours. Theory and practice of inferring phylogenetic trees using molecular sequence data. Practical techniques for obtaining sequence data, advantages and disadvantages of common approaches for inferring trees, statistical methods for comparing alternative hypotheses. (Same course as Evolution and Ecology 210.) Offered in alternate years.—III. Nadler, Sanderson

245. Field Nematology (1)
Fieldwork—6 days. Prerequisite: course 100. Six-day demonstration and field study in applied nematology including diagnosis and prediction of nematode field problem strategies for control field plot design, and establishment in association with diverse California crops. (S/U grading only.)—I. (I.)

290. Seminar (1)
Seminar—1 hour. (S/U grading only.)—II, III. (II, III.)

290C. Advanced Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Planning and results of research programs, proposals, and experiments. Discussion and critical evaluation of original research being conducted by the group. Discussion led by individual research instructors for research group. (S/U grading only.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Neurobiology, Physiology, and Behavior

Leo M. Chalupa, Ph.D., Chairperson of the Section

Section Office, 196 Briggs Hall (530-752-0203)

http://npb.ucdavis.edu

Faculty

Primary Section Members
Joseph F. Antognini, Ph.D., M.D. Professor *(Anesthesiology and Pain Medicine)*
Kenneth H. Britten, Ph.D., Associate Professor
Earl E. Carstens, Ph.D., Professor
Leo M. Chalupa, Ph.D., Professor
Ernest S. Chang, Ph.D., Professor *(Animal Science)*
Barbara X. Chapman, Ph.D., Assistant Professor
William DeBello, Ph.D., Assistant Professor
Jochen Ditterich, Ph.D., Assistant Professor
Charles A. Fuller, Ph.D., Professor
John D. Furlow, Ph.D., Assistant Professor
Jack M. Goldberg, Ph.D., Lecturer
Thomas P. Hahn, Ph.D., Assistant Professor
Barbara A. Horwitz, Ph.D., Professor, *Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement*
Andrew T. Ishida, Ph.D., Professor
Kim McAllister, Ph.D., Assistant Professor
Brian C. Mulloney, Ph.D., Professor
Gabrielle A. Nevitt, Ph.D., Associate Professor
Bruno A. Olshausen, Ph.D., Associate Professor
Pamela A. Pappone, Ph.D., Professor
Gregg H. Recanzone, Ph.D., Associate Professor
Arnold J. Sillman, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Mitchell L. Sutter, Ph.D., Associate Professor
Martin W. Usrey, Ph.D., Assistant Professor
Craig H. Warden, Ph.D., Associate Professor *(Pediatrics)*
W. Jeff Weidner, Ph.D., Professor
John S. Werner, Ph.D., Professor *(Ophthalmology)*
Phyllis M. Wise, Ph.D., Professor
Martin C. Wilson, Ph.D., Professor
Dorothy E. Woolley, Ph.D., Professor

Secondary Section Members
Ronald J. Baskin, Ph.D., Professor
John H. Crowe, Ph.D., Professor
Judy A. Stamps, Ph.D., Professor

Emeriti Faculty

Marylynn S. Barkley, Ph.D., M.D., Professor Emerita
James M. Boda, Ph.D., Professor Emeritus
Harry W. Colvin, Ph.D., Professor Emeritus

John M. Horowitz, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
Frederick W. Lorenz, Ph.D., Professor Emeritus
Peter R. Marler, Ph.D., Professor Emeritus
Verne E. Mendel, Ph.D., Professor Emeritus
Arthur H. Smith, Ph.D., Professor Emeritus

Affiliated Faculty

Michael J. Guinan, Ph.D., Lecturer, *Academic Federation Excellence in Teaching Award*
Ann V. Hedrick, Ph.D., Assistant Adjunct Professor
Lauren C. Liets, Ph.D., Lecturer
Grace L. Rosenquist, Ph.D., Assistant Adjunct Professor

The Neurobiology, Physiology, and Behavior Major Program

Neurobiology, Physiology, and Behavior is a major that emphasizes the understanding of vital functions common to all animals. All animals perform certain basic functions—they grow, reproduce, move, respond to stimuli, and maintain homeostasis. The physiological mechanisms upon which these functions depend are precisely regulated and highly integrated. Actions of the nervous and endocrine systems determine behavior and the interaction between organisms and their physical and social environments. Students in this major study functional mechanisms; the control, regulation, and integration of these mechanisms; and the behavior that relates to those mechanisms. They do so at the level of the cell, the organ system, and the organism.

The Program. In the freshman and sophomore years, students majoring in neurobiology, physiology, and behavior build a broad scientific background, taking courses in chemistry, biology, physics, and mathematics. As juniors or seniors, students can enroll in a variety of Neurobiology, Physiology and Behavior courses and related upper division courses. Students can participate in a number of advanced laboratory courses or may design an individual, independent project guided by a member of the faculty.

Career Alternatives. Completion of the neurobiology, physiology, and behavior major provides the foundation for advanced study leading to careers in high school teaching, college level teaching or research. It also serves as the basis for further training in the health professions, including but not limited to human and veterinary medicine, medical technology, physical therapy, pharmacy, dentistry and optometry. The major is also appropriate for those intending to seek careers in biotechnology or other biologically related industries.

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 60-70
Biological Sciences 1A-1B-1C 15
Chemistry 2A-2B-2C 15
Chemistry 8A-8B or 118A-118B-118C .. 6-12
Mathematics 16A-16B-16C or 21A-21B-21C 9-12
Physics 7A-7B-7C 12
Statistics 13, 32, 100 (recommended), or 102 3-4

Depth Subject Matter..... 50-51
Biological Sciences 101, 102, 103, 104... 13
Neurobiology, Physiology, and Behavior 100, 101, 101L, 102, 104L 19
Select three or more units of laboratory course work from the following list..... 3
Neurobiology, Physiology, and Behavior 106, 111C, 111L, 160L, 194H; other courses with the approval of the master adviser.
Additional neurobiology, physiology, and behavior depth unit requirement..... 12
All other Neurobiology, Physiology, and Behavior courses not used in satisfaction of any other requirement; or Anthropology 154A, 154B; or Entomology 104; or Exercise Biology 101, 102, 111. Courses 192, 197T, 199 may not be used to satisfy the depth unit requirement.
One course from Anthropology 151, Evolution and Ecology 100, Geology 107.. 3-4

Total Units for Major..... 110-121

Master Adviser. J. Goldberg, 191 Briggs Hall.

Advising Center. 188 Briggs Hall (530-752-9696)

Graduate Study. Information on graduate study in neuroscience, physiology or behavior may be obtained by writing the Graduate Adviser, Graduate Group Complex. See also the graduate course offerings listed under Animal Behavior Graduate Group, Neuroscience Graduate Group, and Physiology Graduate Group. See also the Graduate Studies chapter of this catalog.

Courses in Neurobiology, Physiology, and Behavior (NPB)

Lower Division Courses

10. Elementary Human Physiology (4)
Lecture—3 hours; discussion—1 hour. Introduction to physiology for non-science majors. Includes basic cell physiology and survey of major organ systems and how they function in homeostasis and human health. Not open for credit to students who have completed course 101. GE credit: SciEng.—III. (III.) Guinan, Antognini

12. Human Nervous System (3)
Lecture—3 hours. Organization and function of the human nervous system for non-science majors. Brain function discussed in relation to cognition, learning and memory, and neurological diseases. Not open for credit to students who have completed courses 100, 112 or Psychology 108. GE credit: SciEng.—III. (III.) Recanzone

12G. Understanding the Human Nervous System (1)
Discussion—1 hour. Prerequisite: concurrent enrollment in course 12. For non-science majors. Scientific studies of brain function will be discussed in relation to ethical considerations, social, economic, and political implications and current and future research. GE credit with concurrent enrollment in course 12: Wrt.—Recanzone

90A. Lower Division Seminar: Issues in Body Weight Regulation (2)
Seminar—2 hours. Prerequisite: lower division standing, consent of instructor. Critical examination of issues in body weight regulation through shared readings, discussions, written assignments, debates and oral presentations. Limited enrollment.—II. (II.) C. Warden, N. Warden

90B. Human Color Perception (2)
Seminar—2 hours; term paper. Prerequisite: lower division standing. The neural determinants of color appearance and why we see the world in the way we do. Demonstrations of color phenomena and what they tell us about the human brain. Limited enrollment. GE credit: ArtHum or SciEng, Wrt.—II. (II.) Werner

90C. Current Issues in Animal Behavior (2)
Seminar—2 hours. Prerequisite: lower division standing. The mechanisms and outcomes of sexual selection (mate choice and mate competition). Theory, current models and evidence that supports or refutes the models. Limited enrollment.—II. (II.) Hedrick

90D. Lower Division Seminar: Current Issues in Reproductive Endocrinology (2)
Seminar—2 hours. Prerequisite: lower division standing. The integrative roles of reproductive hormones in mammalian reproduction and health. Current theory and models regarding hormone function and use in reproductive health and contraception, and evidence that supports or refutes the models.

90E. Biology of Aging (2)
Seminar—2 hours. Prerequisite: freshman standing. Current theories on the biology of aging covering genetic, biochemical, and physiological aspects. Emphasis on critical evaluation of controversial and contemporary issues.—I. (I.) Wise

91C. Research Conference (1)
Discussion—1 hour. Prerequisite: Lower division standing in Neurobiology, Physiology and Behavior or related biological science and consent of instructor; concurrent enrollment in course 99. Research findings and methods in neurobiology, physiology, and/or behavior. Presentation and discussion of research by faculty and students. (P/NP grading only.)—I, II, III. (I, II, III.)

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the section of Neurobiology, Physiology, and Behavior. Internships supervised by a member of the faculty. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: lower division standing and consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: undergraduate standing and consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Neurobiology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B; Physics 5C or 7C recommended. Brains and nervous systems, neurons and neural circuits. Vision, hearing, and feature extraction by the central nervous system. Development of nervous systems. Coordination of movement. The cell biology of learning and memory. Perception, cognition, and disorders of the brain. Not open for credit to students who have completed course 112, 160, 161 or 162, or Neuroscience 221 or 222.—I, II, III. (I, II III.) Chapman, Sutter, Mulloney

101. Systemic Physiology (5)
Lecture—5 hours. Prerequisite: Biological Sciences 1B; Physics 1B or 7C strongly recommended. Systemic physiology with emphasis on aspects of human physiology. Functions of major organ systems, with the structure of those systems described as a basis for understanding the functions.—I, II, III. (I, II, III.) DeBello, Ishida, Goldberg, Sillman, Usrey, Weidner

101L. Systemic Physiology Laboratory (3)
Laboratory—3 hours; discussion—2 hours. Prerequisite: course 101 prior to taking 101L recommended, but 101 may be taken concurrently. Selected experiments to illustrate functional characteristics of organ systems discussed in course 101.—I, III. (I, III.) Goldberg, Liets

102. Animal Behavior (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Basic principles of behavioral organization in vertebrate and invertebrate animals. Underlying physiological and ethological mechanisms. The evolution of behavior, with special emphasis on behavior under natural conditions. Not open for credit to students who have completed course 155. (Former course 155.)—II, III. (II, III.) Hahn, Nevitt

103. Cellular Physiology/Neurobiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103 and 104; Physics 7C recommended. Cellular physiology with emphasis on membrane transport processes and neuronal physiology. Fundamental physical-chemical and biological mechanisms of membrane transport will be considered in relation to cytoplasmic homeostasis, communication between cells, and the cellular mechanisms of sensory and motor transduction. Not open for credit to students who have completed course 100B. (Former course 100B.)—II. (II.) Pappone

104L. Cellular Physiology/Neurobiology Laboratory (4)
Lecture—1 hour; laboratory—five 6-hour sessions and discussion—five 2-hour sessions to alternate weekly; extensive writing. Prerequisite: course 100 or 101 and Biological Sciences 103 and 104. Experiments in the physical and chemical processes of cells and tissues. GE credit: Wrt.—II. (II.)

105. Introduction to Computer Models (4)
Lecture—3 hours; lecture/laboratory—1 hour. Prerequisite: Mathematics 16C or the equivalent, Physics 7C, Chemistry 2C, and course 100 or 101. Introduction to the ideas, mathematical techniques and computer tools required for developing models of cellular processes in physiology and neurobiology. Applications include membrane transport, ionic channels, action potentials, Ca^{2+} oscillations, respiration, and muscle contraction. Offered in alternate years.

106. Experiments in Neurobiology, Physiology, and Behavior: Design and Execution (3)
Laboratory—7.5 hours; discussion—0.5 hours. Prerequisite: course 100 or 101 or 102, and 199 and consent of instructor. Design and execution of experiments in neurobiology, physiology, and/or behavior. Students choose and design a project in consultation with the sponsoring faculty member. May be repeated once for credit to complete the project, with consent of instructor. An additional repeat is permitted for a different project under the guidance of another faculty member. (P/NP grading only.)—I, II, III. (I, II, III.) Rosenquist

111C. Advanced Systemic Physiology Laboratory (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: courses 101, 101L, Statistics 13; course 112, 113, or 114 recommended. Interfacing physiological recording equipment with microcomputers; data acquisition and analysis using the microcomputer; data interpretation within the framework of physiological concepts.—Sutter

111L. Advanced Systemic Physiology Laboratory (3)
Lecture—1 hour; laboratory—6 hours; discussion—2 hours (laboratory and discussion alternate weekly). Prerequisite: courses 101, 101L. Selected comprehensive experiments in the autonomic nervous system, the cardiovascular, respiratory, and neuromuscular systems. Emphasis on conceptual and methodological approaches using several species in demonstrating the physiology of organ systems. GE credit: Wrt.—I, III. (I, III.) Liets

112. Neuroscience (3)
Lecture—3 hours. Prerequisite: course 100 or 101. Presentation of concepts in neuroscience including sensory systems, motor systems, and higher neural integration. Emphasis on mammalian nervous system.—I. (I.) Carstens

113. Cardiovascular, Respiratory, and Renal Physiology (4)
Lecture—4 hours. Prerequisite: course 101; Chemistry 8B, Physics 7B and 7C recommended. An intense and advanced presentation of concepts in cardiovascular, respiratory, and renal physiology including discussion of acid-base balance.—II. (II.) Goldberg

114. Gastrointestinal Physiology (3)
Lecture—3 hours; term paper. Prerequisite: course 101; Biological Sciences 103 recommended. Advanced gastrointestinal physiology covering absorption, secretion, motility, and special emphasis on endocrinology and innervation. Emphasis will be on physiology of the gastrointestinal tract; some pathology and nutritional items will be covered. GE credit: Wrt.—I. (I.) Horwitz

117. Avian Physiology (3)
Lecture—3 hours. Prerequisite: course 101 or Biological Sciences 1B. Physiology of the various systems of birds with emphasis on digestion, respiration, excretion, and endocrine systems.—III. (III.) Millam

121. Physiology of Reproduction (3)
Lecture—3 hours. Prerequisite: course 101. Physiological mechanisms related to reproduction, breeding efficiency, and fertility, with special reference to domestic animals.—II. (II.) Berger

121L. Physiology of Reproduction Laboratory (1)
Laboratory—3 hours. Prerequisite: course 121 recommended (may be taken concurrently). Experiments on the reproductive systems of domestic animals including male and female gametes. (P/NP grading only.)—II. (II.) Berger

122. Developmental Endocrinology (3)
Lecture—3 hours. Prerequisite: course 101. Hormonal control of development, maturation and senescence from the cellular to organismal level, with emphasis on the human. Prenatal and neonatal life, childhood and adolescence, adulthood and pregnancy, as well as the endocrinology of aging.

123. Comparative Vertebrate Organology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A and 1B. Functional anatomy of major organ systems in vertebrates. Each system examined from cellular to gross level in fish, birds, and mammals. Emphasis on how differentiated cell types are integrated into tissues and organs to perform diverse physiological functions. (Same course as Anatomy, Physiology, and Cell Biology 100.)—II. (II.) Guinan

124. Comparative Neuroanatomy (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: Psychology 101, or course 100 or 101. Overview of the neuroanatomy of the nervous system in a variety of mammalian and non-mammalian vertebrates. Examine changes or modifications to neural structures as a result of morphological or behavioral specializations. (Same course as Psychology 124.)—II. (II.) Krubitzer, Recanzone

125. Comparative Physiology: Neurointegrative Mechanisms (3)
Lecture—3 hours. Prerequisite: course 101. Comparisons of physiological functions in the animal kingdom: neurointegrative mechanisms of integration including aspects of phylogenetic development at both neuronal and systemic levels.—I. (I.) Woolley

126. Comparative Physiology: Sensory Systems (3)
Lecture—3 hours. Prerequisite: course 100 or 101. Basic physiological mechanisms involved in sensory systems. Comparative approach to considerations of mechanosensitive systems (audition, lateral lines, touch, echolocation, equilibrium), chemosensitive systems (olfaction, taste, pheromones), photosensitive systems (vision, infrared detection, UV detection), electroreception, and pain. Emphasis on receptors.—II. (II.) Sillman

127. Comparative Physiology: Circulation (3)
Lecture—3 hours. Prerequisite: course 101. Comparisons of physiological functions in the animal kingdom: circulation. Comparative approach to cardio-vascular function in vertebrates and invertebrates.—II. (II.) Weidner

128. Comparative Physiology: Endocrinology (3)
Lecture—3 hours. Prerequisite: course 101. Comparison of physiological functions in the animal kingdom: animal hormones and their functions.—II. (II.) Furlow, Chang

129. Comparative Physiology: Respiration (3)
Lecture—3 hours. Prerequisite: course 101. Comparisons of physiological functions in the animal kingdom: respiration.

130. Physiology of the Endocrine Glands (4)
Lecture—4 hours. Prerequisite: course 101. Advanced presentation of concepts in endocrinology with emphasis on the role of hormones in reproduction, metabolism, and disease.—I. (I.) Adams

131. Physiological Genomics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, and 101, upper division standing. Genomics and its role in elucidating physiological and pathophysiological mechanisms; bioinformatics.—I. (I.) Warden

139. Frontiers in Physiology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: courses 100 and 101; 102 (may be taken concurrently). Lectures by leading authorities and discussion of the latest research in newly emerging areas in physiology. Offered every third year.—III.

140. Principles of Environmental Physiology (3)
Lecture—3 hours. Prerequisite: course 101; Biological Sciences 102 recommended. Physiological aspects of interactions of organisms and environmental, cellular, system, and organismal levels. Emphasis on regulatory responses/ mechanisms to thermal, pressure, gravity and light environmental variables. Not open for credit to students who have completed course 148. (Former course 148.)—II. (II.) Fuller

141. Physiological Adaptation of Marine Organisms (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 103. Residence at Bodega Marine Laboratory required. Physiological adaptation to the environment among organisms in marine and estuarine habitats. (See Bodega Marine Laboratory Program.)—III. (III.) Chang, Clegg

141P. Physiological Adaptation of Marine Organisms/ Advanced Laboratory Topics (5)
Laboratory—12 hours; discussion—1 hour. Prerequisite: course 141 concurrently. Residence at Bodega Marine Laboratory required. Scientific research from hypothesis to publication, including training in methods of library research. Research related to topic covered in course 141. Final presentation both oral and written. (See Bodega Marine Laboratory Program.)—III. (III.) Chang, Clegg

150. Advanced Animal Behavior (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 102 or Psychology 101. Advanced integrative survey of biological principles of behavioral organization, emphasizing historical roots, current research directions, conceptual issues and controversies. Laboratory exercises on the description and analysis of the behavior of captive and free-living animals. (Same course as Psychology 122.)—III. (III.) Owings

152. Hormones and Behavior (3)
Lecture—3 hours. Prerequisite: course 101, and either course 102 or Psychology 101. Endocrine physiology with an emphasis on the principles of behavior. Fundamental relationships between hormones and various behaviors engaged in by the organism during its lifetime. Role of hormones in behavioral homeostasis, social behavior, reproductive behavior, parental behavior, adaptation to stress. (Same course as Psychology 123.)—III. (III.) Furlow, Hahn

159. Frontiers in Behavior (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: courses 100, 101, 102. Lectures by leading authorities and discussion of the latest research in newly emerging areas in behavioral biology. Offered every third year.—(III).

160. Molecular and Cellular Neurobiology (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: course 100, Biological Sciences 101 and consent of instructor. Selected topics in neurobiology. Topics include channel biophysics, action potential propagation, intracellular signal transduction pathways, synaptic physiology and quantal analysis, cellular mechanisms of synaptic plasticity, and neuromodulation of synaptic circuitry. (Same course as Neuroscience 160.)—III. (III.) Burns, Chen, Mulloney

160L. Advanced Cellular Neurobiology Laboratory (4)
Laboratory—12 hours. Prerequisite: course 160, Physics 7C recommended. Students will learn to record neural activity, to interpret their recordings, and to label neurons with antibodies against neurotransmitters.—III. (III.) Mulloney

161. Developmental Neurobiology (3)
Lecture—3 hours. Prerequisite: course 100 or 101. Issues, theoretical concepts, and methodologies in developmental neurobiology. Topics include prenatal and postnatal differentiation of neurons, and plasticity in the mature and aging brain. Integration of neurochemical, structural, physiological and behavioral perspectives.—III. (III.) Chalupa, McAllister

162. Neural Mechanisms of Behavior (3)
Lecture—3 hours. Prerequisite: course 100 or 101. The relationship between brain and behavior. Identification and analysis of the relevant neural circuits involved. Examples of systems to be considered are birdsong, locomotion, echolocation.—III. (III.) Britten

163. Information Processing Models in Neuroscience and Psychology (4)
Lecture—3 hours; term paper. Prerequisite: Mathematics 16B, Physics 7B, course 100 or Psychology 101. Basic mathematical modeling techniques used in neuroscience and psychology. Specific topics include linear systems theory, Fourier transforms, neural networks, adaptive systems, probabilistic inference and information theory. Emphasis on understanding information processing in neural systems. (Same course as Psychology 128.)—II. (II.) Sutter, Olshausen

164. Mammalian Vision (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100, 112, or Psychology 101. Structure and function of the mammalian visual system, from the formation of images on the retina through visually guided behavior and perception. Emphasis on biological mechanisms underlying vision.—II. Britten, Chalupa, Werner

168. Neurobiology of Addictive Drugs (4)
Lecture/discussion—4 hours. Prerequisite: course 100 or 101 or the equivalent. Neurobiological basis for the effects and mechanisms of action of drugs with addictive potential, including opiates (morphine, heroin, methadone), amphetamines, cocaine, nicotine, marijuana (cannabinoids), alcohol, caffeine, and mind-altering drugs such as LSD and antidepressants.—III. (III.) Woolley

169. Frontiers in Neurobiology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: courses 100 and 101, course 102 (may be taken concurrently). Lectures by leading authorities and discussion of the latest research in newly emerging areas in neurobiology. Offered every third year.

190C. Research Conference (1)
Discussion—1 hour. Prerequisite: upper division standing in Neurobiology, Physiology, and Behavior or related biological science and consent of instructor; concurrent enrollment in course 199. Research findings and methods in neurobiology, physiology, and/or behavior. Presentation and discussion of research by faculty and students. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in physiology. (P/NP grading only.)

194HA-194HB-194HC. Neurobiology, Physiology, and Behavior–Honors (1-4-2)
Laboratory—3-12 hours. Prerequisite: senior standing; minimum 3.5 GPA in courses counted toward major; approval by the Master Adviser. Honors project in Neurobiology, Physiology and Behavior. Laboratory research on a specific question. The project is developed with the sponsoring faculty member and approved by the student's Honors Thesis Committee. Honors thesis to be submitted upon completion of the project. (P/NP grading only.)

197T. Tutoring in Neurobiology, Physiology and Behavior (1-5)
Discussion—2-6 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor by tutoring students in one of the Section's regular courses. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

217. Advanced Avian Physiology (1)
Project—1 hour. Prerequisite: course 117 concurrently and graduate standing. Study in depth of a topic in avian physiology through development of a lecture with associated instructional materials such as lesson plan, readings, presentation, and evaluation aids. (S/U grading only.)—III. (III.) Millam

221. Cell and Molecular Neuroscience (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Advanced course on cellular and subcellular organization of the nervous system. Membrane channels, sensory transduction, synaptic transmission and cellular aspects of development and learning. (Same course as Neuroscience 221.)—I. Wilson, Chapman, Pappone

222. Systems Neuroscience (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Integrative and information-processing aspects of nervous system organization. Topics include sensory systems, motor function, sensorimotor integration, the limbic system, and the neurobiology of learning and memory. (Same course as Neuroscience 222.)—II. Usrey

245. Computational Models of Cellular Signaling (3)
Lecture—3 hours. Prerequisite: consent of instructor. Computational and mathematical techniques in modeling of regulatory and signaling phenomena in neuro-biology and cell physiology, focusing on linear and nonlinear ordinary differential equation models. Applications include ion channel kinetics, electrical activity, signal transduction, calcium oscillations, and simple neural circuits.—II. (II.)

247. Topics in Functional Neurogenomics (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. The theory, methods and principles of functional neurogenomics with emphasis on the relationship to molecular mechanisms involved in development and disease of the nervous system. (Same course as Neuroscience 247.)—II. Choudary

261A. Topics in Vision: Eyes and Retinal Mechanisms (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing, course 100 or 112 or the equivalent. Structure and function of the visual system, with emphasis on the eye and retina, including optics, anatomy, transduction, retinal synapses, adaptation, and parallel processing. (Same course as Neuroscience 261A and Molecular, Cellular, and Integrative Physiology 261A.) (S/U grading only.)—II. (II.) Ishida

261B. Topics in Vision: Systems, Psychophysics, Computational Models (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor, course 261A recommended. Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system. (Same course as Neurobiology, Physiology, and Behavior 261B and Molecular, Cellular, and Integrative Physiology 261B.) (S/U grading only.) Offered in alternate years.—II. Olshausen

261C. Topics in Vision: Clinical Vision Science (2)
Lecture/discussion—2 hours. Prerequisite: courses 261A and 261B or consent of instructor. Causes and mechanistic bases of major blinding diseases. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system related to disease. (Same course as Neuroscience 261C and Molecular, Cellular and Integrative Physiology 261C.) Not offered every year. (S/U grading only.)—III. Werner

263. Modeling in Systems Neuroscience (4)
Lecture—3 hours; lecture/laboratory—1 hour. Prerequisite: consent of instructor. Modeling as a tool in systems neuroscience. Mathematical techniques will be introduced and used to explore advanced topics in echolocation, sound localization, electroreception, communications, and motor systems. Other topics include transforms, modeling assumptions, scales and linearity. Offered in alternate years.—Sutter

270. How to Write a Fundable Grant Proposal (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing in a life science and consent of instructor. Familiarization with the skills required to craft a successful grant proposal submitted to extramural agencies such as NIH and NSF.—III. (III.) Chalupa

285. Literature in Visual Neuroscience (2)
Seminar—2 hours. Critical presentation and discussion of current literature in visual neuroscience. (Same course as Neuroscience 285.) May be repeated for credit if topic differs. (S/U grading only.)—I, II, III. (I, II, III.) Usrey, Britten

291. Auditory Neuroscience (1)
Seminar—0.5 hours; discussion—0.5 hours. Prerequisite: course 100 or 112 or Neuroscience 222 or the equivalent. Exploration of various important aspects of auditory physiology, behavior and psychophysics through review of original literature. New topic each quarter. May be repeated for credit with consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.) Sutter, Recanzone

292. Cortical Plasticity and Perception (2)
Lecture/discussion—2 hours. Prerequisite: course 100 or 112 or equivalent or consent of instructor. Examination of research articles on cortical plasticity and changes in perception. Examples drawn from studies of the somatosensory, visual, auditory, and motor cortex. (Same course as Neuroscience 292.) Offered in alternate years. (S/U grading only.)—(II.) Recanzone

Neuroscience (A Graduate Group)

David Amaral, Ph.D., Chairperson of the Group

Group Office, 148 Center for Neuroscience (530-757-8845)

http://neuroscience.ucdavis.edu/ngg

Faculty

David Amaral, Ph.D., Professor *(Psychiatry)*
Kathleen Baynes, Ph.D., Assistant Professor *(Neurology)*
Robert Berman, Ph.D., Professor *(Neurological Surgery)*
Ann Bonham, Ph.D., Associate Professor *(Internal Medicine, Pharmacology)*
Kenneth H. Britten, Ph.D., Assistant Professor *(Neurobiology, Physiology, and Behavior)*
Earl E. Carstens, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Leo M. Chalupa, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Barbara Chapman, Ph.D., Assistant Professor *(Neurobiology, Physiology, and Behavior)*
Nicola S. Clayton, Ph.D., Associate Professor *(Neurobiology, Physiology, and Behavior)*
Gino Cortopassi, Ph.D., Associate Professor *(Molecular Biosciences)*
Dorothy W. Gietzen, Ph.D., Professor *(Anatomy, Physiology, and Cell Biology)*
Fredric Gorin, M.D., Ph.D., Professor *(Neurology)*
Charles M. Gray, Ph.D., Associate Professor *(Neurobiology, Physiology, and Behavior)*
Linda Hall, Ph.D., Professor *(Biochemical Pharmacology)*
Andrew T. Ishida, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
William Jagust, M.D., Professor *(Neurology)*
Edward G. Jones, M.D., Ph.D., Professor *(Psychiatry)*
Marc Kaufman, Ph.D., Professor *(Internal Medicine)*
Leah Krubitzer, Ph.D., Assistant Professor *(Psychology)*
Vijaya Kumari, Ph.D., Professor *(Cell Biology and Human Anatomy)*
Bruce Lyeth, Ph.D., Associate Professor *(Neurological Surgery)*
Kimberley McAllister, Ph.D., Assistant Professor *(Neurology)*
Mark G. McNamee, Ph.D., Professor *(Biochemistry)*
Brian Mulloney, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Gabrielle A. Nevitt, Ph.D., Assistant Professor *(Neurobiology, Physiology, and Behavior)*

Bruno Olshausen, Ph.D., Assistant Professor *(Psychology)*
Pamela A. Pappone, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
Isaac N. Pessah, Ph.D., Associate Professor *(Molecular Biosciences)*
Gregg H. Recanzone, Ph.D., Assistant Professor *(Neurobiology)*
David Richman, M.D. Professor *(Neurology)*
Michael Russell, Ph.D., Assistant Professor *(Anesthesiology)*
Karen Sigvardt, Ph.D., Adjunct Professor *(Neurology)*
Mitchell L. Sutter, Ph.D., Assistant Professor *(Neurobiology)*
Diane Swick, Ph.D., Assistant Adjunct Professor *(Neurology)*
Martin Usey, Ph.D., Assistant Professor *(Neurobiology, Physiology, and Behavior)*
Richard Vulliet, Ph.D., D.V.M., Professor *(Molecular Biosciences)*
Martin C. Wilson, Ph.D., Professor *(Neurobiology, Physiology, and Behavior)*
David Woods, Ph.D., Adjunct Professor *(Neurology)*
Andrew Yonelinas, Ph.D., Associate Professor *(Physiology)*
Tsung Yu Chen, Ph.D., Assistant Professor *(Neurology)*

Graduate Study. The Graduate Group in Neuroscience offers programs of study leading to the Ph.D. degree. Neuroscience is a broad, interdepartmental program with faculty interests ranging from molecular biophysics of channels to cortical organization and cognition. A major goal of the program is to prepare students for careers as research scientists. Details of the program may be obtained from the Group office.

Graduate Advisers. R. Berman *(Neurological Surgery),* E. Carstens *(Neurobiology, Physiology, and Behavior),* B. Chapman *(Neurobiology, Physiology, and Behavior),* K. Sigvardt *(Center for Neuroscience).*

Courses in Neuroscience (NSC)

Upper Division Courses

160. Molecular and Cellular Neurobiology (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: Neurobiology, Physiology, and Behavior 100, Biological Sciences 101 and consent of instructor. Selected topics in neurobiology. Topics include channel biophysics, action potential propagation, intracellular signal transduction pathways, synaptic physiology and quantal analysis, cellular mechanisms of synaptic plasticity, and neuromodulation of synaptic circuitry. (Same course as Neurobiology, Physiology, and Behavior 160.)—III. (III.) Burns, Chen, Mulloney

Graduate Courses

200LA. Laboratory Methods in Neurobiology (6)
Laboratory—18 hours. Prerequisite: graduate standing in the Neuroscience Graduate Group. Individual research in the laboratory of a faculty member. Research problems emphasize the use of contemporary methods and good experimental design. May be repeated three times for credit. (S/U grading only.)—I, II, III. (I, II, III.)

200LB. Laboratory Methods in Neurobiology (3)
Laboratory—9 hours. Prerequisite: graduate standing in the Neuroscience Graduate Group. Individual research in the laboratory of a faculty member. Research problems emphasize the use of contemporary methods and good experimental design. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

220. How to Give a Scientific Seminar (3)
Lecture/discussion—3 hours. Prerequisite: consent of instructor. Presentation of effective seminars. Student presentations of selected neuroscience topics in seminar format. Must be taken in two consecutive quarters.—II-III. (II-III.) McAllister

221. Cell and Molecular Neuroscience (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Advanced course on cellular and subcellular organization of the nervous system. Membrane channels, sensory transduction, synaptic transmission and cellular aspects of development and learning. (Same course as Neurobiology, Physiology, and Behavior 221.)—I. Wilson, Chapman, Pappone

222. Systems Neuroscience (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Integrative and information-processing aspects of nervous system organization. Topics include sensory systems, motor function, sensorimotor integration, the limbic system, and the neurobiology of learning and memory. (Same course as Neurobiology, Physiology, and Behavior 222.)—II. Usrey

223. Cognitive Neuroscience (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate student standing in Psychology or Neuroscience or consent of instructor. Graduate core course for neuroscience. Neurobiological bases of higher mental function including attention, memory, language. One of three in three-quarter sequence. (Same course as Psychology 261.)—III. (III.)

226. Molecular and Developmental Neurobiology (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Introduction to molecular and developmental neurobiology. Topics range from neurulation to development of sensory systems and include modern molecular methods and their application in developmental neuroscience.—II. (II.) McAllister, L'Etoile

243. Topics in Cellular and Behavioral Neurobiology (2)
Discussion—1 hour; seminar—1 hour. Prerequisite: consent of instructor. An advanced examination of several currrent problems in neurobiology. Topics will vary in different years; may be repeated for credit. (S/U grading only.)—III. (III.) Ishida

247. Topics in Functional Neurogenomics (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. The theory, methods and principles of functional neurogenomics with emphasis on the relationship to molecular mechanisms involved in development and disease of the nervous system. (Same course as Neurobiology, Physiology, and Behavior 247.)—II. Choudary

250. Biology of Neuroglia (2)
Lecture/discussion—1.5 hours. Prerequisite: consent of instructor. The properties and functions of non-neuronal or neuroglial cells in the mammalian central nervous system with relevance to neuronal development, physiology and injury response. Offered in alternate years. (Same course as Cell Biology and Human Anatomy 250.) (S/U grading only.)—III. Kumari

261A. Topics in Vision: Eyes and Retinal Mechanisms (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing, Neurobiology, Physiology, and Behavior 100 or 112 or the equivalent. Structure and function of the visual system, with emphasis on the eye and retina, including optics, anatomy, transduction, retinal synapses, adaptation, and parallel processing. (Same course as Neurobiology, Physiology, and Behavior 261A and Molecular, Cellular, and Integrative Physiology 261A.) (S/U grading only.)—II. (II.) Ishida

261B. Topics in Vision: Systems, Psychophysics, Computational Models (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor, course 261A recommended. Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system. (Same course as Neurobiology, Physiology, and Behavior 261B and Molecular, Cellular, and Integrative Physiology 261B.) (S/U grading only.) Offered in alternate years.—II. Olshausen

261C. Topics in Vision: Clinical Vision Science (2)
Lecture/discussion—2 hours. Prerequisite: courses 261A and 261B, or consent of instructor. Causes and mechanistic bases of major blinding diseases. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system related to disease. (Same course as Neurobiology, Physiology, and Behavior 261C and Molecular, Cellular, and Integrative Physiology 261C.) (S/U grading only.) Not offered every year.—III. Werner

283. Neurobiological Literature (1)
Seminar—1 hour. Prerequisite: consent of instructor. Critical presentation and analysis of recent journal articles in neurobiology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Mulloney, Wilson

284. Development of Sensory Systems (1)
Seminar—1 hour. Prerequisite: consent of instructor. Presentation and discussion of recent literature on the development of sensory systems. May be repeated for credit. (S/U grading only.)—II, III. (II, III.) Chapman

285. Literature in Visual Neuroscience (2)
Seminar—2 hours. Critical presentation and discussion of current literature in visual neuroscience. (Same course as Neurobiology, Physiology, and Behavior 285.) May be repeated for credit if topic differs. (S/U grading only.)—I, II, III. (I, II, III.) Usrey, Britten

290C. Research Conference in Neurobiology (1)
Discussion—1 hour. Prerequisite: graduate standing in Neuroscience or consent of instructor; course 299 (concurrently). Presentation and discussion of faculty and graduate student research in neurobiology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

292. Cortical Plasticity and Perception (2)
Lecture/discussion—2 hours. Prerequisite: Neurobiology, Physiology, and Behavior 100 or 112 or equivalent or consent of instructor. Examination of research articles on cortical plasticity and changes in perception. Examples drawn from studies of the somatosensory, visual, auditory, and motor cortex. (Same course as Neurobiology, Physiology, and Behavior 292.) Offered in alternate years. (S/U grading only.)—(II.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Neurology

See Medicine, School of

Neurosurgery

See Medicine, School of

Nutrition

See Clinical Nutrition; Food Service Management; Nutrition; Nutrition (A Graduate Group); Nutrition Science; and Clinical Nutrition and Metabolism (under Internal Medicine in Medicine, School of)

Nutrition

(College of Agricultural and Environmental Sciences)
Carl L. Keen, Ph.D., Chairperson of the Department
Department Office, 3135 Meyer Hall (530-752-4630)
http://nutrition.ucdavis.edu

Faculty

Kenneth H. Brown, M.D., Professor
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Andrew J. Clifford, Ph.D., Professor
Kathryn G. Dewey, Ph.D., Professor
Louis E. Grivetti, Ph.D., Professor *(Nutrition, Geography)*
Carl L. Keen, Ph.D., Professor *(Nutrition, Internal Medicine)*
Bo L. Lönnerdal, Ph.D., Professor *(Nutrition, Internal Medicine)*
Roger McDonald, Ph.D., Professor
Patricia Oteiza, Ph.D., Associate Professor
Robert B. Rucker, Ph.D., Professor *(Nutrition, Biological Chemistry)*
Barbara O. Schneeman, Ph.D., Professor *(Nutrition, Food Science and Technology, Internal Medicine)*
Francene M. Steinberg, Ph.D., R.D., Associate Professor
Judith S. Stern, Sc.D., R.D., Professor *(Nutrition, Internal Medicine)*

Emeriti Faculty

Lindsay H. Allen, Ph.D., Professor Emeritus
Janet King, Ph.D., Professor Emeritus
Frances J. Zeman, Ph.D., Professor Emeritus

Affiliated Faculty

Elizabeth A. Applegate, Ph.D., Senior Lecturer, *Academic Federation Excellence in Teaching Award*
Linda Bacon, Ph.D., Assistant Researcher
Ellen Bonnel, Ph.D., Academic Administrator
Betti Burri, Ph.D., Associate Adjunct Professor
Britt Burton-Freeman, Ph.D., Assistant Research Nutritionist
Paul A. Davis, Ph.D., Research Biochemist *(Nutrition, Internal Medicine)*
Stephen R. Dueker, Ph.D., Assistant Researcher
Cesar Fraga, Ph.D., Research Chemist
Robert M. Hackman, Ph.D., Research Nutririonist
Charles Halsted, M.D., Professor (Internal Medicine)
Marjorie Haskell, Ph.D., Assistant Researcher
Peter Havel, Ph.D., D.V.M., Associate Researcher
Wayne Hawkes, Ph.D., Assistant Adjunct Professor
M. Jane Heinig, Ph.D., Academic Administrator
Liping Huang, Ph.D., Assistant Adjunct Professor
Daniel Hwang, Ph.D., Adjunct Professor
Robert A. Jacob, Ph.D., Adjunct Professor
Amy Block Joy, Ph.D., Specialist in Cooperative Extension
Lucia Kaiser, Ph.D., R.D., Associate Specialist in Cooperative Extension
Nancy Keim, Ph.D., Associate Adjunct Professor
Shannon Kelleher, Ph.D., Assistant Researcher
Darshan Kelley, Ph.D., Adjunct Professor
Mary Kretsch, Ph.D., Associate Adjunct Professor
Louise Lanoue, Ph.D., Assistant Researcher
Joo-Young Lee, Ph.D., Assistant Research
Yumei Lin, Ph.D., Assistant Researcher
Hagen Schroeter, Ph.D., Assistant Researcher
Charles Stephensen, Ph.D., Associate Adjunct Professor
Barbara Sutherland, Ph.D., Academic Administrator
Marilyn S. Townsend, M.S., R.D., Associate Specialist in Cooperative Extension
Judith Turnland, Ph.D., Adjunct Professor
Janet Uriu-Adams, Ph.D., Associate Researcher
Marta Van Loan, Ph.D., Associate Adjunct Professor
John S. Vogel, Ph.D., Adjunct Professor
Sheri Zidenberg-Cherr, Ph.D., Specialist in Cooperative Extension
Susan Zunino, Ph.D., Associate Adjunct Professor

Major Programs. See the majors in Clinical Nutrition and Nutrition Science.

Minor Program Requirements:

The Department of Nutrition offers four minor programs open to students majoring in other disciplines who wish to complement their study programs with a concentration in the area of food and nutrition.

Note: If the student's major program requires the same course in biochemistry and physiology, only one of the courses may duplicate credit toward the minor. Each program below lists replacement courses to fulfill the minimum unit requirement.

	UNITS
Community Nutrition	**24**
Preparation: plan in advance to include the required course prerequisites.	
Nutrition 101 and 111	9
Nutrition 118, 192 (2 units)	6
Nutrition 120A or 120B	4
Neurobiology, Physiology, and Behavior 101	5
Replacement courses (see note above): Nutrition 114, 116A-116B, 116AL-116BL.	

	UNITS
Food Service Management	**25**
Preparation: plan in advance to include the required course prerequisites.	
Food Science and Technology 100A-100B, 101A-101B and 108	13
Food Service Management 120, 120L, 122	8
Agricultural and Resource Economics 112	4
Replacement courses (see note above): Nutrition 10, 101, 111, 114, 116A-116B, Economics 1A-1B.	

	UNITS
Nutrition and Food	**24**
Preparation: plan in advance to include the required course prerequisites.	
Nutrition 101, 111	9
Nutrition 120A or 120B	4
Food Science and Technology 100A, 100B	6
Neurobiology, Physiology, and Behavior 101	5
Replacement courses (see note above): Nutrition 114, 116A-116B, 116AL-116BL.	

	UNITS
Nutrition Science	**20**
Preparation: plan in advance to include the required course prerequisites.	
Animal Biology 102 and 103, or Biological Sciences 102 and 103 and Nutrition 101	8-11
Neurobiology, Physiology, and Behavior 101	5
Nutrition 111	4
Replacement courses (see note above): Nutrition 114, 115, 116A-116B, 117, 120A or 120B, 122, 123, 124, 201, 204.	

Minor Adviser. R.B. Rucker.

Graduate Study. Programs of study leading to the M.S. and Ph.D. degrees are available in Nutrition. For information on graduate study contact the Nutrition Graduate Group.

Courses in Nutrition (NUT)

Lower Division Courses

10. Discoveries and Concepts in Nutrition (3)
Lecture—3 hours. Nutrition as a science; historical development of nutrition concepts; properties of nutrients and foods. Not open for credit to students who have taken an upper division course in nutrition. GE credit: SciEng.—I, II, III. (I, II, III.) Applegate

11. Current Topics and Controversies in Nutrition (2)
Discussion—1.5 hours; oral reports, written reports, term paper. Prerequisite: course 10 (may be taken concurrently). Assigned readings and discussion of topics of current concern and broad interest in contemporary nutrition. Coordinated with course 10. Not open for credit to students who have taken an upper division course in nutrition. GE credit: SciEng, Wrt.—I, II, III. (I, II, III.) Applegate

99. Individual Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

111AV. Introduction to Nutrition and Metabolism (3)
Online lecture—3 hours. Prerequisite: Chemistry 8B, Neurobiology, Physiology, and Behavior 101 or the equivalent. Introduction to metabolism of protein, fat and carbohydrate; the biological role of vitamins and minerals; nutrient requirements during the life cycle; assessment of dietary intake and nutritional status. Not open for credit to students who have completed course 101.—III. McDonald

111B. Recommendations and Standards for Human Nutrition (2)
Lecture—2 hours. Prerequisite: Chemistry 8B, Neurobiology, Physiology, and Behavior 101 or the equivalent. Critical analysis of the development of nutritional recommendations for humans. Topics include history of modern recommendations, development of the Recommended Dietary Allowance (RDA) and other food guides; the Dietary Reference Intakes (DRI); administrative structure of regulatory agencies pertinent to nutrition recommendations; introduction to scientific methods used to determine the recommendations; food labeling laws; nutrition recommendations in other countries and cultures. Not open for credit to students who have completed course 111.—III. Schneeman

112. Nutritional Assessment: Dietary, Anthropometric, and Clinical Measures (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Animal Biology 102 and 103 or Nutrition 101, Nutrition 111 (may be taken concurrently), Statistics 13. Methods of human nutritional assessment, including dietary, anthropometric, biochemical and hematological techniques, and physical examination. Principles of precision, accuracy, and interpretation of results for individuals and populations.—III. (III.) Brown,

114. Developmental Nutrition (4)
Lecture—4 hours. Prerequisite: Animal Biology 102 and 103 or course 101; course 111. Role of nutritional factors in embryonic and postnatal development. GE credit: SciEng, Wrt.—II. (II.) Keen

115. Animal Feeds and Nutrition (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 8B, Animal Science 41. Analyses and evaluation of feeds, influences of production, processing and storage methods on nutritive value of feeds. Animal nutrition. Diet formulation. GE credit: SciEng, Wrt.—II. (II.) DePeters

116A-116B. Clinical Nutrition (3-3)
Lecture—3 hours. Prerequisite: courses 111, 112 and Neurobiology, Physiology and Behavior 101 or the equivalent. Biochemical and physiological bases for therapeutic diets. Problems in planning diets for normal and pathological conditions.—I-II. (I-II.) Steinberg, Stern, Clifford

116AL. Clinical Nutrition Practicum (3)
Lecture—1 hour; laboratory—3 hours; discussion—1 hour. Prerequisite: course 116A (may be taken concurrently). Fundamental principles of planning and evaluating therapeutic diets and patient education for pathological conditions covered in 116A.—I. (I.) Steinberg

116BL. Clinical Nutrition Practicum (3)
Lecture—1 hour; laboratory—3 hours; discussion—1 hour. Prerequisite: courses 116AL, and 116B (may be taken concurrently). Fundamental principles of planning and evaluating therapeutic diets and patient education for pathological conditions covered in 116B. Continuation of course 116AL.—II. (II.) Steinberg

117. Experimental Nutrition (6)
Lecture—3 hours; laboratory—6 hours; extensive writing. Prerequisite: courses 111, Biological Sciences 102 and 103, and a laboratory course in nutrition or biochemistry. Methods of assessing nutritional status. Application of chemical, microbiological, chromatographic and enzymatic techniques to current problems in nutrition. GE credit: Wrt.—I. (I.) Clifford

118. Community Nutrition (4)
Lecture—4 hours. Prerequisite: course 101 or 111, and 116A. Nutrition problems in contemporary communities and of selected target groups in the United States and in developing countries. Nutrition programs and policy, principles of nutrition education.—II. (II.) Dewey

119A. International Community-Based Nutritional Assessment (1)
Lecture/discussion—1 hour. Prerequisite: course 112 (may be taken concurrently) and consent of instructor. Issues and problems related to community-based nutritional assessment in a low-income country, major nutritional problems in low-income countries; ethical issues in human investigation; survey design, data collection techniques, and data analysis; preparation for international travel; cross-cultural communication, health, and safety while living abroad.—III. (III.) Brown

119B. International Community-Based Nutritional Assessment (6)
Lecture—2 hours; fieldwork—12 hours. Prerequisite: course 119A and consent of instructor. A six-week summer course in Peru. Implementation of a community-based nutritional assessment survey, including development of the survey instrument, selection of the study sample, collection and verification of data, and analysis and interpretation of the results; the project will be carried out by paired participation of students and faculty members of UC Davis and the collaborating foreign institution.—summer. (summer.) Brown

122. Ruminant Nutrition and Digestive Physiology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: upper division standing; Animal Biology 103 or consent of instructor; Neurobiology, Physiology and Behavior 101, Biological Sciences 1C, and Mathematics 16B recommended. Study of nutrient utilization as influenced by the unique aspects of digestion and fermentation in ruminants, both domestic and wild. Laboratories include comparative anatomy, feed evaluation, digestion kinetics using fistulated cows, computer modeling, and microbial exercises.—III. (III.) Fadel

123. Comparative Animal Nutrition (3)
Lecture—3 hours. Prerequisite: Animal Biology 103. Restricted to upper division or graduate students. Comparative nutrition of animals; including laboratory, companion, zoo, and wild animals. Digestion and metabolic adaptations required for animal species to consume diverse diets ranging from grasses and leaves to nectar to insects and meat. Relation of nutrition to metabolic adaptations and physiological states, including growth, reproduction, and diseases.—III. (III.) Klasing

123L. Comparative Animal Nutrition Laboratory (1)
Laboratory—3 hours. Prerequisite: Animal Biology 103, course 123 (may be taken concurrently). Laboratory exercises leading to written reports on establishment of nutritional requirements and formulation of complete diets for laboratory, companion, zoo and wild animals.—III. (III.) Klasing

124. Nutrition and Feeding of Finfishes (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103 and Wildlife, Fish and Conservation Biology 121. Principles of nutrition and feeding of fishes under commercial situations; implication of fish nutrition to the environment and conservation of endangered species.—I. (I.) Hung

127. Environmental Stress and Development in Marine Organisms (10)
Lecture—4 hours; laboratory—12 hours; discussion—2 hours. Prerequisite: Environmental Toxicology 101 or Biological Sciences 102 or 104 or the equivalent; Environmental Toxicology 114A or course 114 recommended. Course taught at Bodega Marine Laboratory. Effects of environmental and nutritional stress, including pollutants, on development and function in embryos and larvae of marine organisms. Emphasis on advanced experimental methods. (Same course as Environmental Toxicology 127.) GE credit: SciEng.—summer. Cherr

129. Journalistic Practicum in Nutrition (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 111; a course in written or oral expression or consent of instructor. Critical analysis and discussion of current, controversial issues in nutrition; the use of journalistic techniques to interpret scientific findings for the lay public. Students will be required to write several articles for campus media. Course may be repeated once for credit.—III. (III.) Stern

130. Experiments in Nutrition: Design and Execution (2)
Laboratory—6 hours. Prerequisite: consent of instructor; course 101, 110, 111, or 114 recommended. Experiments in current nutritional problems. Experimental design: students choose project and, independently or in groups of 2-3, design a protocol, complete the project, and report findings. May be repeated for credit up to six times (three times per instructor) with consent of instructor.—I, II, III, summer. (I, II, III, summer.)

190. Proseminar in Nutrition (1)
Seminar—1 hour. Prerequisite: senior standing; course 111. Discussion of human nutrition problems. Each term will involve a different emphasis among experimental, clinical, and dietetic problems of community, national and international scope. May be repeated twice for credit with consent of instructor.—I, II, III. (I, II, III.) Zidenberg-Cherr

190C. Nutrition Research Conference (1)
Discussion—1 hour. Prerequisite: upper division standing in Nutrition or related biological science; consent of instructor. Introduction to research findings and methods in nutrition. Presentation and discussion of research by faculty and students. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: one upper division course in nutrition and consent of instructor. Work experience on or off campus in practical application of nutrition, supervised by a faculty member. (P/NP grading only.)

197T. Tutoring in Nutrition (1-2)
Discussion/laboratory—3 or 6 hours. Prerequisite: Nutrition Science, Clinical Nutrition or related major. Completion of course 101. Tutoring of students in nutrition courses, assistance with discussion groups or laboratory sections, weekly conference with instructor in charge of course: written evaluations. May be repeated if tutoring a different course. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

201. Vitamin and Cofactor Metabolism (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: one upper division nutritional biochemistry and physiology course. Review of studies and relationships involving the metabolic functions of vitamins. Comparative nutritional aspects and the metabolism and chemistry of vitamins and vitamin-like compounds.—II. (II.) Rucker, Steinberg

202. Advanced Nutritional Energetics (2)
Lecture—2 hours. Prerequisite: Animal Biology 102, 103, Neurobiology, Physiology and Behavior 101 or the equivalent. History of nutritional energetics. Evaluation of energy transformations associated with food utilization. Energy expenditures at cellular, tissue, and animal levels as affected by diet and physiological state. Current and future feeding systems.—III. (III.) Sainz

203. Advanced Protein and Amino Acid Nutrition (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: one upper division nutritional biochemistry and physiology course. Nutritional significance of protein and amino acids, including studies of the influence of dietary protein on digestion, absorption, metabolism, resistance to disease, and food intake. Study of dietary requirements and interrelationships among amino acids.—III. (III.) Calvert

204. Mineral Metabolism (2)
Lecture—2 hours. Prerequisite: upper division nutrition or biochemistry course. Studies of metabolic functions and nutritional interrelationships involving minerals.—III. (III.) Lönnerdal, Keen

219A. International Nutrition (3)
Lecture/discussion—3 hours. Prerequisite: upper division course in nutrition or consent of instructor. Epidemiology, etiology, and consequences of undernutrition in developing countries. Offered in alternate years.—II. Brown, Dewey

219B. International Nutrition (3)
Lecture/discussion—3 hours. Prerequisite: upper division course in nutrition or consent of instructor. Nutrition policies and programs in developing countries. Offered in alternate years.—III. Brown, Dewey

230. Experiments in Nutrition: Design and Execution (2)
Laboratory—6 hours. Prerequisite: consent of instructor; courses 201, 202, 203, 204, or the equivalent recommended. Student selected projects to enhance laboratory skills. Independently, or in groups of 2-3 students, design a protocol, carry out the project, analyze the results and report the findings. May be repeated for credit up to six times (limit of three times per instructor) with consent of instructor.—I, II, III. (I, II, III.)

250. Metabolic Homeostasis (3)
Lecture—2 hours; discussion—1.5 hours. Prerequisite: passing the Nutrition Graduate Group Preliminary Examination or consent of instructor. Preference given to students with advanced standing in the Nutrition Graduate Group. Regulatory mechanisms of carbohydrate, lipid, and protein homeostasis; mechanisms of metabolic enzyme regulation and of the metabolic hormones; homeostatic mechanisms and interactions; fuel-fuel interactions; nutrition energy balance.—III. (III.) Walsh

251. Nutrition and Immunity (2)
Lecture/discussion—2 hours. Prerequisite: Pathology, Microbiology and Immunology 126, Medical Microbiology 107 or the equivalent, Animal Biology 102. Cellular and molecular mechanisms underlying interactions of nutrition and immune function, including modulation of immunocompetence by diet and effects of immune responses on nutritional needs. Lectures and discussion explore implications for resistance to infection, autoimmunity and cancer. Offered in alternate years.—(II.) Klasing, Erickson, Stephensen

252. Nutrition and Development (3)
Lecture—3 hours. Prerequisite: courses 201, 202, 203, 204. Relationship of nutrition to prenatal and early postnatal development.—II. (II.) Keen

253. Control of Food Intake (3)
Lecture—2 hours; discussion—1 hour; 2 or 3 laboratory demonstrations per quarter. Prerequisite: course 201 or 202 or consent of instructor. Comprehensive study of the biochemical, nutritional, behavioral, and physiological mechanisms controlling food intake. Subject matter will be approached through lectures, laboratory demonstration and discussions where students and staff will critically evaluate the literature. Offered in alternate years.—(III.) Stern

254. Applications of Systems Analysis in Nutrition (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 202, Physiological Sciences 205A-205B or the equivalent. Quantitative aspects of digestion and metabolism; principles of systems analysis. Evolution of models of energy metabolism as applied in current feeding systems. Critical evaluations of mechanistic models used analytically in support of nutritional research. Offered in alternate years. –II. Fadel

257. Selected Topics in Nutritional and Hormonal Control of Nitrogen Metabolism (2)
Lecture—2 hours. Prerequisite: courses 201 through 204; Physiological Sciences 205A-205B or the equivalent. Quantitative and qualitative aspects of nitrogen metabolism; critical evaluation of dietary intake, hormones and diet-hormone interactions which affect nitrogen metabolism, including protein synthesis-degradation, amino acid synthesis-catabolism, nitrogen transport-excretion, depending on current literature. Offered in alternate years.—(I.) Klasing, Calvert

258. Field Research Methods in International Nutrition (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing or consent of instructor. Issues and problems related to implementation of nutrition field research in less-developed countries, including ethics; relationships with local governments, communities, and scientists; data collection techniques and quality assurance; field logistics; research budgets; and other administrative and personal issues. Offered in alternate years.—(II.) Brown, Dewey,

259. Nutrition and Aging (2)
Lecture—2 hours. Prerequisite: three of courses 201, 202, 203 and 204. Interaction between nutrition and aging. Topics include physiological/biochemical basis of aging, age-related changes affecting nutritional requirements, nutrition and mortality rate, assessment of nutritional status in the elderly, and relationship between developmental nutrition and the rate of aging. Offered in alternate years.—(I.) McDonald

260. Nutrition During Pregnancy (6)
Lecture—5 hours; term paper. Prerequisite: acceptance into the Master's Degree program of Advanced Studies in Maternal and Child Nutrition. Overview of the anatomical, physiological and biochemical changes that occur during pregnancy and early development. Discussion and evaluation of nutritional/lifestyle factors associated with pregnancy outcomes and nutrition programs/interventions for pregnant women.—I. (I.)

261. Lactation and Infant Nutrition (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: course 260. Overview of the physiological and biochemical processes underlying human lactation and nutritional needs of both mother and infant. Development of skills in assessment, nutrition counseling, education and support of new mothers and their families.—I. (I.)

262. Child and Adolescent Nutrition (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: course 261. Relationships among nutrition, growth, and development during childhood and adolescence. Nutritional assessment for normal and high risk groups; psychological, social, and economic factors contributing to nutritional status. Nutritional needs and interventions for special groups, including obese children/adolescents, athletes, and eating disordered.—I. (I.) Dewey

270. Scientific Ethics in Biomedical Studies: Emphasis on Nutrition (3)
Lecture—1 hour; discussion—1 hour; term paper. Scientific ethics in biomedical studies, especially nutrition. Discussion and case study presentations on scientific integrity, fraud, misconduct, conflict of interest, human and animal research protections. Not open for credit to students who have completed course 492B.—III. Steinberg

290. Beginning Nutrition Seminar (2)
Lecture/discussion—1 hour; seminar—1 hour. Prerequisite: first year graduate standing. Discussion and critical evaluation of topics in nutrition with emphasis on literature review and evaluation in this field. Students give oral presentations on relevant topics.—I. (I.) Schneeman, Dewey, Conklin

290C. Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Major professors lead research discussions with their graduate students. Research papers are reviewed and project proposals presented and evaluated. Format will combine seminar and discussion style. (S/U grading only.)—I, II, III. (I, II, III.)

291. Advanced Nutrition Seminar (1)
Seminar—1 hour. Prerequisite: second-year graduate standing. Advanced topics in nutrition research. Multiple sections may be taken concurrently for credit. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

293A. Current Topics in Obesity, Food Intake and Energy Balance (3)
Lecture—1 hour; seminar—1 hour; discussion—1 hour. Prerequisite: graduate standing or course 129. Undergraduates with upper division standing with at least one writing course may enroll with consent of instructor. Current research and its evaluation. Principles of experimental design and scientific background for given article. Articles summarized for posting on Internet for use by healthcare professionals. May be repeated for credit with consent of instructor.—I. (I.) Stern

293B. Current Topics in Obesity, Food Intake, and Energy Balance with Special Topics (3)
Lecture—1 hour; seminar—1 hour; discussion—1 hour. Prerequisite: graduate standing or course 129. Undergraduates with upper division standing with at least one writing course may enroll with consent of instructor. A continuation of course 293A, with additional special topics. May be repeated for credit up to 3 times with consent of instructor.—II. (II.) Stern

294A. Current Topics in Developmental Nutrition (2)
Seminar—2 hours. Prerequisite: course 114 or 252 or consent of instructor. Effects of nutrition on embryology, morphogenesis, and developmental mechanisms. May be repeated for credit when topic differs.—I, II, III. (I, II, III.) Lanoue

297T. Supervised Teaching in Nutrition (1-3)
Teaching under faculty supervision—3-9 hours. Prerequisite: graduate standing in nutrition or consent of instructor. Practical experience in teaching nutrition at the university level; curriculum design and evaluation; preparation and presentation of material. Assistance in laboratories, discussion sections, and evaluation of student work. (S/U grading only.)

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Professional Course

492A. Professionalism: An Academic Perspective (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing. For graduate students in their initial quarter of residence. Professionalism topics are presented and examples drawn from both the biological and social sciences.—I, II. (I, II.) Grivetti

492C. Grant Writing (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: graduate standing in Nutrition or consent of instructor. Preparation of grants for governmental agencies (particularly NIH and USDA) and private foundations. Students will write a research grant or fellowship application. May be repeated once for credit with consent of instructor. Offered in alternate years.—III. Stern

Nutrition (A Graduate Group)

Kathryn G. Dewey, Ph.D., Chairperson of the Group
Group Office, 1202D Meyer Hall (530-754-7684)
http://nutrition.ucdavis.edu/ggn

Faculty

Lindsay H. Allen, Ph.D., R.D., Professor *(Nutrition)*
Kenneth H. Brown, M.D., Professor *(Nutrition)*
C. Christopher Calvert, Ph.D., Professor *(Animal Science)*
Andrew J. Clifford, Ph.D., Professor *(Nutrition)*
Douglas E. Conklin, Ph.D., Associate Professor *(Animal Science)*
Edward J. DePeters, Ph.D., Professor *(Animal Science)*
Kathryn G. Dewey, Ph.D., Professor *(Nutrition)*
Kent L. Erickson, Ph.D., Professor (Cell Biology and Human Anatomy)
James G. Fadel, Ph.D., Professor (Animal Science)
Andrea J. Fascetti, D.V.M, Ph.D., Assistant Professor *(Molecular Biosciences)*
J. Bruce German, Ph.D., Professor *(Food Science and Technology)*
M. Eric Gershwin, M.D., Professor *(Internal Medicine)*
Dorothy W. Gietzen, Ph.D., Professor *(Anatomy, Physiology, and Cell Biology)*
Ralph Green, M.D., Professor *(Pathology)*
Louis E. Grivetti, Ph.D., Professor *(Nutrition, Geography)*
Jean-Xavier Guinard, Ph.D., Professor *(Food Science and Technology)*
Charles H. Halsted, M.D., Professor *(Internal Medicine, Nutrition)*
Robert J. Hansen, Ph.D., Professor *(Molecular Biosciences)*
Silas S. O. Hung, Ph.D., Professor *(Animal Science)*
Thomas Jue, Ph.D., Professor *(Biological Chemistry)*
Sidika E. Kasim-Karakas, M.D., Associate Professor *(Internal Medicine)*
George A. Kaysen, M.D., Ph.D., Professor *(Internal Medicine)*
Carl L. Keen, Ph.D., Professor *(Nutrition, Internal Medicine)*
Kirk C. Klasing, Ph.D., Professor *(Animal Science)*
Bo L. Lönnerdal, Ph.D., Professor *(Nutrition, Internal Medicine)*
Stanley L. Marks, B.V.Sc., Ph.D. Associate Professor *(Medicine and Epidemiology)*
Roger B. McDonald, Ph.D., Professor *(Nutrition)*
Alyson Mitchell, Ph.D., Assistant Professor *(Food Science and Technology)*
Anthony F. Philipps, M.D., Professor *(Pediatrics)*
Ernesto Pollitt, Ph.D., Professor *(Pediatrics)*
Helen E. Raybould, Ph.D., Professor *(Anatomy, Physiology and Cell Biology)*
Quinton R. Rogers, Ph.D., Professor *(Molecular Biosciences)*
Robert B. Rucker, Ph.D., Professor *(Nutrition, Biological Chemistry)*
Roberto D. Sainz, Ph.D., Associate Professor *(Animal Science)*
Barbara O. Schneeman, Ph.D., Professor *(Nutrition, Food Science and Technology, Internal Medicine)*
Francene M. Steinberg, Ph.D., R.D., Assistant Professor *(Nutrition)*
Judith S. Stern, Sc.D., R.D., Professor *(Nutrition, Internal Medicine)*
Suzanne Teuber, M.D., Associate Professor *(Internal Medicine)*
Donal A. Walsh, Ph.D., Professor *(Biological Chemistry)*
Craig H. Warden, Ph.D., Associate Professor *(Neurobiology, Physiology, and Behavior)*
Bruce M. Wolfe, M.D., Professor *(Surgery)*
Vincent A. Ziboh, Ph.D., Professor *(Dermatology, Biological Chemistry)*

Emeriti Faculty

Ransom L. Baldwin, Jr., Ph.D., Professor Emeritus
Arthur L. Black, Ph.D., Professor Emeritus
Harry W. Colvin, Jr., Ph.D., Professor Emeritus
Robert E. Feeney, Ph.D., Professor Emeritus
Richard A. Freedland, Ph.D., Professor Emeritus
William N. Garrett, Ph.D., Professor Emeritus
C. Richard Grau, Ph.D., Professor Emeritus
Fredric W. Hill, Ph.D., Professor Emeritus
Jiro J. Kaneko, D.V.M., Ph.D., D.V.Sc.(hc), Professor Emeritus
F. Howard Kratzer, Ph.D., Professor Emeritus
Verne E. Mendel, Ph.D., Professor Emeritus
James H. Meyer, Ph.D., Professor Emeritus
James G. Morris, Ph.D., Professor Emeritus
Howard G. Schutz, Ph.D., Professor Emeritus
Aloys L. Tappel, Ph.D., Professor Emeritus
Pran N. Vohra, Ph.D., Professor Emeritus
William C. Weir, Ph.D., Professor Emeritus
Frances J. Zeman, Ph.D., Professor Emeritus

Affiliated Faculty

Paul A. Davis, Ph.D., Associate Researcher *(Internal Medicine)*
Mari S. Golub, Ph.D., Adjunct Professor *(Internal Medicine)*
Peter J. Havel, D.V.M., Ph.D., Associate Research Nutritionist *(Nutrition)*
Liping Huang, Ph.D., Assistant Adjunct Professor *(Nutrition)*
Robert A. Jacob, Ph.D., Adjunct Professor *(Nutrition)*
Amy Block Joy, Ph.D., Nutrition Science Specialist *(Nutrition)*
Nancy L. Kein, Ph.D., R.D., Adjunct Professor *(Nutrition)*
Darshan S. Kelley, Ph.D., Adjunct Professor *(Nutrition)*
Janet C. King, Ph.D., Adjunct Professor *(Nutrition)*
Mary J. Kretsch, Ph.D., R.D., Associate Adjunct Professor *(Nutrition)*
Joshua W. Miller, Ph.D., Assistant Adjunct Professor *(Pathology)*
James W. Oltjen, Ph.D., Management Systems Specialist *(Animal Science)*
Peter H. Robinson, Ph.D., Associate Extension Specialist *(Animal Science)*
Charles B. Stephensen, Ph.D., Adjunct Professor *(Nutrition)*
Judith R. Turnlund, Ph.D., R.D., Adjunct Professor *(Nutrition)*
Marta D. Van Loan, Ph.D., Adjunct Professor *(Nutrition)*
Sheri A. Zidenberg-Cherr, Ph.D., Nutrition Science Specialist *(Nutrition)*

Graduate Study. The Graduate Group in Nutrition offers programs of study and research leading to the M.S. and Ph.D. degrees. The great diversity of research interests represented by the faculty members allows students to choose from a wide variety of themes: nutritional biochemistry, animal nutrition, nutrition and development, nutrient bioavailability, human/clinical nutrition, nutrition and behavior, nutritional energetics, community nutrition, maternal and child nutrition, nutrition and endocrinology, international nutrition, obesity/body composition, physiology of digestion, nutrition and chronic disease, culture and nutrition, nutrition and gene expression, nutrition and aging, food preferences, nutrition and immunity, diet and exercise, dietary assessment, protein and lipid metabolism, food intake regulation, nutrition education.

Graduate Advisers. Consult the Nutrition Graduate Group Office.

Nutrition Science

(College of Agricultural and Environmental Sciences)

Faculty

See the Department of Nutrition

The Major Program

The study of nutrition encompasses all aspects of the consumption and utilization of food and its constituents. Key areas of study include the biochemical reactions important to utilization of nutrients and food constituents and to the impact of diet on health and disease, and nutrition-related policy and public health issues. The nutrition science major includes two options for studying these areas: *nutritional biochemistry* and *community nutrition.*

The Program. Nutrition as it is taught on the Davis campus is a biological science and requires a complete background in chemistry and biology, along with calculus and either physics (nutritional biochemistry option) or economics (community nutrition option). These courses are generally completed during the first two years, and along with biochemistry, must be completed before most nutrition classes can be taken. During their junior and senior years, students in the nutritional biochemistry option take additional course work in biochemistry, genetics, microbiology, physiology, immunology, and/or toxicology. Students in the community nutrition option take additional course work in social and health-related sciences.

Career Alternatives. Both options are excellent preparation for professional or graduate training in medicine, public health, or other health sciences. The nutritional biochemistry option also provides preparation for technical work in nutrition in the animal, food, and pharmaceutical industries. The community nutrition option prepares students for jobs in administrative, teaching, or public health/public service positions. Students who complete the additional academic requirements for an internship in dietetics are also qualified for careers in dietetics following completion of an internship.

B.S. Major Requirements:

UNITS

English Composition Requirement..... 0-8
See College requirement

Preparatory Subject Matter 60-66
Anthropology 2 or Geography 2 or Sociology 3 4
Biological Sciences 1A, 1B, 1C..... 15
Chemistry 2A-2B-2C and 8A-8B, or 118A-118B, or 128A-128B and 129A 21-23
Mathematics 16A-16B 6
Physics 1A-1B (Nutritional Biochemistry option) or Economics 1A-1B (Community Nutrition option)..... 6-10
Sociology 46A or Psychology 41..... 4
Statistics 13 or Agricultural Management and Rangeland Resources 120..... 4

Breadth/General Education 6-24
Satisfaction of General Education requirement

Depth Subject Matter..... 57-58
Animal Biology 102, 103..... 10
Biological Sciences 101 4
Food Science and Technology 100A and 100B 8
Neurobiology, Physiology, and Behavior 101, 101L 8

Nutritional Biochemistry option:
Nutrition 111A and 111B, 113, 116A, 116B, 117, 190 23
Additional nutrition..... 9

Community Nutrition option:
Nutrition 111A and 111B, 113, 116A, 116B, 119, 190, 192 (2 units) 25

Restricted Electives 14-15
Select one of the two options.

Nutritional Biochemistry option:
Biochemistry laboratory (Molecular and Cellular Biology 120L or an alternative selected upon consultation and approval of the faculty adviser)..... 6
Additional courses in genetics, biochemistry, microbial biology, physiology, immunology, or toxicology, chosen from the following list in consultation with the faculty adviser..... 8
Animal Genetics 111, Animal Science 123, 124, Anthropology 153, Biological Sciences 104, Environmental Toxicology 101, 112A, 112B, 114A, 114B, 128, Exercise Biology 101, 102, 110, Food Science and Technology 100C, 104, 123-123L, 128, Neurobiology, Physiology, and Behavior 112, 113, 114, 121, 130, 161, Molecular and Cellular Biology 121, 122, 123, 141, 150-150L, 161, 162, 163, Microbiology 102, 160, Medical Microbiology 107, 130, Psychology 108, Population, Health, and Reproduction 150, Pathology, Microbiology, and Immunology 102, 126, 127, 128.

Community Nutrition option:
Economics 100, 101, or Agricultural and Resource Economics 100A, 100B .. 8-10
Additional courses chosen from the following list in consultation with the faculty adviser..... 5-7
African American and African Studies 100, Agricultural and Resource Economics 15, 120, 130, Agricultural Management and Rangeland Resources 150, Anthropology 101, 122, 126, 131, 133, Asian American Studies 100, Chicana/o Studies 110, 140, Communication 145, Community and Regional Development 2, 151, 152, 153, 172, 174, 175, 176, Consumer Science 100, Economics 115A, 115B, 123, 130, 151A, 151B, 162, Education 110, 153, Environmental Science and Policy 126, 165, Environmental Toxicology 101, 128, Epidemiology and Preventive Medicine 101, 160, 180, Exercise Biology 101, 102, 110, 113, 117, Food Science and Technology 104, 140, Geography 170, Human Development 100A, 100B, 100C, International Agricultural Development 10, 103, 110, 111, 195, Native American Studies 115, Political Science 105, Psychology 1, 108, 112, 130, 145, 160, 168, Sociology 145A, 145B, 154, 170.

Unrestricted Electives..... 6-38

Total Units for the Degree..... 180

Major Adviser. B. L. Lonnerdal.

Advising Center for the major is located in 1202E Meyer Hall (530-752-2512).

Dietetics Internship. To fulfill the academic requirements for an internship in Dietetics, choose the following courses from the categories in which they appear above: English 1 or 3, Psychology 1, Communication 1, Sociology 1 or 3 or Anthropology 2, Economics 1A or 1B, Nutrition 116AL-BL, 118. The following courses must be added (some of which may meet restricted elective requirements): Agricultural and Resource Economics 112; Community and Regional Development 173 or Education 110; Food Science and Technology 101A, 101B, 108; Food Service Management 120, 120L, 122; Food Science and Technology 104, 104L or Microbiology 102, 102L. Students intending to apply for admission to a dietetic internship should contact the Advising Office no later than the first quarter of the junior year for information on procedures.

Graduate Study. The Department of Nutrition offers programs of study and research leading to the M.S. and Ph.D. degrees in Nutrition. For information on graduate study contact the graduate adviser. See also the Graduate Studies chapter of this catalog.

Obstetrics and Gynecology

See Medicine, School of

Ophthalmology

See Medicine, School of

Organizational Studies

See Sociology

Orthopaedic Surgery

See Medicine, School of

Otolaryngology

See Medicine, School of

Parks and Recreation

See Community and Regional Development; Design; Environmental Planning and Management (under Environmental Horticulture); Landscape Architecture; and Physical Education

Pathology

See Pathology (Medicine, School of); Pathology, Microbiology, and Immunology; and Plant Pathology

Pathology, Microbiology, and Immunology

See Veterinary Medicine, School of

Pediatrics

See Medicine, School of

Pharmacology and Toxicology

See Medical Pharmacology and Toxicology (under Medicine, School of); Molecular Biosciences (Veterinary Medicine); and Pharmacology and Toxicology (A Graduate Group)

Pharmacology and Toxicology (A Graduate Group)

Isaac N. Pessah, Ph.D., Chairperson of the Group

Group Office, 4117 Meyer Hall (Department of Environmental Toxicology, 530-752-4516)

http://www.envtox.ucdavis.edu/ptx

Faculty. The 60 faculty in the graduate group are from more than 20 academic departments and organized research units within the College of Agricultural and Environmental Sciences, the School of Medicine and the School of Veterinary Medicine.

Graduate Study. The program of study and research leading to the Ph.D. degree emphasizes an interdisciplinary approach to graduate student training. Many specialty areas in pharmacology and toxicology are represented in the research interests of the faculty. Graduate students can study areas of pharmacology and toxicology which emphasize the effects of chemicals in the environment, on human health, and on ecosystems. Molecular and analytical approaches are used to study reproductive, genetic and developmental, respiratory and neurological systems, as well as metabolic fate and pharmacokinetics. Career opportunities include teaching in professional schools and hospitals, laboratory research in academia, government, industry, environmental control, and agricultural and drug regulatory agencies. For detailed information on the program, contact the Group Office, appropriate graduate adviser, or the group chairperson.

Graduate Advisers. A.R. Buckpitt *(Molecular Biosciences),* J.A. Last *(Pulmonary Medicine),* M.G. Miller *(Environmental Toxicology),* K. Pinkerton *(Institute of Toxicology and Environmental Health),* R. Wu *(Pulmonary Medicine).*

Courses in Pharmacology and Toxicology (PTX)

Graduate Courses

201. Principles of Pharmacology and Toxicology I (5)
Lecture—5 hours. Prerequisite: Biological Sciences 102 and Neurobiology, Physiology and Behavior 101. First of three courses presenting fundamental principles of pharmacology and toxicology. Introductory overview of basic concepts in pharmacology/toxicology, followed by in-depth blocks on fate processes of chemicals in the body, fate processes in tissue selective responses, selective toxicity employed therapeutically.—I. (I.)

202. Principles of Pharmacology and Toxicology II (4)
Lecture—4 hours. Prerequisite: course 201. The second of three courses presenting fundamental principles of pharmacology and toxicology. Principles of pharmacodynamics and mechanisms of drug/toxicant actions.—II. (II.)

203. Principles of Pharmacology and Toxicology (4)
Lecture—4 hours. Prerequisite: courses 201 and 202. Integrated physiological systems, cardiovascular and nervous systems and how drugs and toxicants act to perturb function.—III. (III.)

230. Advanced Topics in Pharmacology and Toxicology (1-3)
Lecture/discussion/seminar—1 hour each (course format can vary at option of instructor). Prerequisite: course 201 and consent of instructor. In-depth coverage of selected topics for graduate students in Pharmacology-Toxicology and related disciplines. Topics determined by instructor in charge for each quarter.—I, II, III. (I, II, III.)

290. Seminar (1)
Current topics in pharmacology and toxicology. (S/U grading only.)—I, II, III. (I, II, III.)

299. Research (1-12)
(S/U grading only.)

Philosophy

(College of Letters and Science)

Gerald Dworkin, Ph.D., Chairperson of the Department

Department Office, 1238 Social Sciences and Humanities Building (530-752-0607)

http://philosophy.ucdavis.edu

Faculty

Victor M. Caston, Ph.D., Associate Professor
Robert C. Cummins, Ph.D., Professor
James R. Griesemer, Ph.D., Professor
Gerald Dworkin, Ph.D., Professor
Jeffrey C. King, Ph.D., Professor
George J. Mattey II, Ph.D., Lecturer
Karen L. Neander, Ph.D., Professor
Connie S. Rosati, Ph.D., Assistant Professor
Paul Teller, Ph.D., Professor
Pekka Vayrynen, Ph.D., Assistant Professor
Michael V. Wedin, Ph.D., Professor
George Wilson, Ph.D., Professor

Emeriti Faculty

Ronald A. Arbini, Ph.D., Professor Emeritus
William H. Bossart, Ph.D., Professor Emeritus
Joel I. Friedman, Ph.D., Professor Emeritus
Neal W. Gilbert, Ph.D., Professor Emeritus
Marjorie Grene, Ph.D., Professor Emeritus
Michael Jubien, Ph.D., Professor Emeritus
John F. Malcolm, Ph.D., Professor Emeritus

The Major Program

Philosophy addresses problems and questions that arise in all areas of human thought and experience and in all disciplines. Recurring questions about the nature of value, the good life, right conduct, knowledge, truth, language, mind, and reality are central to philosophical study. Philosophy also investigates the methodologies and assumptions of the major disciplines in the university in order to deepen our understanding of the sciences, of mathematics, art, literature, and history, and of religion and morality. It leads us to address issues about the nature of these subjects, about the methods of reasoning characteristic of them, and about the contributions they make to our understanding of ourselves and our world.

Philosophy contributes to the liberal education of its students. The department emphasizes an analytic approach to philosophical questions, which trains students to understand and evaluate arguments and to think and write precisely and clearly. These skills are of immense value in a variety of careers.

The Program. The Department of Philosophy offers courses in such areas as the theory of knowledge, metaphysics, logic, ethics, and political philosophy. In addition, upper division courses are offered in moral and political philosophy, and aesthetics, and in the philosophy of religion, of mind, of language, of mathematics, of law, and of the physical, biological, and social sciences.

The problems of philosophy have important roots in past. The history of philosophy is important not only as part of the heritage of educated persons, but also because it is relevant to contemporary issues.

For these reasons, the department places great emphasis on the history of philosophy, providing courses on the major figures and traditions of western philosophy.

Career Alternatives. Students of philosophy learn to understand and evaluate arguments and to think and write precisely and clearly. These analytical skills are assets in any career. Many of our majors have pursued graduate study in philosophy and have become philosophers in their own right. Others have pursued academic careers in related disciplines in the humanities and social sciences. Philosophy majors are well prepared for law, business, or other professional schools and have found careers in computer programming, government service, teaching, the ministry, and social work.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 16
One course from any three of the following areas 12
(a) General Philosophy: Philosophy 1
(b) Ancient Philosophy: Philosophy 21
(c) Early Modern Philosophy: Philosophy 22N
(d) Philosophy of Mind: Philosophy 13
(e) Ethics: Philosophy 14, 15 or 24
(f) Philosophy of Science: Philosophy 30, 31, 32 or 38
(g) Metaphysics: Philosophy 101
(h) Theory of Knowledge: Philosophy 102
Philosophy 12 4

Depth Subject Matter 36
Upper division units in Philosophy 36
Note: Philosophy 101 and 102 may not be counted toward both preparatory and depth subject matter units.

Total Units for the Major 52

Major Adviser. G.J. Mattey.

Advising Office. 1238 Social Science and Humanities.

Minor Program Requirements:

Students wishing to minor in Philosophy may choose a general minor or a minor specializing in logic. There are no specific courses required for the general minor, so students may create a program to suit their own interests. The range of choice in the logic specialization is limited to the courses listed.

UNITS

Philosophy—General 20
Twenty upper division units in philosophy. Philosophy 12 may be substituted for four of the upper division units.

Philosophy—Logic 20
Philosophy 12 or Mathematics 108 4
Philosophy 112 4
Select units from Philosophy 113, 131, 132, 134, 135, 189K 12

Minor Adviser. G.J. Mattey.

Honors Program. The department offers an honors program, which gives qualifying majors the opportunity to work closely with faculty and graduate students.

Courses for Non-Majors. Students majoring in most disciplines in the university will find courses relevant to their educational or career goals. Philosophy 1 is the introductory course for non-majors. Philosophy 5 teaches critical thinking. The following courses are recommended:

(i) pre-law: 12, 14, 24, 30, 102, 112, 115, 116, 118 and, especially, 119; *(ii) pre-medical:* 14, 30, 108, 114, 115, 116; *(iii) business:* 14, 102, 112, 114, 115, 116, 117, 118, 119; *(iv) social policy:* 14, 24, 101, 102, 114, 115, 116, 117, 118, 119; *(v) social sciences:* 12, 30, 31, 32, 101, 102, 103, 109, 118, 131; *(vi) physical sciences:* 12, 30, 31, 32, 101, 102, 106, 107, 112, 131; *(vii) biological sciences:* 30, 31, 32, 101, 102, 108, 110; *(viii) humanities and the arts:* 14, 21 through 24, 101, 102, 103, 105, 114, 116, 118, 123, 160 through 175; *(ix) agricultural and environmental science and policy:* 5, 14, 24, 30, 31, 114, 115, 116, 118.

Department Activities. The Philosophy department sponsors a lecture-seminar series of well-known philosophers who present papers in their fields of expertise. The department also operates ongoing faculty and graduate student colloquia. Undergraduate students are welcome to attend and join these discussions. Information can be obtained in the department office.

Graduate Study. The Department of Philosophy offers programs of study leading to the M.A. and Ph.D. degrees. Detailed information may be obtained by writing to the Graduate Adviser.

Graduate Adviser. G. Wilson.

Courses in Philosophy (PHI)

Lower Division Courses

1. Introduction to Philosophy (4)
Lecture—3 hours; discussion—1 hour. Problems of philosophy through major writings from various periods. Problems are drawn from political, aesthetic, religious, metaphysical, and epistemological concerns of philosophy. GE credit: ArtHum, Wrt.—I, II, III. (I, II, III.) King, Cummins, Caston, Wedin

5. Critical Reasoning (4)
Lecture—3 hours; discussion—1 hour. Criteria of good reasoning in everyday life and in science. Topics to be covered may include basic principles of deduction and induction; fallacies in reasoning; techniques and aids to reasoning; principles of scientific investigation; aids to clarity. Not open to students who have completed course 6. GE credit: Wrt.

11. Philosophy East and West (4)
Lecture—3 hours; discussion—1 hour. Comparative treatment of select theories in Eastern and Western philosophy, e.g., of self, God, being, knowledge, enlightenment. Topics selected from the following philosophies: Eastern—Buddhist, Confucian, Hindu, Taoist; and Western—Platonist, Aristotelian, Medieval Christian, Modern Rationalist/Empiricist, Kantian, Hegelian, Existentialist. GE credit: ArtHum, Div, Wrt.

12. Introduction to Symbolic Logic (4)
Lecture—3 hours; discussion—1 hour. Sentence logic syntax and semantics. Truth tables. Transcription between sentence logic and English. Logical equivalence. Validity. Proof techniques.—I. (I.) Teller

13. Minds, Brains, and Computers (4)
Lecture—3 hours; discussion—1 hour. Contemporary theories of the nature of the mind. The mind as a brain process and as a computer process. Ways in which neuroscience, artificial intelligence and psychology seek to understand the mind. Offered in alternate years. GE credit: SciEng or SocSci, Wrt.—Cummins

14. Ethical and Social Problems in Contemporary Society (4)
Lecture—3 hours; discussion—1 hour. Philosophical issues and positions involved in contemporary moral and social problems. Possible topics include civil disobedience and revolution, racial and sex discrimination, environment, population control, technology and human values, sexual morality, freedom in society. GE credit: ArtHum, Div, Wrt.—Rosati

15. Bioethics (4)
Lecture—3 hours; discussion–1 hour. Critical analysis of normative issues raised by contemporary medicine and biology. Possible topics include euthanasia, abortion, reproductive technologies, genetic engineering, practitioner/patient relationships, allocation of medical resources, experimentation on human subjects. GE credit: ArtHum, Wrt.—Dworkin

21. History of Philosophy: Ancient (4)
Lecture—3 hours; discussion—1 hour. Survey of Greek philosophy with special attention to the Pre-Socratics, Plato, and Aristotle. GE credit: ArtHum, Wrt.—Wedin

22N. History of Philosophy: Early Modern (4)
Lecture—3 hours; discussion—1 hour. Survey of major figures in philosophy of the seventeenth and eighteenth centuries, with emphasis on Descartes, Hume, and Kant. Not open for credit to students who have completed former course 22 or 23. GE credit: ArtHum, Wrt.—Cummins, Mattey

24. Introduction to Ethics and Political Philosophy (4)
Lecture—3 hours; discussion—1 hour. Reading of historical and contemporary works highlighting central problems in ethical theory and political philosophy. Why should we be moral? What is moral behavior? What is justice, both for the individual and for society? Is there a right of rebellion? GE credit: ArtHum, Wrt.—Väyrynen

30. Introduction to Philosophy of Science (4)
Lecture—3 hours; discussion—1 hour. Basic problems in the philosophy of science, common to the physical, biological, and social sciences. Analysis of explanation, confirmation theory, observational and theoretical terms, the nature of theories, operationalism and behaviorism, realism, reduction. Not open for credit to students who have taken course 104. GE credit: ArtHum or SciEng, Wrt.—Teller

31. Appraising Scientific Reasoning (4)
Lecture—3 hours; discussion—1 hour. Introduction to scientific hypotheses and the kinds of reasoning used to justify such hypotheses. Emphasis on adequate justification, criteria, and strategies for distinguishing scientific from pseudoscientific theories. Concrete historical and contemporary cases. GE credit: ArtHum or SciEng.—Griesemer

32. Understanding Scientific Change (4)
Lecture—3 hours; discussion—1 hour. Concepts of scientific change in historical and philosophical perspective. Survey of models of growth of knowledge, 17th century to present. Relationship between logic of theories and theory choice. Kuhn's revolution model. Examples from various sciences. GE credit: ArtHum or SciEng, Wrt.—Griesemer

38. Introduction to Philosophy of Biology (4)
Lecture—3 hours; discussion—1 hour. Non-technical introduction to philosophical, social, and scientific ideas, methods and technologies in contemporary biological fields such as evolution, genetics, molecular biology, ecology, behavior. Philosophical consideration of determinism, reductionism, explanation, theory, modeling, observation, experimentation. Evaluation of scientific explanations of human nature. GE credit: ArtHum, Wrt.—Griesemer, Neander

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

(Certain upper division courses may not be offered every year.)

101. Metaphysics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy recommended. Theories of being. Such topics as reality, substance, universals, space, time, causality, becoming, body, experience, persons, freedom, and determinism. Views of the nature and method of metaphysics. Anti-metaphysical arguments. GE credit: ArtHum, Wrt.

102. Theory of Knowledge (4)
Lecture—3 hours; extensive writing or discussion. Prerequisite: one course in philosophy. Analysis of the concept of knowledge. The relation between knowledge, belief and truth. Development of foundationalist, coherentist and externalist theories of justified belief. Examination of skepticism. GE credit: ArtHum, Wrt.—Mattey

103. Philosophy of Mind (4)
Lecture/discussion—3 hours; term paper. The relation between mind and body, our knowledge of other minds, and the explanation of mental acts. Discussion of such concepts as action, intention, and causation. GE credit: ArtHum, Wrt.—Cummins, Neander

105. Philosophy of Religion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy recommended. Logical, metaphysical, epistemological, and existential aspects of selected religious concepts and problems. GE credit: ArtHum, Wrt.

107. Philosophy of the Physical Sciences (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one philosophy course or a science background recommended. Nature of testability and confirmation of scientific hypotheses; nature of scientific laws, theories, explanations, and models. Problems of causality, determininism, induction, and probability; the structure of scientific revolutions. GE credit: ArtHum or SciEng, Wrt.—Teller

108. Philosophy of the Biological Sciences (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in biology or one course in philosophy. Scientific method in biology. Nature of biological theories, explanations, and models. Problems of evolutionary theory, ecology, genetics, and sociobiology. Science and human values. GE credit: ArtHum or SciEng, Wrt.—Griesemer

109. Philosophy of the Social Sciences (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy or a social science recommended. The nature of the social sciences, their subject matter and methods. Similarities to and differences from natural and life sciences. Predicting and explaining human behavior. Behaviorism. Reduction, holism, and individualism. Related moral issues. The social sciences and philosophy. GE credit: ArtHum or SocSci, Wrt.—Neander, Teller

111. Philosophy of Space and Time (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one upper division philosophy course. Philosophical problems of space and time. The philosophical implications of space-time theories, such as those of Newton and Einstein. Topics may include the nature of geometry, conventionalism, absolutist versus relationist views of space and time, philosophical impact of relativity theory.—Teller

112. Intermediate Symbolic Logic (4)
Lecture/discussion—4 hours. Prerequisite: course 12 or consent of instructor. Predicate logic syntax and semantics. Transcription between predicate logic and English. Proof techniques. Identity, functions, and definite descriptions. Introduction to concepts of metatheory.—II. (II.) Mattey

113. Advanced Logic (4)
Lecture/discussion—4 hours. Prerequisite: course 112 or Mathematics 108 or the equivalent. Topics will vary between metalogic of First-Order logic through the Completeness and Löwenheim-Skolem theorems; and Zermelo-Fraenkel set theory typically axiomatized as a First-Order theory. May be repeated once when subject area differs.

114. History of Ethics (4)
Lecture/discussion—4 hours. Prerequisite: one philosophy course. Study of some classic texts from the history of philosophical writing on central problems of ethics, taking the form either of a survey or concentrated examination of selected historical figures. Readings from such philosophers as Aristotle, Butler, Hume, Kant, Mill. GE credit: ArtHum, Wrt.

115. Problems in Normative Ethics (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy. Moral philosophy studied through examination of moral problems and the moral principles and common sense intuitions that bear on them. Problems discussed may include: animal rights, fetal rights, euthanasia, justice and health care, war, nuclear deterrence, world hunger, environmental protection. GE credit: ArtHum, Wrt.

116. Ethical Theories (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy; one course in ethics recommended. Study of fundamental concepts and problems in ethical theory through an examination of classical and contemporary philosophical theories of ethics. Among the theories that may be discussed are utilitarianism, virtue theory, theories of natural rights, Kantian ethical theory, and contractarianism.—Väyrynen

117. Foundations of Ethics (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one of courses 114, 115, 116, 101, or 137. Advanced investigation of questions about the nature and foundations of morality. Among the topics that may be discussed are moral realism and anti-realism, cognitivism and non-cognitivism, types of relativism, moral skepticism, normative language and normative belief.—Rosati

118. Political Philosophy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy. Intensive examination of some central concepts of political thought such as the state, sovereignty, rights, obligation, freedom, law, authority, and responsibility. GE credit: SocSci, Div, Wrt.—Rosati

119. Philosophy of Law (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy or consent of instructor. Philosophical theories of the nature of law, legal obligation, the relation of law and morals. Problems for law involving liberty and justice: freedom of expression, privacy, rights, discrimination and fairness, responsibility, and punishment. GE credit: SocSci, Div, Wrt.—Rosati

123. Aesthetics (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy recommended. Nature of art, of artistic creation, of the work of art, and of aesthetic experience; nature and validity of criticism; relations of art to its environment. GE credit: ArtHum, Wrt.—Wilson

125. Theory of Action (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: one course in Philosophy. Survey of prominent contemporary approaches to leading problems in action theory. Problems include issues about the nature of intentional action and the conceptual character of explanations of actions in terms of the agent's reasons. Offered in alternate years. GE credit: ArtHum, Wrt.—Wilson

127. Film Theory (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: Film Studies 1 or consent of instructor. Survey of the conceptual frameworks used to study film (including semiotics, psychoanalysis, spectatorship, auteur, genre and narrative theories). Historical survey of major film theorists. (Same course as Film Studies 127.) GE credit: ArtHum, Wrt.—Wilson

128. Rationality (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: at least one course in philosophy. Philosophical issues concerning rationality in its various forms. Focus is on theoretical and practical reasoning and conditions for rational belief, choice, and action. Possible additional topics include rationality and human limitations; paradoxes of rationality; varieties of irrationality; rationality and objectivity.—Väyrynen

131. Philosophy of Logic and Mathematics (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 12 or one course for credit in mathematics. Nature of formal systems and mathematical theories. Selected topics include logical and semantical paradoxes; foundations of mathematics; set theory, type theory, and intuitionistic theory; philosophy of geometry; philosophical implications of Gödel's incompleteness results.

134. Modal Logic (4)
Lecture/discussion—4 hours. Prerequisite: course 112 or Mathematics 108 or the equivalent. Survey of the main systems of modal logic, including Lewis systems S4 and S5. "Possible worlds" semantics and formal proofs. Applications to epistemology, ethics, or temporality.—King, Mattey

135. Alternative Logics (4)
Lecture/discussion—4 hours. Prerequisite: course 12, Mathematics 108, or the equivalent. Alternatives to standard truth-functional logic, including many-valued logics, intuitionist logics, relevance logics, and non-monotonic logics.—Mattey

137. Philosophy of Language (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy or linguistics. Discussion of philosophical theories of how languages work and philosophical problems arising from thinking about language. Emphasis on modern (1879–present) philosophical views on language.—Wilson, King

143. Hellenistic and Neo-Platonic Philosophy (4)
Lecture/discussion—4 hours. Prerequisite: course 21. Greek philosophy after Aristotle, including Epicureanism, Stoicism, Skepticism and Neo-Platonism. GE: ArtHum, Wrt.—Caston

145. Medieval Philosophy (4)
Lecture/discussion—3 hours; written reports. Prerequisite: course 21. Study of major philosophers in the medieval period. GE credit: ArtHum, Wrt.—Caston

151. Nineteenth Century European Philosophy (4)
Lecture/discussion—4 hours. Prerequisite: course 22N. Survey of the main movements in nineteenth century philosophy on the European continent. Idealism in Schopenhauer and Hegel, dialectical materialism in Marx, irrationalism in Kierkegaard, Nietzsche and Dostoevsky. Not offered every year. GE credit; ArtHum.—Mattey

156. Contemporary Analytic Philosophy (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy. Consideration of central issues such as meaning/reference, analytic/synthetic, reductionism, formal and ordinary language, essential properties, ontological commitment, possible world semantics; influential works by philosophers such as Russell, Moore, Wittgenstein, Austin, Carnap, Quine, Putnam, Kripke, van Fraassen.—King, Cummins

157. Twentieth Century European Philosophy (4)
Lecture/discussion—4 hours. Prerequisite: one course in Philosophy. Survey of the main movements in twentieth century philosophy on the European continent, including phenomenology, existentialism, structuralism and post-modernism. Philosophers covered include Husserl, Heidegger, Sartre, Levi-Strauss, Foucault. Offered in alternate years. GE credit: ArtHum, Wrt.—Mattey

160. Pre-Socratics (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 21. Study of the metaphysical views of such pre-Socratic figures as the Milesians, the Pythagoreans, Heracleitus, Parmenides, Empedocles, Anaxagoras, and the atomists.—Wedin

161. Plato (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 21. Examines Plato's most important contributions in metaphysics, epistemology, psychology, cosmology, ethics and political philosophy. Dialogues will be selected from Plato's middle and later writings. Offered in alternate years.—Wedin, Caston

162. Aristotle (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 21. An overview of Aristotle's most central and influential writings. Topics selected from fields such as metaphysics, physics, ethics, logic, and psychology. Offered in alternate years.—Wedin, Caston

168. Descartes (4)
Lecture/discussion—4 hours. Prerequisite: course 22N. The philosophical writings of Renè Descartes. Topics include the refutation of skepticism, the nature and existence of mind and body, the existence of God, and the foundations of science. Not offered every year.—Mattey

170. Leibniz (4)
Lecture/discussion—4 hours. Prerequisite: course 22N. Survey of the philosophical writings of Gottfried Wilhelm Leibniz. Topics include Leibniz's logic, the existence of God, human freedom, substance, and the relation between science and metaphysics. Not offered every year.—Mattey

172. Locke and Berkeley (4)
Lecture/discussion—4 hours. Prerequisite: course 22N. Principal metaphysical works of John Locke and George Berkeley. Topics include abstract ideas, existence of matter, primary and secondary qualities, essence, substance, the existence of God, and the nature of scientific knowledge. May be repeated for credit. Not offered every year.—Cummins

174. Hume (4)
Lecture/discussion—4 hours. Prerequisite: course 22N. David Hume's *Treatise of Human Nature* and related writings. Topics include empiricism, space, causality, belief, skepticism, the passions, and morality. Not offered every year.—Mattey

175. Kant (4)
Lecture/discussion—4 hours. Prerequisite: course 22N. Immanuel Kant's *Critique of Pure Reason* and related writings. Topics include the nature of human cognition, space and time, *a priori* concepts, substance, causality, human freedom, and the existence of God. Not offered every year.—Mattey

189A-K. Special Topics in Philosophy (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in the area of the special topic. Special topics in **(A)** History of Philosophy, **(B)** Metaphysics, **(C)** Theory of Knowledge, **(D)** Ethics, **(E)** Political Philosophy, **(F)** Philosophy of Law, **(G)** Aesthetics, **(H)** Philosophy of Mind, **(I)** Philosophy of Science, **(J)** Philosophy of Language, **(K)** Logic. May be repeated up to 8 units of credit. Not offered every year.

194HA-194HB. Honors Research Project (4-4)
Tutoring—3 hours; term paper. Prerequisite: consent of instructor; open to students who are members of the honors program in Philosophy. Completion of honors research project under direction of an instructor. Consult departmental major adviser for list of instructors available in a given quarter.

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

201. Metaphysics (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics vary from quarter to quarter and may include the following: What are things? Do names refer to things? If so, how? Do things have essential properties? What is the nature of necessity? May be repeated for credit when topic differs and with consent of instructor.

202. Theory of Knowledge (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing in philosophy or consent of instructor. Topics vary from quarter to quarter. Sample topics include belief, skepticism, justification, externalism, naturalized epistemology. May be repeated for credit with consent of instructor.—Mattey

203. Philosophy of Mind (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics in the philosophy of mind such as the mind-body problem, mental representation, consciousness, intentionality. May be repeated for credit with consent of instructor.—Cummins

203P. Philosophy of Mind Practicum (4)
Practicum—12 hours. Prerequisite: consent of instructor. Specific research conducted and prepared for publication by advanced students in a team setting. Topics include knowledge representation and learning in neural networks, the nature and formal properties of mental representation. May be repeated for credit when topic differs and with consent of instructor. (S/U grading only.)—Cummins

207. Philosophy of Physics (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing in Philosophy or consent of instructor. Intensive treatment of one (or more) topic(s) in the philosophy of physics, such as foundations of spacetime theories, the interpretation of quantum mechanics, or foundations of statistical mechanics. May be repeated for credit when topic differs and with consent of instructor.—Teller

208. Philosophy of Biology (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Intensive treatment of one (or more) topic(s) in the philosophy of biology, such as foundations of evolutionary theories, reductionism in biology, sociobiology and cultural evolution. May be repeated for credit when topic differs and with consent of instructor.—Griesemer

210. Philosophy of Science (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Treatment of one or more general topics of current interest in philosophy of science. Topics may include scientific explanation, theories of confirmation, scientific realism, reduction in physics and biology. May be repeated for credit when topic differs and with consent of instructor.—Teller

212. Philosophy of Logic and Mathematics (4)
Seminar—3 hours; term paper. Prerequisite: course 112 or 113 or Mathematics 108 or 125 or the equivalent. Philosophical issues in logic and math. Topics may include nature of logical and mathematical truth or knowledge, correctness of logical systems, foundations of mathematics, metaphysical and epistemological presuppositions, applications to philosophical problems and formalization of philosophical theories. May be repeated for credit when topic differs and with consent of instructor.—King

214. Ethics (4)
Seminar—3 hours; term paper Prerequisite: graduate standing in philosophy or consent of instructor. Topics may include morality and motivation, objectivity in ethics, the relationship between the factual and the moral. Topics vary from quarter to quarter. May be repeated for credit when topic differs and with consent of instructor.—Dworkin, Rosati, Väyrynen

217. Political Philosophy (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Advanced studies in political philosophy. Topics vary but may include distributive justice, enforcement of morality by the state, equality, obligation to obey the law, social contract theory. May be repeated for credit when topic differs and with consent of instructor.—Dworkin

237. Philosophy of Language (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of philosophical issues raised by language, such as the nature of semantic content, proper semantics for verbs of propositional attitude, feasibility and limitations of formal semantics and pragmatics for natural languages. May be repeated for credit when topic differs and with consent of instructor.—King

261. Plato (4)
Seminar—3 hours; term paper. Prerequisite; graduate standing or consent of instructor. Advanced seminar designed for analysis of arguments, doctrines, and texts from Plato's works. Methods of argumentation and interpretation are especially stressed. Topics vary according to instructor. May be repeated for credit with consent of instructor.—Wedin, Caston

262. Aristotle (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Advanced seminar designed for analysis of arguments, doctrines, and texts from Aristotle's works. Methods of argumentation and interpretation are especially stressed. Topics vary according to instructor. May be repeated for credit with consent of instructor.—Wedin, Caston

275. Kant (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing in philosophy or consent of instructor. Intensive study of a topic in the philosophy of Kant, in such areas as metaphysics, theory of knowledge, ethics. May be repeated for credit with consent of instructor.—Mattey

290. History of Philosophy (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics in the history of philosophy. Topics vary according to instructor from quarter to quarter. May be repeated for credit when topic differs and with consent of instructor.—Wedin, Mattey, Wilson

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Physical Education

(College of Letters and Science)

Suzanne C. Williams, M.S., Program Director

Program Office, 264 Hickey Gymnasium
(530-752-1111)

Committee in Charge

G. Robert Biggs, B.A. *(Physical Education)*
Kathleen M. DeYoung, B.A. *(Physical Education)*
Pamela L. Gill-Fisher, M.A. *(Physical Education)*
Raymond S. Goldbar, M.A. *(Physical Education)*
Robert G. Holly, Ph.D., *(Exercise Biology)*
Susan Kauslarich, Ph.D., *(Chemistry)*
Barbara A. Jahn, M.S. *(Physical Education)*
Melvin R. Ramey, Ph.D. *(Civil and Environmental Engineering)*
Deanne M. Vochatzer, M.A. *(Physical Education)*
Jon E. Vochatzer, M.S. *(Physical Education)*
Suzanne C. Williams, M.S. *(Physical Education)*

Faculty

G. Robert Biggs, B.A., Supervisor
Kathleen M. DeYoung, B.A., Supervisor
Pamela L. Gill-Fisher, M.A., Supervisor
Raymond S. Goldbar, M.A., Supervisor
Barbara A. Jahn, M.S., Supervisor
Deanne M. Vochatzer, M.A., Supervisor
Jon E. Vochatzer, M.S., Supervisor
Suzanne C. Williams, M.S., Supervisor

Affiliated Faculty

Carissa Adams, Ph.D., Lecturer/Coach
Alex Antipa, B.S., Lecturer
Stephen T. Bronzan, M.S., Lecturer/Coach
Greg Bruce, M.A., Lecturer/Coach
Ping Chou, B.A., Lecturer/Coach
Greg Clink, M.A., Lecturer/Coach
Gary Colberg, M.A., Principal Recreation Supervisor
Rob Dewar, M.A., Lecturer/Coach
Steven Doten, Ph.D., Lecturer/Coach
Henry Fastenau, Lecturer/Coach
Adam Getchell, B.S., Lecturer
Stephanie Hawbecker, M.A., Lecturer/Coach
Karla Helder, B.A., Lecturer/Coach
Jeff Hogan, B.A., Supervising Athletic Trainer/Lecturer
Jason Jaques, M.A., Lecturer/Coach
Mark Johnson, M.S., Lecturer/Coach
Elaine Jones, M.S., Lecturer/Coach
Andrea Khoo, B.S., Lecturer
Daryl Lee, M.S., Lecturer/Coach
Ron Manara, B.A., Lecturer/Coach
Bill Maze, M.B.A., Lecturer/Coach
Mike Moroski, M.A., Lecturer/Coach
Peter Motekaitis, M.A., Lecturer/Coach
Mark Munoz, B.S., Lecturer/Coach
Mieko Nagata, M.S., Lecturer/Coach
Gerald Nunes, B.S., Lecturer
Rex Peters, M.S., Lecturer/Coach
Emily Plesser, M.A., Lecturer/Coach
Jill Radzinski, M.A., Athletic Trainer/Lecturer
Felipe Restrepo, M.A., Lecturer/Coach
Maryclaire Robinson, M.S., Lecturer/Coach

Michelle Roppeau, M.A., Student Affairs Officer/Lecturer
Dwayne Schaffer, M.A., Lecturer/Coach
Sandy Simpson, B.A., Lecturer/Coach
Gary Stewart, M.A., Lecturer/Coach
Meghan Strom, B.A., Lecturer/Coach
Lisa Varnum, B.S., Athletic Trainer/Lecturer
Matt Vaughn, M.A., Lecturer/Coach
Bill Wagman, M.A., Lecturer/Coach
Cy Williams, M.A.T., Lecturer/Coach
Jamey Wright, M.S., Lecturer/Coach
Lennie Zalesky, M.A., Lecturer/Coach

The Program of Study

The Program in Physical Education facilitates the development and offering of non-major courses related to physical activities and education, fitness and health, athletic training, and organized sport. The Program is available as part of a student's general educational experience to enhance and broaden the understanding and experience of physical activity in the maintenance of lifetime health and fitness.

The basic activities series includes Physical Education 1, fitness, lifetime, and sports skills, Physical Education 6 for students participating in intercollegiate athletics, and Physical Education 7 for students interested in a career in teaching/coaching or officiating sports.

Additional lower division courses include those in special skill areas, such as life-saving and water safety, scuba diving, and health and fitness. Upper division courses include advanced skills in scuba diving and a series of courses that meet the mandated requirements for students pursuing teacher preparation and certification.

Teaching Credential Subject Representative. S. Williams. See also the section on the Teacher Education Program.

Class and Recreational Use of Facilities. The incidental fee payable by all students at the time of registration entitles students to the use of the gymnasium, showers, towels, lockers, tennis courts, and athletic fields. Certain equipment for games and sports is available for exercise and recreation, either with or without instruction. Lockers must be turned in on the last day of class, i.e., before the final examination period. Fines are imposed for each formal transaction necessitated by failure of the student to comply with the regulations of the program.

Courses in Physical Education (PHE)

Lower Division Courses

1. Physical Activities (0.5)
Laboratory—2 hours. Sections in: (a) sports skills, rules and strategy; (b) physical fitness and personal health; (c) recreation; (d) aerobic dance. May be repeated along with course 6 for a combined total of 6 units. (P/NP grading only.)—I, II, III. (I, II, III.)

6. Preparation and Participation in ICA Competition (1)
Discussion/laboratory—10-20 hours. Prerequisite: consent of instructor (coach). Preparation and participation in Intercollegiate Athletics. Development of fundamental and advanced individual and team skills. In-depth knowledge of rules and strategy. Advanced sports competition and Conference and NCAA levels. May be repeated along with course 1 for a combined total of 6 units. (P/NP grading only.)—I, II, III. (I, II, III.)

7. Professional Physical Education Activities: Men and Women (1)
Lecture—1 hour; or laboratory—2 hours. Fundamental skills for: (a) coaching competitive athletics; (b) classroom teaching and coaching, and (c) classroom teaching and officiating. May be repeated for a total of six units.—I, II. (I, II.)

8. Student-Athlete Life Skills (1)
Lecture—1 hour. For student-athletes. Balancing academic and athletic demands. Academic, psychological, and sociocultural issues which influence success as a college student-athlete. May be repeated up to 3 times for credit. (P/NP grading only.)—I. (I.)

15. Administration of Intramural Sports (2)
Lecture—2 hours. Planning and administering intramural sports programs at the high school and college level.—I. (I.) Colberg

25. Theory of Lifesaving and Water Safety (2)
Lecture—1 hour; laboratory—2 hours. Prerequisite: sound physical condition, and no physical handicap that would render student unable to perform the required skills and ability to pass preliminary swimming test. Provides the student with the knowledge, organizational procedures, and skill development necessary to provide for water safety and save his/her own life or the life of another in an aquatic emergency. (American Red Cross Advanced Lifesaving Certificate awarded upon successful completion of necessary requirements.)—I, II, III. (I, II, III.) Jahn

27. Training Course for Water Safety Instructors (2)
Lecture—1 hour; laboratory—2 hours. Prerequisite: advanced swimming (course 1) or consent of instructor; course 5 and current Advanced Life-Saving Certificate. Theoretical knowledge and practical experience necessary for the organization and teaching of swimming and lifesaving classes. (American Red Cross Water Safety Instructor's Certificate awarded upon successful completion of necessary requirements.)—III. (III.) Jahn

29. Basic Scuba (2)
Lecture—2 hours; laboratory—2 hours. Prerequisite: good physical condition, ability to pass preliminary swimming test. Introduction to basic knowledge required for scuba diving, function and maintenance of equipment, physics and physiology of diving, diver first aid and CPR, oceanography and marine life, and underwater communication. Pool and open water sessions available for certification. (P/NP grading only.)—I, III. (I, III.)

40. Drugs and Society (2)
Lecture—2 hours; fieldwork—2 hours total; film-viewing—5 hours total. Pharmacology, methods of use, and effects of use of psychoactive and performance-enhancing drugs. Historical overview of drug use. Identification of behavior of "at-risk" and "user" populations. (P/NP grading only.)—I, III. (I, III.)

44. Principles of Healthful Living (2)
Lecture—2 hours. Application of scientific and empirical knowledge to personal, family, and community health problems. (P/NP grading only.)—I, II, III. (I, II, III.)

92. Physical Education Internship (1-5)
Internship—3-15 hours; written project proposal and evaluation. Prerequisite: consent of instructor; enrollment dependent on availability of intern positions, with priority given to Exercise Biology majors. Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under department faculty supervision. May be repeated for credit once but no internship units will be counted toward Exercise Biology major. (P/NP grading only.)

97T. Tutoring in Physical Education (1-5)
Tutorial—1-5 hours. Prerequisite: lower division standing and consent of Program Director. Tutoring of students in lower division physical activity courses. Weekly meetings with instructor in charge of courses. Written reports on methods and materials required. May be repeated once for credit. (P/NP grading only.)

97TC. Tutoring in the Community (1-5)
Tutorial—2-15 hours; discussion—1 hour. Prerequisite: lower division standing and consent of Program Director. Tutoring in the community in physical activity related projects under the guidance of the Physical Education faculty. Regular meetings with instructor in charge and written report required. May be repeated once for credit. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor and Program Director. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

100. Field Experience in Teaching Physical Education (2)
Discussion—1 hour; fieldwork—4 hours. Prerequisite: upper division standing and appropriate course 1 or 7. Tutoring or teacher's aide in physical education activities, including athletic coaching, in public schools under the guidance of a regular teacher with supervision by a departmental faculty person. May be repeated once for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

120. Sports in American Society (4)
Lecture—3 hours; discussion—1 hour. Sociological approaches to the study of sport and contemporary American culture, including sport's interaction with politics, economics, religion, gender, race, media and ethics. Socialization factors involving youth, scholastic, collegiate, and Olympic sport. (Same course as Exercise Biology 120.) GE credit: SocSci, Div.—I, II, III. Salitsky, Doten

128A. Intermediate Scuba Diving (4)
Lecture—3 hours; laboratory—3 hours; fieldwork—2 hours. Prerequisite: course 29 and consent of instructor. Lectures and practice in diver safety, rescue, accident management and patient care. Pool and open water sessions required for certification. (P/NP grading only.)—II. (II.) Fastenau

128B. Research Diving Techniques (4)
Lecture—3 hours; laboratory—3 hours; fieldwork—3 hours. Prerequisite: course 128A; consent of instructor. Lectures and application on search and light salvage, night diving, research techniques, cold-water, low visibility diving, blue water, deep and altitude diving. Pool and open water sessions required for certification. (P/NP grading only.)—III. (III.) Fastenau

131. Physical Activity and the Disabled (4)
Lecture—3 hours; laboratory—3 hours. The study of the diverse and complex nature of individuals with disabilities and how they adapt to their disabilities in daily living. Integration of individuals with disabilities into the community, schools, and physical activity and recreational programs. Not open for credit to students who have completed Exercise Biology 131. Vochatzer

133. Prevention and Care of Sports Injuries (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Cell Biology and Human Anatomy 101 (may be taken concurrently). Prevention, care, and rehabilitation of injuries incurred by athletes. Laboratory on anatomy, emergency care, physical therapy methods, and taping techniques. Not open for credit to students who have completed Exercise Biology 133.—II.

135. Advanced Procedures in Evaluation and Management of Athletic Injuries (3)
Lecture—3 hours. Prerequisite: course 133 or Exercise Biology 133, Cell Biology and Human Anatomy 101, consent of instructor. Advanced study of the evaluation and management of athletic injuries, including mechanism of injury, biomechanics and pathophysiology. Current topics in athletic training. Not open for credit to students who have completed Exercise Biology 135.—III.

142. Physical Education in the Public Schools (3)
Lecture—3 hours. Analysis and study of the principles and methods basic to teaching physical education at the elementary and secondary levels.—II. (II.) S. Williams

143. Coaching Effectiveness (3)
Lecture—3 hours. Prerequisite: upper division standing; 3 units of courses 1 and 6 combined. Synthesis and application of basic components of sport psychology, sport pedagogy, and sport physiology and basic management and administration of athletics in public high schools. (P/NP grading only.)—II. (II.) Bronzan

144. Principles of Health Education (2)
Lecture—2 hours. Prerequisite: course 44 and upper division standing or consent of instructor. Principles of teaching health education in the public schools. (P/NP grading only.)—II. (II.)

150. Recreation in the Community (3)
Lecture—2 hours; discussion—1 hour; two Saturday field trips—8 hours. The nature and scope of community recreation programs in California emphasizing low income, highly populated areas, and poor rural communities.

192. Physical Education Internship (1-12)
Internship—3-36 hours; written project proposal and evaluation. Prerequisite: upper division standing and consent of instructor; enrollment dependent on availability of intern positions, with priority given to Exercise Science majors. Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under department faculty supervision. May be repeated for a total of 12 units (including course 92) but no internship units will be counted toward Exercise Science major. (P/NP grading only.)—I, II, III. (I, II, III.)

197T. Tutoring in Physical Education (1-5)
Tutorial—1-5 hours. Prerequisite: consent of chairperson. Tutoring of students in lower division physical activity courses. Written reports on methods and materials required. May be repeated once for credit. (P/NP grading only.)

197TC. Tutoring in the Community (1-5)
Tutorial—2-15 hours; discussion—1 hour. Prerequisite: upper division standing and consent of Department Chairperson. Tutoring in the community in physical education related projects under the guidance of the Physical Education faculty. Regular meetings with instructor in charge and written report required. May be repeated once for credit. (P/NP grading only

198. Directed Group Study (1-5)
Prerequisite: consent of instructor and Department Chairperson. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Professional Courses

300. The Elementary Physical Education Program (2)
Lecture—1 hour; laboratory—2 hours; field trips to selected programs. Prerequisite: senior standing or credential student. Introduction to principles, theories, material, and practices of elementary school physical education program.—III. (III.)

380. Methods of Teaching Physical Education (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: course 142 and six units of course 7; or consent of instructor. The methods of teaching group and individual activities for grades K-12; program planning, class management, organization, and evaluation. (P/NP grading only.)—S. Williams

Physical Medicine and Rehabilitation

See Medicine, School of

Physics

(College of Letters and Science)

Shirley Chiang, Ph.D., Chairperson of the Department

Wendell H. Potter, Ph.D., Vice Chairperson of the Department (Administration and Undergraduate Matters)

Steven Carlip, Ph.D., Vice Chairperson of the Department (Graduate Matters)

Department Office, 225 Physics/Geology Building (530-752-1500)

http://www.physics.ucdavis.edu

Faculty

Andreas J. Albrecht, Ph.D., Professor
Robert H. Becker, Ph.D., Professor
Patricia C. Boeshaar, Ph.D., Senior Lecturer
Steven Carlip, Ph.D., Professor
Daniel A. Cebra, Ph.D., Associate Professor
Ling-Lie Chau, Ph.D., Professor
Maxwell B. Chertok, Ph.D., Assistant Professor
Shirley Chiang, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Lawrence B. Coleman, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Linton R. Corruccini, Ph.D., Professor
Daniel L. Cox, Ph.D., Professor
Charles S. Fadley, Ph.D., Professor
Christopher D. Fassnacht, Ph.D., Assistant Professor
Daniel Ferenc, Ph.D., Associate Professor
Zachary Fisk, Ph.D., Professor
Ching-Yao Fong, Ph.D., Professor
John F. Gunion, Ph.D., Professor
Nemanja Kaloper, Ph.D., Assistant Professor
Joseph E. Kiskis, Ph.D., Professor
Barry M. Klein, Ph.D., Professor
Lloyd E. Knox, Ph.D., Associate Professor
Winston T. Ko, Ph.D., Professor
Richard L. Lander, Ph.D., Professor
Kai Liu, Ph.D., Assistant Professor
Lori Lubin, Ph.D., Assistant Professor
David E. Pellett, Ph.D., Professor
Warren E. Pickett, Ph.D., Professor
Wendell H. Potter, Ph.D., Senior Lecturer
John B. Rundle, Ph.D., Professor
Richard T. Scalettar, Ph.D., Professor
Rajiv R.P. Singh, Ph.D., Professor
S. Mani Tripathi, Ph.D., Professor
J. Anthony Tyson, Ph.D., Professor
David J. Webb, Ph.D., Associate Professor
Philip M. Yager, Ph.D., Professor
Xiangdong Zhu, Ph.D., Professor
Rena J. Zieve, Ph.D., Associate Professor
Gergely Zimanyi, Ph.D., Professor

Emeriti Faculty

Franklin P. Brady, Ph.D., Professor Emeritus
Thomas A. Cahill, Ph.D., Professor Emeritus
James E. Draper, Ph.D., Professor Emeritus
Glen W. Erickson, Ph.D., Professor Emeritus
Claude Garrod, Ph.D., Professor Emeritus
James P. Hurley, Ph.D., Professor Emeritus
John A. Jungerman, Ph.D., Professor Emeritus
William J. Knox, Ph.D., Professor Emeritus
Douglas W. McColm, Ph.D., Senior Lecturer Emeritus, *Academic Senate Distinguished Teaching Award*
Neal Peek, Ph.D., Senior Lecturer Emeritus
Roderick V. Reid, Jr., Ph.D., Professor Emeritus

Affiliated Faculty

Rodney W. Cole, Ph.D., Lecturer, *Academic Federation Excellence in Teaching Award*
Randy R. Harris, Ph.D., Lecturer, *Academic Federation Excellence in Teaching Award*
Eckart Lorenz, Ph.D., Adjunct Professor
Michael McElfresh, Ph.D., Adjunct Professor
Randy Phelps, Ph.D., Associate Adjunct Professor
Harry B. Radousky, Ph.D., Adjunct Professor
Michael Van Hove, Ph.D., Adjunct Professor
Ramona Vogt, Ph.D., Associate Adjunct Professor

The Major Program

From the smallest subatomic particles to atoms, molecules, stars, and galaxies, the study of physics is the study of what makes the universe work. Information learned from high-energy particle accelerators and nuclear reactors teaches us not only what holds the nucleus and the atom together but also why stars shine and how radiation therapy fights cancer.

The Program. The Department of Physics offers three degree programs: the Bachelor of Arts in Physics, and the Bachelor of Science in Physics and in Applied Physics. The A.B. degree provides a broad coverage of classical and modern physics while permitting a broader liberal arts education than is possible with the other two programs. The B.S. degree in either Physics or Applied Physics should be followed by the student who plans to enter physics as a profession. The B.S. in Applied Physics provides the student with a solid introduction to a particular applied physics specialty. For the student who plans to enter the job market on completing a B.S. degree, the applied physics orientation would be an asset. Either B.S. program provides a solid foundation in physics for the student interested in graduate work in either pure or applied physics.

Career Alternatives. Careers in physics and applied physics include research and development, either in universities, government laboratories, or industry; teaching in high schools, junior colleges, and universities; management and administration in industrial laboratories and in government agencies; and in production and sales in industry. A major in physics also provides a strong base for graduate-level work in such interdisciplinary areas as chemical physics, biophysics and medical physics, geophysics and environmental physics, astrophysics and astronomy, computer science, and materials science.

Physics

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**41-47**
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE	19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B	22
Depth Subject Matter	**35-37**
Physics 104A, 105A, 110A, 110B, 112, 115A, 122	28
At least one course from 127, 140A, 129A, or 130A	4
Physics 105AL (1 unit) waived if 104B taken	0-1
At least one additional fixed-unit upper division Physics course excluding 137 and 160	3-4
Total Units for the Major	**76-84**

B.S. Major Requirements:

	UNITS
Preparatory Subject Matter	**50-56**
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE	19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B	22
Computer Science Engineering 30 (or equivalent programming course)	4
Chemistry 2A or 2HA (2B-2C or 2HB-2HC highly recommended)	5
Depth Subject Matter	**59-62**
Physics 104A, 105A, 105B, 110A, 110B, 110C, 112, 115A, 115B,	**36**
Physics 105AL (1 unit) or 104B	1-4
Physics 122 or 116A,B and C	4-12
Two courses from one specialty (Astrophysics/Cosmology, Condensed Matter, or Nuclear/Particle Physics) and one course from a different specialty. Lists of courses in each specialty are available from the department.	12

Additional upper division Physics courses excluding 137 and 160, for a total of 15 upper division Physics courses of 3 or more units each. With prior departmental approval, one course from mathematics, engineering, or natural science may be used to meet this requirement. May include only one course from 194H, 195, 198, 199 0-9

Total Units for the Major 109-118

Applied Physics

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 49-56
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE 19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B 22
Computer Science Engineering 30 (or equivalent programming course)..... 4
Chemistry 2A or 2HA (2B-2C or 2HB-2HC highly recommended) or Computer Science Engineering 40 depending on area of concentration 4-5

Depth Subject Matter.....57-62
Physics 104A, 105A, 110A, 110B, 112, 115A, 116A, 116B,..... 32
Physics 105AL (1 unit) or 104B..... 1-4
Physics 122 or 116 C 4
Further courses from approved lists within one of the following concentrations chosen in consultation with a major adviser, to bring total number of 3-5 unit Depth courses to 15..... 20-22

Lists of approved courses for concentrations in atmospheric physics, chemical physics, computational physics, geophysics, materials science and physics oceanography are available from the Physics Department.

Total Units for the Major 106-118

Recommended Electives
Astronomy: Astronomy 2

Computer and numerical analysis: Mathematics 128A or Applied Science Engineering 115

Statistics: Statistics 131A

Advanced mathematics: Mathematics 108, 118A-118B, 119A-119B, 121A-121B, 127A-127B-127C, 185A, 185B

Program Variance. Courses from other departments may be submitted for courses in the depth subject matter requirements by obtaining written permission from the Undergraduate Curriculum Committee Chairperson, as approved by the Department.

Major Advisers. Contact Departmental Undergraduate Majors Office, 225 Physics/Geology Building, for adviser assignment.

Minor Program Requirements:

Two distinct minor emphases are offered, all requiring prerequisites equivalent to Mathematics 21A-21B-21C-21D and 22A-22B and Physics 9A-9B-9C-9D. Students considering the possibility of earning a Physics minor should consult with a Physics major adviser before beginning work in one of these minor programs.

UNITS

Classical Physics emphasis..... 24
Physics 104A, 105A, 105C, 108, 108L, 110A-110B. 24
(If the fall quarter courses, 104A, 105A, 110A, are taken in different years, 104A and 105A should be taken in the first year; course 105C does not require 105B.)

Quantum Physics emphasis..... 24
Physics 104A, 105A, 105B, 112, 115A-115B 24
(Physics 104A and 105A-105B must precede 115A-115B. Physics 110A recommended.)

Graduate Study. The Department of Physics offers programs of study and research leading to the M.S. and Ph.D. degrees. Further information regarding requirements for these three degrees, graduate research, teaching assistantships, and research assistantships may be obtained by writing to the Chairperson, Department of Physics, One Shields Avenue, University of California, Davis 95616.

Astronomy. In addition to the introductory Astronomy courses listed, Upper Division and graduate courses in Astronomy, Astrophysics and Cosmology are listed under Physics.

Courses in Astronomy (AST)

Lower Division Courses

2. Introduction to Modern Astronomy and Astrophysics (4)
Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: good facility in high school physics and mathematics (algebra and trigonometry). Description and interpretation of astronomical phenomena using the laws of modern physics. Modern astronomical instrumentation. Gravitation, relativity, electromagnetic radiation, atomic and nuclear processes in relation to the structure and evolution of stars, the solar system, galaxies, and the Universe. Not open to students who have received credit for course 10.—I, III. (I, III.) Becker, Fassnacht, Knox, Lubin

10G. Introduction to Stars, Galaxies, and the Universe (3)
Lecture—3 hours. Non-mathematical introduction to astrophysics of the Universe beyond our solar system using concepts of modern physics. Not open for credit to students who have completed course 2, 10, or any physics course (except 10, 137 or 160). GE credit: SciEng.—I, III. (I, III.)

10L. Observational Astronomy Laboratory (1)
Laboratory—2.5 hours. Prerequisite: course 10G or 10S (may be taken concurrently). Introduction to observations of the night sky using small telescopes in nighttime laboratory. Not open for credit to students who have completed course 2 or 10.—I, II, III. (I, II, III.)

10S. Introduction to the Solar System (3)
Lecture—3 hours. Non-mathematical introduction to astrophysics of the solar system using concepts of modern physics. Not open for credit to students who have completed course 2, 10, or any physics course (except 10, 137 or 160). GE credit: SciEng.—II, III. (II, III.)

Courses in Physics (PHY)

Physics 10 is primarily a concept-oriented one-quarter lecture/discussion course requiring relatively little mathematical background.

Physics 1 is a two-quarter sequence requiring some mathematics (trigonometry). Either 1A alone or both quarters may be taken. The sequence is not intended to satisfy entrance requirements of a year of physics for professional schools, but will satisfy requirements of 3 or 6 units of physics.

Physics 7 is a one-year (three-quarter) introductory physics course with laboratory intended for students majoring in the biological sciences. It has a calculus prerequisite. If you don't need a full year of introductory physics, you should take one or two quarters of Physics 1 instead. Read the following information carefully if you are using Physics 7 to complete an introductory course you have already begun.

The sequence of material in Physics 7 is different from that in most traditionally taught introductory physics courses. Physics 7B is most like the first quarter or semester of traditionally taught courses which treat classical mechanics. Physics 7C is most like the last quarter or semester which, in traditionally taught courses, treats optics, electricity and magnetism, and modern physics. The content and sequence of Physics 7A is unlike that of most other traditionally taught courses.

If you have completed one introductory quarter or semester of a traditionally taught physics course and want to continue with Physics 7, you should first take (and will receive full credit for) Physics 7A.Then, either skip 7B, but self-study the last three weeks of material, **or** take 7B and receive reduced credit. Next, take 7C for full credit.

If you have taken two quarters of a year-long introductory physics course and have not had extensive work in optics, electricity and magnetism, and modern physics, you should take Physics 7C. In no case should you take Physics 7B without first taking Physics 7A. All other situations should be discussed directly with a Physics 7 instructor.

Students not intending to take the entire sequence should take Physics 1.

Physics 9 is a four-quarter sequence using calculus throughout and including laboratory work as an integral part. The course is primarily for students in the physical sciences and engineering.

Physics 9H is a five-quarter honors physics sequence, which may be taken instead of Physics 9. It is intended primarily for first-year students with a strong interest in physics and with advanced placement in mathematics. In course requirements and prerequisites, Physics 9HA–9HE can be substituted for Physics 9A–9D.

Lower Division Courses

1A. Principles of Physics (3)
Lecture—3 hours. Prerequisite: trigonometry or consent of instructor. Mechanics. Introduction to general principles and analytical methods used in physics with emphasis on applications in applied agricultural and biological sciences and in physical education. Not open to students who have received credit for course 7B, or 9A.—I. (I.)

1B. Principles of Physics (3)
Lecture—3 hours. Prerequisite: course 1A or 9A. Continuation of course 1A. Heat, optics, electricity, modern physics. Not open for credit to students who have received credit for course 7A, 7B, 7C, 9B, 9C, or 9D.—II. (II.)

7A. General Physics (4)
Lecture—1.5 hours; discussion/laboratory—5 hours. Prerequisite: Mathematics 16B (may be taken concurrently). Introduction to general principles and analytical methods used in physics for students majoring in a biological science. Only two units of credit allowed to students who have completed course 9B, or 1B.—I, II, III. (I, II, III.)

7B. General Physics (4)
Lecture—1.5 hours; discussion/laboratory—5 hours. Prerequisite: course 7A. Continuation of course 7A. Only two units of credit allowed to students who have completed course 9A, or 1A.—I, II, III. (I, II, III.)

7C. General Physics (4)
Lecture—1.5 hours; discussion/laboratory—5 hours. Prerequisite: course 7B. Continuation of course 7B. Only two units of credit allowed to students who have completed course 9C or.—I, II, III. (I, II, III.)

9A. Classical Physics (5)
Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour. Prerequisite: Mathematics 21B. Introduction to general principles and analytical methods used in physics for physical science and engineering majors. Classical mechanics. Only 2 units of credit to students who have completed course 1A or 7B. Not open for credit to students who have completed course 9HA.—III.

9B. Classical Physics (5)
Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour. Prerequisite: course 9A, Mathematics 21C, 21D (may be taken concurrently). Continuation of course 9A. Fluid mechanics, thermodynamics, wave phenomena, optics. Only 2 units of credit to students who have completed course 7A. Not open for credit to students who have completed course 9HB, 9HC, or Engineering 105.—I.

9C. Classical Physics (5)
Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour. Prerequisite; course 9B, Mathematics 21D, 22A (may be taken concurrently). Electricity and magnetism including circuits and Maxwell's equations. Only 3 units of credit to students who have completed course 7C. Not open for credit to students who have completed course 9HD.—II.

9D. Modern Physics (4)
Lecture—3 hours; discussion—1.5 hours. Prerequisite: course 9C and Mathematics 22A; Mathematics 22B recommended (may be taken concurrently). Introduction to physics concepts developed since 1900. Special relativity, quantum mechanics, atoms, molecules, condensed matter, nuclear and particle physics. Not open for credit to students who have completed course 9HB, 9HC, or 9HE.—III. (III.)

9HA. Honors Physics (5)
Lecture—3 hours; discussion/laboratory—4 hours. Prerequisite: Mathematics 21B (may be taken concurrently) or consent of instructor. Classical mechanics. Same material as course 9A in greater depth. For students in physical sciences, mathematics, and engineering. Only 2 units of credit to students who have completed course 7B. Not open for credit to students who have completed course 9A.—I.

9HB. Honors Physics (5)
Lecture—3 hours; discussion/laboratory—4 hours. Prerequisite: Physics 9HA or 9A, Mathematics 21C (may be taken concurrently). Special relativity, thermal physics. Continuation of course 9HA. Only 2 units of credit to students who have completed course 7A. Not open for credit to students who have completed course 9B or 9D.—II.

9HC. Honors Physics (5)
Lecture—3 hours; discussion/laboratory—4 hours. Prerequisite: course 9HB and Mathematics 21D (may be taken concurrently). Waves, sound, optics, quantum physics. Continuation of Physics 9HB. Only 2 units of credit to students who have completed course 7C. Not open for credit to students who have completed course 9B or 9D.—III.

9HD. Honors Physics (5)
Lecture—3 hours; discussion/laboratory—4 hours. Prerequisite: course 9HC and Mathematics 21D. Electricity and magnetism. Continuation of Physics 9HC. Not open for credit to students who have completed course 9C.—I.

9HE. Honors Physics (5)
Lecture—3 hours; discussion/laboratory—4 hours. Prerequisite: course 9HD and Mathematics 22B (may be taken concurrently). Application of quantum mechanics. Not open for credit to students who have completed course 9D.—II.

10. Topics in Physics for Nonscientists (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: high school algebra. Emphasis varies: survey of basic principles or a deeper exploration of some particular branch. Past topics included black holes, space time, and relativity; physics of music; history and philosophy; energy and the environment; and natural phenomena. Check with the department office for the current emphasis. No units of credit allowed if taken after any other physics course. GE credit: SciEng, Wrt.—I, II. (I, II.)

49. Supplementary Work in Lower Division Physics (1-3)
Students with partial credit in lower division physics courses may, with consent of instructor, complete the credit under this heading. May be repeated for credit.—I, II, III. (I, II, III.)

90X. Lower Division Seminar (2)
Seminar—2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Physics through shared readings, discussions, written assignments, or special activities such as laboratory work. May be repeated for credit. Limited enrollment.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

102. Computational Laboratory in Physics (1)
Laboratory—3 hours. Prerequisite: Mathematics 21D, 22A, 22B, Computer Science Engineering 30, course 9D or 9HD, course 104A concurrently. Introduction to computational physics and to the computational resources in the physics department. Preparation for brief programming assignments required in other upper division physics classes. Not open for credit to students who have completed course 104B or 105AL.—I. (I.) Fong

104A. Introductory Methods of Mathematical Physics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 9B, 9C, 9D and Mathematics 21D, 22A, and 22B with grade C- or better or consent of instructor. Introduction to the mathematics used in upper-division physics courses, including applications of vector spaces, Fourier analysis, partial differential equations.—I. (I.)

104B. Computational Methods of Mathematical Physics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 104A with grade C- or better and course 105AL or consent of instructor. Introduction to the use of computational techniques to solve the mathematical problems that arise in advanced physics courses, complementing the analytical approaches emphasized in course 104A.—II. (II.)

104C. Intermediate Methods of Mathematical Physics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 104A with grade C- or better or consent of instructor. Applications of complex analysis, conditional probability, integral transformations and other advanced topics. Not offered every year.

105A-105B. Analytical Mechanics (4-4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 9B, 9C, 9D and Mathematics 21D, 22A, and 22B passed with grade C– or better; or consent of department; course 104A and 105A passed with a grade C– or better or consent of department required for 105B. Principles and applications of Newtonian mechanics; introduction to Lagrange's and Hamilton's equations.—I-II. (I-II.)

105C. Continuum Mechanics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 104B and 105A passed with a grade of C– or better, or consent of department. The continuum hypothesis and limitations. Tensor methods develop stress-strain relations for linear isotropic solids/fluids and field equations to study wave propagation in solids/fluids, heat flow, potential flow and ocean waves.—III. (III.)

108. Optics (3)
Lecture—3 hours. Prerequisite: course 9 or 7 sequence and Mathematics 21 sequence or consent of instructor. The phenomena of diffraction, interference, and polarization of light, with applications to current problems in astrophysics, material science, and atmospheric science. Study of modern optical instrumentation. Open to non-majors.—III. (III.)

108L. Optics Laboratory (1)
Laboratory—3 hours. Prerequisite: course 108 concurrently. The laboratory will consist of one major project pursued throughout the quarter, based on modern applications of optical techniques.—III. (III.)

110A-110B-110C. Electricity and Magnetism (4-4-4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 9B, 9C, 9D and Mathematics 21D, 22A, and 22B passed with grade C– or better, or consent of department; prerequisite for 110B is courses 110A and 104A passed with a grade of C– or better or consent of department; prerequisite for course 110C is courses 110B and 104B passed with a grade of C– or better, or consent of department. Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves.—II-III-I. (II-III-I.)

112. Thermodynamics and Statistical Mechanics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 115A or the equivalent. Introduction to classical and quantum statistical mechanics and their connections with thermodynamics. The theory is developed for the ideal gas model and simple magnetic models and then extended to studies of solids, quantum fluids, and chemical equilibria.—I. (I.)

115A. Foundation of Quantum Mechanics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 104A and 105B with grade C- of better, or consent of instructor. Introduction to the methods of quantum mechanics with applications to atomic, molecular, solid state, nuclear and elementary particle physics.—III. (III.)

115B. Applications of Quantum Mechanics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 115A passed with a grade of C– of better, or consent of department. Angular momentum and spin; hydrogen atom and atomic spectra; perturbation theory; scattering theory.—I. (I.)

116A. Electronic Instrumentation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 9C, Mathematics 22B. An experimental and theoretical study of important electronic circuits commonly used in physics.—I. (I.)

116B. Electronic Instrumentation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 9D, 116A. Continuation of course 116A. Introduction to the use of digital electronics and microcomputers in experimental physics.—II. (II.)

116C. Introduction to Computer-Based Experiments in Physics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 9D or 9HD, 116B, Mathematics 22B or consent of instructor. Introduction to techniques for making physical measurements using computer-based instrumentation.—III. (III.) Pellett

121. Atomic Physics (4)
Lecture—3 hours; term paper. Prerequisite: course 9D. The phenomena of atomic physics including contemporary work: fine-and hyperfine-structure, quantum electrodynamics, laser spectroscopy, beam foil experiments and trapped atoms.—I. (I.)

122. Advanced Physics Laboratory (4)
Laboratory—8 hours; extensive problem solving. Prerequisite: course 9D with grade C- or better or consent of instructor. Experimental techniques and measurements in atomic, condensed matter, nuclear and high energy physics. Student performs three to six experiments depending on difficulty. Individual work is stressed. May be repeated for credit.—II. (II.)

126. Introduction to Cosmology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 105A or consent of instructor. Introduction to cosmology.—III. (III.)

127. Introduction to Astrophysics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 105A passed with grade C- or better, or consent of instructor. Celestial mechanics, radiation, astrophysical measurements, electromagnetic processes, the sun, binary and variable stars, stellar structure and evolution, galaxies, cosmology.—III. (III.)

129A. Introduction to Nuclear Physics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 115A passed with a grade of C- or better or consent of instructor. Survey of basic nuclear properties and concepts requiring introductory knowledge of quantum mechanics: nuclear models and forces, radioactive decay and detecting nuclear radiation and nuclear reaction products, alpha, beta and gamma decay.—III. (III.)

129B. Nuclear Physics, Extensions and Applications (4)
Lecture—3 hours; term paper. Prerequisite: course 129A. Continuation of course 129A. Nuclear reactions, neutrons, fission, fusion accelerators, intro-

duction to meson and particle physics, nuclear astrophysics, and applications of nuclear physics and techniques to mass spectrometry, nuclear medicine, trace element analysis. Not offered every year.

130A-130B. Elementary Particle Physics (4-4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 115A passed with a grade of C- or better or consent of instructor. Properties and classification of elementary particles and their interactions. Experimental techniques. Conservation laws and symmetries. Strong, electromagnetic, and weak interactions. Introduction to Feynman calculus. Not offered every year.

137. Weapons of Mass Destruction, the Cold War, and Modern Terrorism (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing, one course from 1B, 7C, 9C, or 10. Science of nuclear, biological, and chemical weapons related to the Cold War and terrorism. Order of magnitude calculations and modern quandaries of mass destruction. (Same course as Applied Science Engineering 137.) GE credit: SciEng, Wrt.—I. Cox

140A-140B. Introduction to Solid State Physics (4-4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 115A or the equivalent passed with a grade of C- or better or consent of instructor. Survey of fundamental ideas in the physics of solids, with selected device applications. Crystal structure, x-ray and neutron diffraction, phonons, simple metals, energy bands and Fermi surfaces, semiconductors, optical properties, magnetism, superconductivity.—II-III. (II-III.)

160. Environmental Physics and Society (3)
Lecture—3 hours. Prerequisite: course 9D or 7C; or course 10 or 1B and Mathematics 16B or the equivalent. Impact of humankind on the environment will be discussed from the point of view of the physical sciences. Calculations based on physical principles will be made, and the resulting policy implications will be considered. (Same course as Engineering 160.) GE credit: SciEng or SocSci.—III. (III.)

194HA-194HB. Special Study for Honors Students (4-4)
Independent study—12 hours. Prerequisite: consent of instructor required. Open only to Physics and Applied Physics majors who satisfy the College of Letters and Science requirements for entrance into the Honors Program. Independent research project at a level significantly beyond that defined by the normal physics curriculum. (Deferred grading only, pending completion of sequence).

195. Senior Thesis (5)
Independent study—15 hours. Prerequisite: consent of instructor required. Open only to Physics and Applied Physics majors with senior standing. Preparation of a senior thesis on a topic selected by the student with approval of the department. May be repeated for a total of 15 units.—I, II, III. (I, II, III.)

197T. Tutoring in Physics and Astronomy (1-5)
Tutoring of students in lower division courses. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. Weekly meeting with instructor. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

200A. Theory of Mechanics and Electromagnetics (4)
Lecture—3 hours; independent study—1 hour. Prerequisite: courses 104B, 105B, and 110C or the equivalent; course 204A concurrently. Theoretical approaches in classical mechanics including the use of generalized coordinates and virtual work; variational calculus; Lagrange equations; symmetries, conservation laws, and Noether theorem; Lagrangian density; Hamilton formalism; canonical transformations; Poisson brackets; and Hamilton-Jacobi equations.—I. (I.)

200B-200C. Theory of Mechanics and Electromagnetics (4-4)
Lecture—3 hours; independent study—1 hour. Prerequisite: course 200A, and course 204B concurrently. Theoretical approaches in electromagnetics including static electromagnetic fields; Maxwell's equations; plane waves in various media; magnetohydrodynamics; diffraction theory; radiating systems; and special relativity.—II-III. (II-III.)

204A-204B. Methods of Mathematical Physics (4-4)
Lecture—3 hours; independent study—1 hour. Prerequisite: courses 104A and 104B or the equivalent. Linear vector spaces, operators and their spectral analysis, complete sets of functions, complex variables, functional analysis, Green's functions, calculus of variations, introduction to numerical analysis.—I-II. (I-II.)

210. Computational Physics (3)
Lecture—3 hours. Prerequisite: knowledge of Fortran or C. Analytic techniques to solve differential equations and eignevalue problems. Physics content of course will be self-contained, and adjusted according to background of students.—II. (II.)

215A-215B-215C. Quantum Mechanics (4-4-4)
Lecture—3 hours; independent study—1 hour. Prerequisite: course 115B or the equivalent. Formal development and interpretation of non-relativistic quantum mechanics; its application to atomic, nuclear, molecular, and solid-state problems; brief introduction to relativistic quantum mechanics and the Dirac equation.—I-II-III. (I-II-III.)

219A. Statistical Mechanics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 215B or the equivalent. Foundations of thermodynamics and classical and quantum statistical mechanics with simple applications to properties of solids, real gases, nuclear matter, etc. and a brief introduction to phase transitions.—III. (III.)

219B. Statistical Mechanics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 219A. Further applications of thermodynamics and classical and quantum statistical mechanics. The modern theory of fluctuations about the equilibrium state, phase transitions and critical phenomena.—I. (I.)

223A. Group Theoretical Methods of Physics—Condensed Matter (3)
Lecture—3 hours. Prerequisite: courses 215A, 215B (215C is corequisite) or consent of instructor. Theory of groups and their representations with applications in condensed matter. Not offered every year.—I. (I.)

223B. Group Theoretical Methods of Physics—Elementary Particles (3)
Lecture—3 hours. Prerequisite: courses 215A, 215B (215C is corequisite) or consent of instructor. Theory of groups and their representations with applications in elementary particle physics. Not offered every year.

224A. Nuclear Physics (3)
Lecture—3 hours. Prerequisite: course 215B. Comprehensive study of the nucleon-nucleon interaction including the deuteron, nucleon-nucleon scattering, polarization, determination of real parameters of S-matrix, and related topics. Not offered every year.

224B. Nuclear Physics (3)
Lecture—3 hours. Prerequisite: course 224A. Study of nuclear models, including shell model, collective model, unified model. Energy level spectra, static momenta, and electromagnetic transition rates. Not offered every year.

224C. Nuclear Physics (3)
Lecture—3 hours. Prerequisite: course 224B. Study of nuclear scattering and reactions including the optical model and direct interactions. Beta decay and an introduction to weak interactions. Not offered every year.

229A. Advanced Nuclear Theory (3)
Lecture—3 hours. Prerequisite: course 224C. Advanced topics in nuclear theory; theory of quantum-mechanical scattering processes. Exact formal theory and models for two-body scattering. Not offered every year.

229B. Advanced Nuclear Theory (3)
Lecture—3 hours. Prerequisite: course 229A. Advanced topics in nuclear theory; theory of quantum-mechanical scattering processes. Exact formal theory and models for three-body scattering. Not offered every year.

230A. Quantum Theory of Fields (3)
Lecture—3 hours. Prerequisite: course 215C. Relativistic quantum mechanics of particles; techniques and applications of second quantization; Feynman diagrams; renormalization.—I. (I.)

230B. Quantum Theory of Fields (3)
Lecture—3 hours. Prerequisite: course 230A. Continuation of 230A, with selected advanced topics, such as S-matrix theory, dispersion relations, axiomatic formulations.—II. (II.)

240A-240B. Solid State Physics (3-3)
Lecture—3 hours. Prerequisite: courses 215A-215B-215C; courses 140A-140B recommended. Introduction to the phenomena and theory of the solid state. Periodic structures, lattice structures, electron states, static properties, electron-electron interaction, electron dynamics, transport properties, optical properties, the Fermi surface, magnetism, superconductivity.—III. (I-III.)

240C-240D. Solid State Physics (3-3)
Lecture—3 hours. Prerequisite: course 240A-240B or the equivalent. General introduction to many-body techniques as applied in solid state physics.—II-III. (II-III.)

241. Advanced Topics in Magnetism (3)
Lecture—3 hours. Prerequisite: courses 240A-240B, 240C-240D, or consent of instructor. Topics chosen from areas of current research interest. Not offered every year.

242. Advanced Topics in Superconductivity (3)
Lecture—3 hours. Prerequisite: courses 240A-240B, 240C-240D, or consent of instructor. Topics chosen from areas of current research interest. Not offered every year.

243A-243B-243C. Surface Physics of Materials (3-3-3)
Lecture—3 hours. Prerequisite: courses 140A-140B, 115A-115B or the equivalents; courses 215A, 240A, or the equivalents recommended. Experimental and theoretical fundamentals of surface and interface physics and chemistry, including electronic and magnetic structure, thermodynamics, adsorption kinetics, epitaxial growth, and a discussion of various spectroscopic and structural probes based on photons, electrons, ions, and scanning probes. Offered in alternate years—(I, II, III.)

245A. High-Energy Physics (3)
Lecture—3 hours. Prerequisite: course 230A. Phenomenology and systematics of strong, electromagnetic, and weak interactions of hadrons and leptons; determination of quantum numbers; quarks and quarkonia; deep inelastic scattering; the quark parton model; experiments at hadron colliders and electron-positron colliders.—II. (II.)

245B. High-Energy Physics (3)
Lecture—3 hours. Prerequisite: course 245A. Electroweak interactions; phenomenology of the Standard Model of $SU(2)_L xU(1)$; weak interaction experiments; properties of and experiments with W and Z vector bosons; Glashow-Weinberg-Salam model and the Higgs boson; introduction to supersymmetry and other speculations.—III. (III.)

245C. High-Energy Physics (3)
Lecture—3 hours. Prerequisite: course 245A. Strong interaction: quantum chromodynamics phenomenology; jets and other experimental tests; quark and gluon distribution functions; quark and gluon scattering; applications of the renormalization group. Not offered every year.—III. (III.)

246. Supersymmetry: Theory and Phenomenology (3)
Lecture—3 hours. Prerequisite: courses 230A-230B, 245A-245B recommended, or consent of instructor. Construction of supersymmetric models of particle physics; superfields; supersymmetry breaking the minimal supersymmetric standard model; supergravity. Collider phenomenology of supersymmetry. Dark matter phenomenology. Not offered every year.

250. Special Topics in Physics (3)
Lecture—3 hours. Prerequisite: consent of instructor. Topic varies. May be repeated for credit. Not offered every quarter.—I, II, III. (I, II, III.)

252A. Techniques of Experimental Physics (3)
Lecture—3 hours. Introduction to techniques and methods of designing and executing experiments. Problems and examples from condensed matter research will be utilized. Not offered every year.

252B. Techniques of Experimental Physics (3)
Lecture—3 hours. Introduction to techniques and methods of designing and executing experiments. Problems and examples from nuclear and particle research will be utilized.—III. (III.)

260. Introduction to General Relativity (3)
Lecture—3 hours. Prerequisite: courses 200A, 200B. An introduction to general relativity. Differential geometry and curved spacetime; the Einstein field equations; gravitational fields of stars and black holes; weak fields and gravitational radiation; experimental tests; Big Bang cosmology.—I. (I.)

290. Seminar in Physics (1)
Seminar—1 hour. Prerequisite: graduate standing in Physics or consent of instructor. Presentation and discussion of topics of current research interest in physics. Topics will vary weekly and will cover a broad spectrum of the active fields of physics research at a level accessible to all physics graduate students. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291. Seminar in Nuclear Physics (1)
Seminar—1 hour. Prerequisite: graduate standing in Physics or consent of instructor. Presentation and discussion of topics of current research interest in nuclear physics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

292. Seminar in Elementary Particle Physics (1)
Seminar—1 hour. Prerequisite: graduate standing in Physics or consent of instructor. Presentation and discussion of topics of current research interest in elementary particle physics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, II.)

293. Seminar in Condensed Matter Physics (1)
Seminar—1 hour. Prerequisite: graduate standing in Physics or consent of instructor. Presentation and discussion of topics of current research interest in condensed matter physics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

294. Seminar in Cosmology (1)
Seminar—1 hour. Prerequisite: graduate standing in Physics or consent of instructor. Presentation and discussion of topics of current research interest in Cosmology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

295. Introduction to Departmental Research (1)
Seminar—1 hour. Seminar to introduce first- and second-year physics graduate students to the fields of specialty and research of the Physics staff. (S/U grading only.)—II.

297. Research on the Teaching and Learning of Physics (3)
Seminar—3 hours. Prerequisite: graduate standing in Physics or consent of instructor. Discussion and analysis of recent research in how students construct understanding of physics and other science concepts and the implications of this research for instruction.—III. (III.) Potter

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Course

390. Methods of Teaching Physics (1)
Lecture/discussion—1 hour. Prerequisite: graduate standing in Physics; consent of instructor. Practical experience in methods and problems related to teaching physics laboratories at the university level, including discussion of teaching techniques, analysis of quizzes and laboratory reports and related topics. Required of all Physics Teaching Assistants. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Physiology

See Anatomy, Physiology, and Cell Biology (Veterinary Medicine, School of); Human Physiology (Medicine, School of); Molecular, Cellular, and Integrative Physiology; Neurobiology, Physiology, and Behavior

Plant Biology

See Agricultural Management and Rangeland Resources; Agronomy; Crop Science and Management; Environmental Horticulture; Integrated Pest Management; Plant Biology; Plant Biology (A Graduate Group); Plant Pathology; Pomology; Vegetable Crops; and Viticulture and Enology

Plant Biology

Venkatesan Sundaresan, Ph.D., Chairperson of the Section

Section Office, 1002 Life Sciences Addition (530-752-0617)

http://www-plb.ucdavis.edu

Committee in Charge of the Major

Deborah Canington, Ph.D. *(Plant Biology)*
Judy Jernstedt, Ph.D. *(Agronomy and Range Science)*
John Labavitch, Ph.D. *(Pomology)*
Alan Stemler, Ph.D. *(Plant Biology)*
Thea Wilkins, Ph.D. *(Agronomy and Range Science)*
Terence Murphy, Ph.D. *(Plant Biology)*

Faculty

Faculty includes members of the Departments of Agronomy and Range Science; Environmental Horticulture; Land, Air and Water Resources; Plant Pathology; Pomology; Vegetable Crops; Viticulture and Enology; and the Sections of the Division of Biological Sciences.

Primary Section Members
John L. Bowman, Ph.D., Associate Professor
Anne Britt, Ph.D., Associate Professor
Katayoon Dehesh, Ph.D., Professor
John J. Harada, Ph.D., Professor
Stacey Harmer, Ph.D., Assistant Professor
Bo Liu, Ph.D., Assistant Professor
William J. Lucas, Ph.D., Professor
Julin Maloof, Ph.D., Assistant Professor
Terence M. Murphy, Ph.D., Professor
Sharman O'Neill, Ph.D., Professor
Thomas L. Rost, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Neelima Sinha, Ph.D., Professor
Venkatesan Sundaresan, Ph.D., Professor
Alan J. Stemler, Ph.D., Professor
Steven M. Theg, Ph.D., Professor
Larry N. Vanderhoef, Ph.D., Professor

Secondary Section Members
Judy Callis, Ph.D., Professor
James A. Doyle, Ph.D., Professor *(Geology)*
Marilynn E. Etzler, Ph.D., Professor
Charles S. Gasser, Ph.D., Professor
Marcel Rejmanek, Ph.D., Professor
Raymond L. Rodriguez, Ph.D., Professor
Irwin H. Segel, Ph.D., Professor
Maureen L. Stanton, Ph.D., Professor
Donald R. Strong, Ph.D., Professor

Emeriti Faculty

Fredrick T. Addicott, Ph.D., Professor Emeritus
Floyd M. Ashton, Ph.D., Professor Emeritus
David E. Bayer, Ph.D., Professor Emeritus
Bruce A. Bonner, Ph.D., Professor Emeritus
Paul A. Castelfranco, Ph.D., Professor Emeritus
Deborah P. Delmer, Ph.D., Professor Emeritus
Emanuel Epstein, Ph.D., Professor Emeritus
Richard H. Falk, Ph.D., Professor Emeritus
Ernest M. Gifford, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*
Hendrick J. Ketellapper, Ph.D., Professor Emeritus
Donald W. Kyhos, Ph.D., Professor Emeritus
Norma J. Lang, Ph.D., Professor Emerita
C. Ralph Stocking, Ph.D., Professor Emeritus
Robert M. Thornton, Ph.D., Senior Lecturer Emeritus, *Academic Senate Distinguished Teaching Award*
John M. Tucker, Ph.D., Professor Emeritus
Grady Webster, Ph.D., Professor Emeritus
Kenneth Wells, Ph.D., Professor Emeritus

Affiliated Faculty

Deborah Canington, Ph.D., Lecturer, *Academic Federation Excellence in Teaching Award*
Ellen Dean, Ph.D., Academic Coordinator/Lecturer
Tom Goliber, Ph.D., Academic Coordinator

The Major Program

Plant Biology is the scientific study of plants as organisms. It includes the disciplines of cellular and molecular plant biology and the traditional areas of botany, such as anatomy, morphology, systematics, physiology, mycology, phycology, ecology, and evolution.

The Program. The plant biology major consists of core courses in applied plant biology, plant anatomy, plant physiology, and plant ecology, as well as biochemistry, cell biology, and genetics. In addition, students complete a set of courses in one of the following areas: (1) general botany; (2) applied plant biology; (3) plant evolution and ecology; (4) plant genetics and breeding; and (5) plant physiology, development, and molecular biology. The major provides breadth in diverse areas of plant biology and depth in one of several areas of specialization. Independent research opportunities in plant biology are available. Consult with an adviser.

Career Alternatives. A plant biology degree is an excellent credential for a wide range of career options, including domestic and international opportunities in business, research and teaching in both governmental and private sectors. Plant biologists can work in the field, in the forest, in the laboratory, in botanical gardens or nurseries, in food or seed companies, or in pharmaceutical, energy or chemical industries, and pursue rewarding careers in the areas of biotechnology, environmental protection, farming, or agribusiness. The program is also an excellent background for students wishing to enter graduate or other professional schools, including medicine, law or journalism.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 35
Biological Sciences 1A-1B-1C 15
Chemistry 2A-2B, 8A-8B 16
Agricultural Management and Rangeland Resources 120 or Statistics 13 or 100 or 102 4

Depth Subject Matter..... 41-43
Biological Sciences 101 4
Evolution and Ecology 108 or Plant Biology 102 or 108 5
Evolution and Ecology 140 or Plant Biology 116 4-5
Plant Biology 105, 111, 112, and Plant Biology 117/Evolution and Ecology 117... 15
Additional upper division units in Plant Biology or related natural science courses 13-14

Total Units for the Major 76-78

Recommended
Chemistry 2C; Evolution and Ecology 100; Plant Biology 118, and Plant Biology148/Plant Pathology148.

For students with interests in specialized areas of plant biology (e.g., agricultural botany, ecology, systematics and evolution, morphology, plant physiology, etc.), certain substitutions, including courses in other sections or departments, may be allowed upon prior consultation with a Plant Biology major adviser.

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 60-67
Biological Sciences 1A-1B-1C 15
Chemistry 2A-2B-2C 15
Chemistry 8A-8B or 118A-118B-118C .. 6-12
Mathematics 16A-16B-16C 9
Physics 7A-7B-7C 12
Agricultural Management and Rangeland Resources 120 or Statistics 13, 32, 100, or 102 3-4

Depth Subject Matter..... 45
Biological Sciences 101 or Plant Biology 152 (Students completing the Applied Plant Biology option or the Plant Genetics and Breeding option should take Plant Biology 152) 4
Biological Sciences 102, 103, 104 9
Plant Biology 105, 111..... 8
Completion of one option listed below 24
Research experience through internships or special studies is recommended.

General Botany option
Evolution and Ecology 100, Plant Biology 112 7
Plant Biology 117 or 142 4
One course from the Applied Plant Biology course list 3-5
One course from the Evolution and Diversity course list 3-5
Additional upper division course work from any of the five course lists, chosen in consultation with an adviser, to achieve a total of 24 or more units. At least one course chosen from the option course lists must include a formal laboratory or fieldwork section 3-7

Applied Plant Biology option
Plant Biology 112..... 3
Plant Biology 142 or 143 3-4
Plant Biology 160, 175..... 7
Molecular and Cellular Biology 120L; Plant Biology, 153, 158, 172L, 189; or Plant Pathology 120 2-6
Additional upper division course work from the Applied Plant Biology course list to achieve a total of 24 or more units 4-9

Plant Evolution and Ecology option
Evolution and Ecology 100..... 4
Plant Biology 117 or 142 4
One course from the Applied Plant Biology course list 3-5
Additional upper division course work from the Ecology and/or Evolution and Diversity course lists to achieve a total of 24 or more units. At least one course chosen must include a formal laboratory or fieldwork section 11-13

Plant Genetics and Breeding option
Plant Biology 108 or 143 3-5
Plant Biology 154..... 4
Plant Biology 112 or 113 or 160 3
Plant Biology 161A or 161B..... 4
Additional upper division course work from the Plant Genetics and Breeding course list to achieve a total of 24 or more units 8-10

Plant Physiology, Development and Molecular Biology option
Plant Biology 112..... 3
Molecular and Cellular Biology 120L, 170L; Plant Biology 111L or 153 4-6
One course from the Applied Plant Biology course list 3-5
One course from the Ecology course list (Plant Biology 117 recommended) ... 3-4
One course from the Evolution and Diversity course list 3-5
Additional upper division course work from the Plant Physiology, Development, and Molecular Biology course list to achieve a total of 24 or more units..... 1-8

Total Units for the Major 105-112

Course Lists

Applied Plant Biology
Agricultural Management and Rangeland Resources 107, 110A, 110B, 110C, 110L, 112, 118, 150, 160, 170A, 170B, 195; Atmospheric Science 133; Entomology 100, 100L, 110, 119, 135; Environmental Horticulture 102, 105, 120, 125, 130, 133; Environmental Toxicology 101; Hydrologic Science 124; International Agricultural Development 160; Nematology 100, 110; Plant Biology 119, 141, 142, 143, 146, 151, 152, 153, 154, 157, 158, 160, 171, 172, 172L, 173, 174 , 176, 177, 178, 188, 196; Plant Pathology 120; Soil Science 100, 105, 109, 111; Viticulture and Enology 101A, 101B, 101C, 110, 115, 116, 118.

Ecology
Agricultural Management and Rangeland Resources 112, 130, 131, 132, 134, 135, 137; Environmental Science and Policy 121, 123, 124, 150C, 151, 151L, 155, 155L; Evolution and Ecology 121, 138; Hydrologic Science 122, 122L, 124; Plant Biology 117, 119, 142, 146; Plant Pathology 150.

Evolution and Diversity
Agricultural Management and Rangeland Resources 131; Evolution and Ecology 100, 102, 140, 149; Plant Biology 102, 108, 116, 118, 143, 148.

Plant Genetics and Breeding
Agricultural Management and Rangeland Resources 118, 150; Entomology 110; Evolution and Ecology 100; Molecular and Cellular Biology 161, 164; Plant Biology 116, 117, 142, 151, 153, 157; Plant Pathology 120, 130.

Plant Physiology, Development, and Molecular Biology
Molecular and Cellular Biology 126; Plant Biology 113, 125, 153, 157, 158, 160; Plant Pathology 130.

Master Adviser. A. Stemler, Plant Biology Section Office, 2220 Life Sciences Addition.

Minor Program Requirements:

UNITS

Plant Biology..... 23
Biological Sciences 1C (or equivalent introductory plant biology course) 5
Upper division units, including at least one course from each of the following four groups 18
(a) Anatomy and morphology:
Evolution and Ecology 140; Plant Biology 105, 116, 118.
(b) Physiology and development:
Plant Biology 111, 112, 125; Plant Pathology 130.
(c) Evolution and ecology:
Evolution and Ecology 100; Plant Biology 102, 117, 143.
(d) Applied plant biology:
Agricultural Management and Rangeland Resources 110A, 110B; Plant Biology 154, 160, 171, 172.

Minor Adviser. Same as for major above.

Honors and Honors Programs. Students on the honors list may elect to substitute a maximum of 5 units of 194H for 5 upper division units of the regular major; however, recommendations for high honors and highest honors at graduation are not dependent on the completion of 194H. Refer to the Academic Information chapter and the appropriate College section for Dean's Honors List information.

Graduate Study. Consult the Plant Biology Graduate Group listing.

Courses in Plant Biology (PLB)

Lower Division Courses

1. Plants for Garden, Orchard and Landscape (2)
Lecture—1 hour; laboratory—3 hours. For nonmajors. Hands-on experience with plants cultivated for food, environmental enhancement and personal satisfaction. Topics include establishing a vegetable garden, pruning and propagating trees and vines, growing flowers and ornamental plants, and the role of plants in human health and well-being. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 2 or Plant Science 1. (Former course Plant Science 1.) (P/NP grading.)—I, III. (I, III.) Marrush

11. Plants and the Biosphere (3)
Lecture—3 hours; one weekend field trip (half-day); term paper. Ethnobotanical and ecological themes are emphasized in examining our dependence on plants, the ecological roles of plants, and the development of botany as a contemporary science. Intended primarily for non-science majors. GE credit: SciEng, Wrt.—I. (I.) Potter

12. Plants and People (3)
Lecture—3 hours. Prerequisite: high school biology. Plants as a resource for food, recreation, and environmental enhancement. Emphasis on how our relationship to plants has changed through history and how the growth and development of plants affect their utility. Not open for credit to students who have completed Plant Science 10. (Former course Plant Science 10.) GE credit: SciEng, Div, Wrt.—I, II, III. (I, II, III.) Bradford, Fischer, Jasieniuk, Nevins

90X. Plant Science Seminar (1-4)
Prerequisite: consent of instructor. Examination of a special topic in a small group setting. Not open for credit to students who have completed course Plant Science 90X. (Former course Plant Science 90X.)

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Technical and/or professional experience on or off campus. Supervised by a member of the Plant Biology faculty. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

For questions about courses numbered 102 through 125, see the Plant Biology Section Office, 1002 Life Sciences Addition. For questions concerning courses numbered 1, 12, 140 through 188 and 196, see the Plant Science Advising Center, 1220 Plant and Environmental Sciences.

102. California Floristics (5)
Lecture—2 hours; lecture/discussion—1 hour; laboratory—6 hours (includes three one-day, weekend field trips). Prerequisite: Biological Sciences 1A, 1B, 1C or the equivalent in plant science. Survey of the flora of California, with emphasis on field recognition and identification of important vascular plant families and genera characterizing the major floristic regions. Lectures review the taxonomic diversity, evolutionary relationships, and geographical patterns of California flora.—III. (III.) Potter, Dean

105. Developmental Plant Anatomy (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: introductory plant biology (for example, Biological Sciences 1C). Survey of vascular plant structure and development. Current ideas and experimental evidence for developmental concepts.—I. (I.) Canington

108. Systematics and Evolution of Angiosperms (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B and 1C. Diversity and classification of angiosperms (flowering plants) on a world scale, and current understanding of the origin of angiosperms and evolutionary relationships and trends within them based on morphological and molecular evidence. (Same course as Evolution and Ecology 108.) GE credit: SciEng.—III. (III.) Doyle

111. Plant Physiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1C; Chemistry 8B and Physics 7C (either may be taken concurrently); course 105 recommended. The plant cell as a functional unit. The processes of absorption, movement, and utilization of water and minerals. Water loss, translocation, photosynthesis, respiration.—I. (I.) Lucas, Dehesh

111D. Problems in Plant Physiology (1)
Discussion—1 hour. Prerequisite: course 111 concurrently. Discussion of problems and applications relating to principles presented in course 111. Students will be assigned problems each week showing novel applications of principles described in course 111 and will prepare answers to be delivered orally during the class period. (P/NP grading only.)—I. (I.) Lucas, Dehesh

112. Plant Growth and Development (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1C, Chemistry 8B. Introduction to the mechanisms and control systems that govern plant growth and development and the responses of plants to the environment. Strong emphasis on vegetative development of flowering plants. GE credit: SciEng.—II. (II.) Harada, Sundaresan

112D. Problems in Plant Growth and Development (1)
Discussion—1 hour. Prerequisite: course 112 concurrently. Discussion of problems and applications relating to principles presented in course 112. Students will be assigned problems each week showing novel applications of the principles described in course 112 and will prepare answers to be delivered orally during class period. (P/NP grading only.)—II. (II.)

113. Molecular and Cellular Biology of Plants (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1C, 101; Biological Sciences 102 recommended. Molecular and cellular aspects of the growth and development of plants and their response to biological and environmental stresses. Primary focus on processes unique to plants. Experimental approaches will be emphasized.—III. (III.) Harada

113D. Problems in Molecular and Cellular Biology of Plants (1)
Discussion—1 hour. Prerequisite: course 113 concurrently. Discussion of topics and applications related to principles presented in course 113. Assigned topics each week show novel applications of the principles described in course 113; discussion of topics during class period. (P/NP grading only.)—III. (III.)

116. Plant Morphology and Evolution (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: introductory plant biology (e.g., Biological Sciences 1C); plant anatomy recommended (e.g., course 105). Introduction to the form, development and evolution of vascular plants. Emphasis given to the form and development of reproductive structures in ferns and seed-producing plants as a basis for determining evolutionary relationships. GE credit: SciEng.—II. (II.) Jernstedt

117. Plant Ecology (4)
Lecture—3 hours; fieldwork—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C; course 111 recommended. The study of the interactions between plants, plant populations or vegetation types and their physical and biological environment. Special emphasis on California. Four full-day field trips and brief write-up of class project required. (Same course as Evolution and Ecology 117.)—I. (I.) Pearcy

118. Introductory Phycology and Bryology (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A and 1C. Comparative morphology, physiology, development and reproduction of cyanobacteria, the major algal groups, and the bryophytes. Focus on structure-function and evolutionary relationships. Ecological factors and commercial uses are considered. Laboratories include study of living organisms and identification exercises.—II. (II.) Canington

119. Population Biology of Weeds (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C; introductory statistics recommended. Origin and evolution of weeds, reproduction and dispersal, seed ecology, modeling of population dynamics, interactions of weeds and crops, biological control. Laboratories emphasize design of competition experiments and identification of weedy species. Not open for credit to students who have completed Plant Biology 121. (Same course as Evolution and Ecology 119.)—III. (III.) Rejmanek

123. Plant-Virus-Vector Interaction (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1C, 101; course 105, Plant Pathology 120, and Entomology 100 recommended. Analysis of the interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern experimental approaches to the interdiction of viral movement. Offered alternate years. (Same course as Entomology 123/Plant Pathology 123.)—(I.) Lucas, Gilbertson, Ullman

126. Plant Biochemistry (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1C or the equivalent, and Biological Sciences 103. The biochemistry of important plant processes and metabolic pathways. Discussion of methods used to understand plant processes, including use of transgenic plants. (Same course as Molecular and Cellular Biology 126.)—(I.) Callis, Abel

140. Culinary and Medicinal Herbs (3)
Lecture/discussion—3 hours. Prerequisite: Biological Sciences 1C. Growth, identification, cultivation, and use of common culinary and medicinal herbs; herbal plant families; effects of climate and soils on herbs; herbal medicine; ecology and geography of herbs; herb garden design; secondary chemistry of active compounds. (Same course as Environmental and Resource Sciences 140.)—III. (III.) Bledsoe

141. Principles and Methods of Ethnobotany (4)
Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: Biological Sciences 1C or Agricultural Management and Rangeland Resources 2 or the equivalent; course 108 recommended. Examination of concepts, questions, and methods in ethnobotany, the study of human-plant interactions. Specific topics include traditional and scientific classification systems, uses of specific plants, plant evolution under domestication, and ethical issues related to ethnobotany. Offered in alternate years. GE credit: SciEng or SocSci, Wrt.—(II.) Potter, Dean

142. Ecology of Crop Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural Management and Rangeland Resources 2 or Biological Sciences 1C; Mathematics 16A or Physics 1A, or consent of instructor. Ecological processes governing the structure and behavior of managed ecosystems. Emphasis on mechanistic and systems views of the physical environment, photosynthetic productivity, competition, adaptation, nutrient cycling, energy relations and contemporary issues such as climate change. GE credit: SciEng.—II. (II.) Denison

143. Evolution of Crop Plants (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1C or the equivalent. Origins of crops and agriculture, including methodological approaches, center of origin and diversity, crop dissemination pathways, and differences between wild and cultivated plants. Group studies of individual crops are published on the Internet. Not open for credit to students who have completed Plant Science 103. GE credit: SciEng, Wrt.—III. (III.) Gepts

144. Trees and Forests (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1C. Biological structure and function of trees as organisms; understanding of forests as communities and as ecosystems; use of forests by humans; tree phenology, photosynthesis, respiration, soil processes, life histories, dormancy, forest biodiversity, and agroforestry. (Same course as Environmental Horticulture 144 and Environmental and Resource Sciences 144.)—I. (I.) Barbour, Berry, Bledsoe

145. Sierra Nevada Flora (3)
Lecture/laboratory—30 hours (total); fieldwork—50 hours (total). Prerequisite: course 102 or 108 or Evolution and Ecology 121 or Environmental Horticulture 105. An introduction to the flora of the Sierra Nevada. Basic plant identification, the principle plant communities and species of the Sierra Nevada. Class offered the first two weeks in July in the Sierra Nevada. Offered in alternate years.—(III.) Ronald

146. Rhizosphere Ecology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Agricultural Management and Rangeland Resources 2 or Biological Sciences 1C. Effects of plant-microbe interactions on plant growth, soil formation, and agricultural sustainability. Physical, chemical and biological processes that occur at the surface of plant roots. Evolution and modification of the biochemical and genetic bases of rhizosphere ecology. Offered in alternate years.—(III.) Phillips

147. Survey of Plant Communities of California (4)
Lecture/discussion—2 hours; fieldwork—3 hours; extensive writing. Prerequisite: Biological Sciences 1A or 1B or 1C or Molecular and Cellular Biology 10 recommended. Consent of instructor required quarter prior to course. Upper division standing required if enrollment must be limited. Selected plant communities analyzed for their structure and the relationship of their component species to the environment. Four weekend field trips required. GE credit: SciEng, Wrt.—III. (III.) Barbour, Jackson, Ronald

148. Introductory Mycology (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Systematics, ecology, evolution, and morphology of fungi. Importance of fungi to humans. (Same course as Plant Pathology 148.)—I. (I.) MacDonald, Rizzo

150. Plant Natural Product Chemistry (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Biological Sciences 101 and 103, or the equivalent. Traditional biochemical and modern genetic

approaches for studying plant-derived compounds such as isoprenoids, alkaloids, and phenylpropanoids. The impact of plant-derived compounds on biological processes in ecology, evolution and nutrition.—I. (I.) Inoue, Kliebenstein

152. Plant Genetics (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: Biological Sciences 1A or consent of instructor. Basic principles of transmission genetics, cytogenetics, population and quantitative genetics, and molecular genetics. Practical aspects of genetic crosses and analysis of segregating populations. Not open for credit to students who have completed Plant Science 105. (Former course Plant Science 105.)—I. (I.) Wilkins

153. Plant, Cell, Tissue and Organ Culture (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1C or Agricultural Management and Rangeland Resources 2. Basic and applied aspects of plant tissue culture including media preparation, micropropagation, embryo-gen-esis, anther culture, protoplast culture and transformation. Offered in alternate years. Not open for credit to students who have completed Plant Science 107. (Former course Plant Science 107.)—II. (II.) Sutter

154. Introduction to Plant Breeding (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 152, Biological Sciences 101 or consent of instructor. The principles, methods and applications of plant breeding and genetics to the improvement of crop plants. Illustration of how plant breeding is a dynamic, multidisciplinary, constantly-evolving science. Laboratory emphasizes hands-on experience in the basics of breeding through experiments. (Former course Plant Science 113.)—II. (II.) St. Clair

157. Physiology of Environmental Stresses in Plants (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 112 (may be taken concurrently) or the equivalent. Stress concepts and principles; physiological, developmental and morphological characteristics enabling plants to avoid or tolerate environmental stresses; mechanisms of acclimation common to many stresses; responses of wild and cultivated species to drought, flooding, nutrient deficiencies, salinity, toxic ions, extreme temperatures. Offered in alternate years.—II. Lauchli, Silk

158. Mineral Nutrition of Plants (4)
Lecture—3 hours: laboratory—3 hours. Prerequisite: course 111 or the equivalent. Evolution and scope of plant nutrition; essential and other elements; mechanisms of absorption and translocation; mineral metabolism; deficiencies and toxicities; genetic and ecological aspects of plant nutrition. Not open for credit to students who have completed Plant Biology/Plant Science 135. (Former course Plant Biology/Plant Science 135.)—III. (III.) Richards, Brown

160. Principles of Plant Biotechnology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A and 101. Principles and concepts of plant biotechnology including recombinant DNA technology, plant molecular biology, plant cell and tissue culture, and crop improvement. Not open for credit to students who have completed Plant Science 140. (Former course Plant Science 140.)—II. (II.) Dandekar

161A. Plant Genetics and Biotechnology Laboratory (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 152 and/or 160. Techniques of genetic analysis at the molecular and organismal levels, including segregation and linkage analysis, cytogenetics and recombinant DNA. Not open for credit to students who have completed Plant Science 141A. (Former course Plant Science 141A.)—I. (I.) Dandekar, Beckles

161B. Plant Genetics and Biotechnology Laboratory (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 152 and/or 160. Advanced techniques of genetic analysis at the molecular and organismal levels, including transformation, gene expression, analysis of transgenic plants and QTL analysis. Not open for credit to students who have completed Plant Science 141B. (Former course Plant Science 141B.)—II. (II.) Powell

162. Cellular and Molecular Bases of Ion Transport Processes (4)
Lecture—2 hours; extensive problem solving. Prerequisite: Biological Sciences 1A or the equivalent, Mathematics 16A or the equivalent, Physics 7A-7B or Chemistry 2A-2B or the equivalent. Basic physiological, biochemical, and molecular principles of energy production in plant and animal cells. The use of energy to transport ions and nutrients in and out of the cell, and cellular and molecular mechanisms regulating these processes.—II. (II.) Blumwald, Shackel

170. Plant Molecular Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Evolution and Ecology 100 and 101, or Environmental Science and Policy 100 or the equivalent. Introduction to the application of molecular genetic techniques to questions concerning ecological, genetic and evolutionary processes in plant populations. Emphasis on the use of molecular genetic information for decision making in management and conservation.—III. (III.) Jasieniuk

171. Plant Propagation (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Agricultural Management and Rangeland Resources 2 or Biological Sciences 1C. Principles and practices of propagating plants covering anatomical, physiological, and practical aspects. Not open for credit to students who have completed Plant Science 109. (Former course Plant Science 109.)—I. (I.) Sutter

172. Postharvest Physiology and Handling of Horticultural Commodities (3)
Lecture—3 hours. Prerequisite: general plant science background recommended (e.g., Agricultural Management and Rangeland Resources 2, course 12 or Food Science and Technology 2); concurrent enrollment in course 172L recommended. Physiological processes related to the maturation and senescence of fruits, vegetables, and ornamentals; fundamentals involved in handling, transportation, storage, and marketing practices, e.g., temperature and humidity control, protective treatments, controlled atmospheres. Not open for credit to students who have completed Plant Science 112. (Former course Plant Science 112.)—I. (I.) Kader, Reid, Saltveit

172L. Postharvest Physiology and Handling Laboratory (2)
Discussion—1 hour; laboratory—3 hours. Prerequisite: course 172 (may be taken concurrently). Demonstrations and exercises following the subject matter of course 172. Not open for credit to students who have completed Plant Science 112L. (Former course Plant Science 112L.)

173. Biological Applications in Fruit Tree Management (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1C or Agricultural Management and Rangeland Resources 2 or the equivalents. Physiology, growth, development and environmental requirements of fruit trees and cultural practices used to maintain them. Emphasis on the application of biological principles in the culture of commercially important temperate zone fruit tree species. Not open for credit to students who have completed Plant Science 115. (Former course Plant Science 115.)—II. (II.) DeJong

174. Biological Applications in Fruit Production (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1C or Agricultural Management and Rangeland Resources 2; course 173 recommended. Reproductive biology of tree-crop species. Biological principles of fruit production, tree nutrition and orchard management. Laboratories emphasize hands-on work with orchard tree systems.—III. (III.) DeJong, Polito

176. Introduction to Weed Science (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Agricultural Management and Rangeland Resources 2 or Biological Sciences 1C. Principles of weed science including mechanical, biological, and chemical control methods. Weed control in crop, pasture, range, brush, forests, aquatic, and non-crop situations. Types of herbicides. Application of herbicides. Sight identification of common weeds and demonstrations to illustrate the principles. Not open for credit to students who have completed former course 120.—II. (II.) Fischer

178. Biology and Management of Freshwater Macrophytes (3)
Lecture—3 hours; two field trips. Prerequisite: Biological Sciences 1A, 1B, 1C, Chemistry 8B; course 111 or Hydrologic Science 122 recommended. Brief survey of common fresh water macrophytes, their reproductive modes, physiology, growth (photosynthesis, nutrient utilization), development (hormonal interactions), ecology and management. Offered in alternate years. Not open for credit to students who have completed former course 150. (Former course 150.)—(I.) Anderson

189. Experiments in Plant Biology: Design and Execution (3)
Laboratory/discussion—6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C or the equivalent courses in plant sciences, and consent of the instructor. Provides an opportunity for undergraduate students to formulate experimental approaches to current questions in plant biology and to carry out their proposed experiments. May be repeated for credit for a total of 12 units. (P/NP grading only.)—I, II, III. (I, II, III.)

190C. Research Conference in Botany (1)
Discussion—1 hour. Prerequisite: upper division standing in botany or related discipline; consent of instructor. Introduction to research methods in botany. Design of field or laboratory research projects, survey of appropriate literature, and discussion of research by faculty and students. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: upper division standing; consent of instructor. Technical and/or professional experience on or off campus. Supervised by a member of the Plant Biology Section faculty. (P/NP grading only.)

194H. Special Study for Honors Students (1-5)
Prerequisite: open only to majors of senior standing on honors list. Independent study of selected topics under the direction of a member or members of the staff. Completion will involve the writing of a senior thesis. (P/NP grading only.)

196. Postharvest Technology of Horticultural Crops (3)
Lecture/discussion/demonstration—5 days; field trip—5 days. Prerequisite: upper division or graduate student standing. Intensive study of current procedures for postharvest handling of fruits, nuts, vegetables, and ornamentals in California. Scheduled first two weeks immediately following last day of spring quarter. Considered a spring course for preenrollment. Not open for credit to students who have completed Plant Science 196. (Former course Plant Science 196.) (P/NP grading only.)—III. (III.) Mitcham

197T. Tutoring in Plant Biology (1-5)
Discussion—2-6 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor by tutoring students in one of the Section's regular courses. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Plant Biology (A Graduate Group)

John Harada, Ph.D., Chairperson of the Group

Group Office, 1004 Life Sciences Addition (530-752-7094; Fax: 530-752-5410)

http://www-plb.ucdavis.edu/pbgg

Faculty

Steffan Abel, Ph.D., Assistant Professor *(Vegetable Crops)*
Douglas Adams, Ph.D., Associate Professor *(Viticulture and Enology)*
Michael Barbour, Ph.D., Professor *(Environmental Horticulture)*
Diane Barrett, Ph.D., Assistant Professor *(Food Science)*
David Bayer, Ph.D., Professor *(Vegetable Crops)*
Alan Bennett, Ph.D., Professor *(Vegetable Crops)*
Alison Berry, Ph.D., Associate Professor *(Environmental Horticulture)*
Caroline Bledsoe, Ph.D., Professor *(Land, Air and Water Resources)*
Arnold Bloom, Ph.D., Professor *(Vegetable Crops)*
Richard Bostock, Ph.D., Professor *(Plant Pathology)*
John Bowman, Ph.D., Assistant Professor *(Plant Biology)*
Kent Bradford, Ph.D., Professor *(Vegetable Crops)*
Anne Britt, Ph.D., Associate Professor *(Plant Biology)*
Patrick Brown, Ph.D., Professor *(Pomology)*
David Burger, Ph.D., Professor *(Environmental Horticulture)*
Judy Callis, Ph.D., Associate Professor *(Molecular and Cellular Biology)*
Doug Cook, Ph.D., Professor *(Plant Pathology)*
John Crowe, Ph.D., Professor *(Molecular and Cellular Biology)*
Abhaya Dandekar, Ph.D., Professor *(Pomology)*
Ted DeJong, Ph.D., Professor *(Pomology)*
Deborah Delmer, Ph.D., Professor *(Plant Biology)*
R.F. Denison, Ph.D., Professor *(Agronomy and Range Science)*
Nick K. Dokoozlian, Ph.D., Associate Cooperative Extension Viticulture Specialist *(Viticulture and Enology)*
James Doyle, Ph.D., Professor *(Evolution and Ecology)*
John Duniway, Ph.D., Professor *(Plant Pathology)*
Don Durzan, Ph.D., Professor *(Environmental Horticulture)*
Marilynn Etzler, Ph.D., Professor *(Molecular and Cellular Biology)*
Albert Fischer, Ph.D., Assistant Professor *(Vegetable Crops)*
Charles Gasser, Ph.D., Professor *(Molecular and Cellular Biology)*
Paul Gepts, Ph.D., Professor *(Agronomy and Range Science)*
David Gilchrist, Ph.D., Professor *(Plant Pathology)*
Leslie D. Gottlieb, Ph.D., Professor *(Evolution and Ecology)*
Thomas Gradziel, Ph.D., Associate Professor *(Pomology)*
John Harada, Ph.D., Professor *(Plant Biology)*
James Harding, Ph.D., Professor *(Environmental Horticulture)*
Theodore Hsiao, Ph.D., Professor *(Land, Air and Water Resources)*
Louise Jackson, Ph.D., Associate Professor *(Vegetable Crops)*
Judy Jernstedt, Ph.D., Associate Professor *(Agronomy and Range Science)*
Adel Kader, Ph.D., Professor *(Pomology)*
Clarence Kado, Ph.D., Professor *(Plant Pathology)*
Daniel Klionsky, Ph.D., Associate Professor *(Microbiology)*
John Labavitch, Ph.D., Professor *(Pomology)*
Clark Lagarias, Ph.D., Professor *(Molecular and Cellular Biology)*
Andre Lauchli, Ph.D., Professor *(Land, Air and Water Resources)*
J. Heinrich Lieth, Ph.D., Professor *(Environmental Horticulture)*
Bo Liu, Ph.D., Assistant Professor *(Plant Biology)*
William Lucas, Ph.D., Professor *(Plant Biology)*
Mark Matthews, Ph.D., Assistant Professor *(Viticulture and Enology)*
Gale McGranahan, Ph.D., Associate Professor *(Pomology)*
Carole Meredith, Ph.D., Professor *(Viticulture and Enology)*
Richard Michelmore, Ph.D., Professor *(Vegetable Crops)*
Terence Murphy, Ph.D., Professor *(Plant Biology)*
Donald Nevins, Ph.D., Professor *(Vegetable Crops)*
Sharman O'Neill, Ph.D., Associate Professor *(Plant Biology)*
Kyaw Tha Paw, Ph.D., Professor *(Land, Air and Water Resources)*
Robert Pearcy, Ph.D., Professor *(Evolution and Ecology)*
Donald Phillips, Ph.D., Professor *(Agronomy and Range Science)*
Vito Polito, Ph.D., Professor *(Pomology)*
Daniel Potter, Ph.D., Assistant Professor *(Pomology)*
Carlos Quiros, Ph.D., Professor *(Vegetable Crops)*
D. William Rains, Ph.D., Professor *(Agronomy and Range Science)*
Michael Reid, Ph.D., Professor *(Environmental Horticulture)*
Marcel Rejmanek, Ph.D., Professor *(Evolution and Ecology)*
Eliska Rejmankova, Ph.D., Associate Professor *(Environmental Science and Policy)*
Jim Richards, Ph.D., Professor *(Land, Air and Water Resources)*
Raymond Rodriguez, Ph.D., Professor *(Molecular and Cellular Biology)*
Pamela Ronald, Ph.D., Assistant Professor *(Plant Pathology)*
Thomas Rost, Ph.D., Professor *(Plant Biology)*
Mikal Saltveit, Ph.D., Professor *(Vegetable Crops)*
Michael Sanderson, Ph.D., Associate Professor *(Evolution and Ecology)*
Mark Schwartz, Ph.D., Assistant Professor *(Environmental Science and Policy)*
Irwin Segel, Ph.D., Professor *(Molecular and Cellular Biology)*
Ken Shackel, Ph.D., Associate Professor *(Pomology)*
Wendy Silk, Ph.D., Professor *(Land, Air and Water Resources)*
Neelima Sinha, Ph.D., Associate Professor *(Plant Biology)*
Alan Stemler, Ph.D., Professor *(Plant Biology)*
Venkatesan Sundaresan, Ph.D., Professor *(Plant Biology)*
Ellen Sutter, Ph.D., Professor *(Pomology)*
Steve Theg, Ph.D., Professor *(Plant Biology)*
Robert Travis, Ph.D., Professor *(Agronomy and Range Science)*
M. Andrew Walker, Ph.D., Associate Professor *(Viticulture and Enology)*
Steve Weinbaum, Ph.D., Professor *(Pomology)*
Thea Wilkins, Ph.D., Associate Professor *(Agronomy and Range Science)*
Larry Williams, Ph.D., Professor *(Viticulture and Enology)*
Valerie Williamson, Ph.D., Associate Professor *(Nematology)*
Lin Wu, Ph.D., Professor *(Environmental Horticulture)*
John Yoder, Ph.D., Professor *(Vegetable Crops)*

Affiliated Faculty

Marita Cantwell-De Trejo, Ph.D., Lecturer *(Vegetable Crops)*
Carlos Crisosto, Ph.D., Associate Specialist *(Pomology)*
Joseph DiTomaso, Ph.D., Lecturer *(Vegetable Crops)*
Richard Evans, Ph.D., Lecturer *(Environmental Horticulture)*
Teresa Fan, Ph.D., Assistant Research Biochemist *(Land, Air and Water Resources)*
Sham Goyal, Ph.D., Lecturer *(Agronomy and Range Science)*
Elizabeth Mitcham, Ph.D., Associate Specialist *(Pomology)*
Jeffrey Mitchell, Ph.D., Lecturer *(Vegetable Crops)*
Trevor Suslow, Ph.D., Lecturer *(Vegetable Crops)*

Graduate Study. The Graduate Group in Plant Biology offers programs of study and research leading to the M.S. and Ph.D. degrees. The program prepares students for careers in teaching and research at colleges and universities, government or industrial laboratories. The graduate curriculum involves both a broad overview of the discipline and in-depth study and research in one of four areas of specialization: cell and molecular biology; ecology, systematics, and evolution; integrative plant and crop physiology; and plant development and structure. These areas of specialization permit individual study and research into diverse aspects of plant biology, including anatomy, biochemistry, cell biology, cytology, developmental biology, ecology, genetics, molecular biology, morphology, paleobotany, physiology, population biology, systematics, and weed science.

Preparation. For both the M.S. and Ph.D. programs, a level of scholastic development equivalent to a Bachelor's degree in biological sciences from a recognized college or university is required. Courses in the following areas are considered to be prerequisite to the advanced degrees in Plant Biology: inorganic chemistry, organic chemistry, introductory physics, genetics, structural botany, biochemistry, introductory plant physiology, introductory plant physiology laboratory, calculus, introductory statistics, plant ecology/systematics/evolution, genetics, and plant cell/molecular biology. Limited deficiencies can be made up after admission. The graduate adviser, the major professor, and the student will design a program of advanced courses to meet individual academic needs within one of the specializations.

Graduate Adviser. Contact the Group office.

Courses in Plant Biology (PBI)

Graduate Courses

201. Plant Senescence: Cellular and Molecular Aspects (4)
Lecture—4 hours. Prerequisite: Plant Biology 111, 112; Biological Sciences 102 and 103. Cellular and molecular phenomena associated with the senescence of plants and plant parts. Emphasis on principles and mechanisms. Offered in alternate years.—I. Labavitch, Reid

202. Advanced Physiology of Cultivated Plants (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing, Plant Biology 111 or the equivalent. Physiological processes as they pertain to growth and partitioning in higher plants. Background lectures on source-sink concepts and current areas of investigation followed by weekly round-table discussion led by students on focused sub-topics in the source-sink area. Offered in alternate years. (S/U grading only.)—I. Matthews, DeJong

203N. Research Tools in Plant Cell and Molecular Biology (4)
Lecture—3 hours; discussion/laboratory—2 hours. Prerequisite: Plant Biology 111 or Biological Sciences 104 or the equivalent. Theories of commonly employed approaches in plant cell and molecular biology, including antibodies, epitope-tagging, bioluminescence, protein identification, and protein localization. Breakthroughs on techniques used in plant biology. Offered in alternate years. (S/U grading only.)—I. Liu

205B. Advanced Plant Physiology (3)
Lecture/discussion—3 hours. Prerequisite: Plant Biology 111, 112, and Biological Sciences 103. Photosynthesis, photophosphorylation, chloroplast metabolism and biology. Offered in alternate years.—II. Theg

205C. Advanced Plant Physiology/ Biochemistry (3)
Lecture—3 hours. Prerequisite: Plant Biology 111, 112, Biological Sciences 103. Integrative studies that combine physiological, biochemical and molecular approaches to study of plant metabolism. Fundamentals of basic metabolic pathways extending to use of mutants and genetic engineering to dissect

such pathways; how pathways are integrated and respond to signals. Offered in alternate years.—III.

208. Plant Hormones and Regulators (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Biology 112. Chemistry, biochemistry and physiological activity of major classes of natural plant growth regulators. Primary consideration given to concepts that are of current research interest. Growth regulators in agriculture. Offered in alternate years.—II. Abel

210. Plant Ecophysiology (3)
Lecture—3 hours. Prerequisite: Plant Biology 111, 112, 117. Study of the mechanisms of physiological adaptation of plants to their environment. Offered in alternate years.—(II.) Pearcy

211. Ecophysiological Methods (3)
Lecture—1 hour; laboratory—4 hours; individual project; one Saturday field trip to be arranged. Prerequisite: Plant Biology 111, 117, and consent of instructor. A laboratory and lecture course covering basic concepts underlying the research methods and instrumentation useful in plant ecophysiology. Offered in alternate years.—III. Pearcy

212. Physiology of Herbicidal Action (3)
Lecture—3 hours. Prerequisite: Plant Biology 112, 122. Study of the fundamental processes involved in the physiological action of herbicides. Detailed consideration of the fate of herbicides in plants. Offered in alternate years.—III.

214. Higher Plant Cell Walls (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Plant Biology 112, and a course in biochemistry. Lectures focus on the structure, analysis, synthesis, and development-related metabolism of cell walls. Discussions center on analysis of scientific papers related to lecture topics. Offered in alternate years.—I. Labavitch, Nevins

217. Membrane Biology of Plants (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Plant Biology 112 and Biological Sciences 103, or consent of instructor. Structure, biogenesis, and function of plant cell membranes. Emphasis will be placed on the molecular basis of plant membrane functions and on the role of membranes in selected physiological processes. Offered in alternate years.—(III.) Lucas

218A. Advanced Concepts in Plant Cell Biology: Cell Biogenesis (3)
Lecture/discussion—3 hours. Prerequisite: Biological Sciences 102, 103. Survey of molecular mechanisms underlying structural and functional differentiation of plant cell subcellular compartments. Topics include membrane and protein biosynthesis, protein targeting and turnover, and regulation of nuclear and organellar gene expression as related to the biogenesis of plant cell organelles. Offered in alternate years.—(II.) Bennet, Theg

218B. Advanced Concepts in Plant Cell Biology: Signal Transduction and Intercellular Communication (3)
Lecture—3 hours. Prerequisite: Biological Sciences 102, 103 or consent of instructor. Intracellular signal transduction pathways in the plant cells as well as longer term, adaptive responses which involve signals transmitted between plant cells. Weekly lectures and student-led discussions on current literature. Offered in alternate years.—III. Lucas

219. Reproductive Biology of Flowering Plants (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Plant Biology 111 and Biological Sciences 101. Fundamental mechanisms of reproductive biology of flowering plants and their influence on genetic variation, evolution, and cultural practices. Offered in alternate years. (Former course Plant Science 270.)—(I.)

220. Plant Developmental Biology (4)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: plant anatomy, physiology, and biochemistry. A survey of the concepts of plant development and organization. Examines plant cells, tissues, and organs with special emphasis on experimental evidence for mechanisms regulating developmental processes. Offered in alternate years.—Bowman, Sinha

223. Special Topics in Scientific Method (2)
Discussion—2 hours. Examine the historical and philosophical background of the scientific method. Analyze the rational, perceptual, causal, creative and social aspects of scientific knowledge. Clarify the roles of reason, experimentation and creativity in scientific research. (S/U grading only.)—I. (I.) Bradford

224. Water in Physiology and Ecology of Plants (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Hydrologic Science 124, or Plant Biology 111 and 117, or consent of instructor. Evapotranspiration and energy balance; water and component potentials; water transport to, within, and from plants; dynamics and regulation of water status; drought resistance; responses to water deficits and salinity; water use efficiency; adaptation to aridity; productivity in relation to water. Offered every fourth quarter. (Former course Plant Science 224.)—II. Hsiao

225. Methods and Instrumentation for Crop and Soil Science (3)
Lecture—1 hour; laboratory—3 hours; discussion—1 hour. Prerequisite: basic knowledge of plant physiology, soil science, chemistry and physics. Theory and practice of in situ sampling and instrumentation methods for crop science (broadly defined to include tree crops) and related aspects of soil science (e.g., moisture and fertility) and laboratory analysis. Offered in alternate years.—III.

227. Plant Molecular Biology (4)
Lecture/discussion—4 hours. Prerequisite: Molecular and Cellular Biology 121 or 161. Molecular aspects of higher plant biology with emphasis on gene expression. Plant nuclear and organelle genome organization, gene structure, mechanisms of gene regulation, gene transfer, and special topics related to development and response to biological and environmental stimuli.—(II.) Britt, Sinha

229. Molecular Biology of Plant Reproduction (3)
Lecture—3 hours. Molecular genetic basis of plant reproduction. Emphasis on understanding developmentally regulated gene expression as it relates to the major changes that occur during plant reproduction and on the genetic control of flowering. Offered in alternate years.

290A. Faculty Seminar (1)
Seminar—1 hour. Seminars presented by members of Plant Biology faculty describing their areas of research. Required of all beginning students in the Plant Biology Graduate Group. (S/U grading only.)—I. (I.)

290B. Seminar (1)
Seminar—1 hour. Seminars presented by visiting scientists on research topics of current interest. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Conference in Botany (1)
Discussion—1 hour. Prerequisite: graduate standing and/or consent of instructor. Presentation and discussion by faculty and graduate students of research projects in botany. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291. Graduate Student Seminar in Plant Biology (1)
Seminar—1 hour. Prerequisite: graduate student standing. Student-given seminars on topics in plant biology, with critiques by instructor and peers. How to give a seminar, including preparation of visual and other teaching aids. Topic determined by instructor in charge. May be repeated for credit. (S/U grading only.)—II, III. (II, III.)

292. Seminars in Plant Biology (1)
Seminar—1 hour. Prerequisite: consent of instructor. Review of current literature in botanical disciplines. Disciplines and special subjects to be announced quarterly. Students present and analyze assigned topics. May be repeated for credit. (S/U grading only.)—II. (II.)

293. Seminar in Postharvest Biology (1)
Discussion—1 hour. Prerequisite: consent of instructor; open to advanced undergraduates. Intensive study of selected topics in the postharvest biology of fruits, vegetables, and ornamentals. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

297T. Tutoring in Plant Biology (1–5)
Tutorial—3–15 hours. Offers graduate students, particularly those not serving as teaching assistants, the opportunity to gain teaching experience. (S/U grading only.)

298. Group Study (1-5)
May be repeated up to 4 times for credit. (S/U grading only.)

299. Research (1-12)
Prerequisite: graduate standing. (S/U grading only.)

Professional Course

390. The Teaching of Plant Biology (2)
Discussion—2 hours. Prerequisite: graduate standing; concurrent appointment as a teaching assistant in Plant Biology. Consideration of the problems of teaching botany, especially of preparing for and conducting discussions, guiding student laboratory work, and the formulation of questions and topics for examinations. (S/U grading only.)—I, II, III. (I, II, III.)

Plant Pathology

(College of Agricultural and Environmental Sciences)
Richard M. Bostock, Ph.D., Chairperson of the Department
Department Office, 354 Hutchison Hall (530-752-0300)
http://www.plpnem.ucdavis.edu/PLP/courses/index.htm

Faculty

Richard M. Bostock, Ph.D., Professor
George Bruening, Ph.D., Professor
Douglas R. Cook, Ph.D., Professor
R. Michael Davis, Ph.D., Professor
John M. Duniway, Ph.D., Professor
Lynn Epstein, Ph.D., Associate Professor
Bryce W. Falk, Ph.D., Professor
Robert L. Gilbertson, Ph.D., Professor
David G. Gilchrist, Ph.D., Professor
Thomas R. Gordon, Ph.D., Professor
Clarence I. Kado, Ph.D., Professor
Bruce Kirkpatrick, Ph.D., Professor
James D. MacDonald, Ph.D., Professor *(Plant Pathology, Environmental Horticulture)*
David Rizzo, Ph.D., Associate Professor
Pamela C. Ronald, Ph.D., Professor
Neal K. VanAlfen, Ph.D., Professor
Robert K. Webster, Ph.D., Professor

Emeriti Faculty

Edward E. Butler, Ph.D., Professor Emeritus
Robert N. Campbell, Ph.D., Professor Emeritus
James E. DeVay, Ph.D., Professor Emeritus
W. Harley English, Ph.D., Professor Emeritus
Raymond G. Grogan, Ph.D., Professor Emeritus
Bert Lear, Ph.D., Professor Emeritus
Srecko John M. Mircetich, Ph.D., Lecturer Emeritus

Affiliated Faculty

Kendra Baumgartner, Ph.D., Lecturer *(USDA)*
Greg Browne, Ph.D., Lecturer *(USDA)*
Daniel Kluepfel, Ph.D., Lecturer *(USDA)*
Deborah A. Golino, Ph.D., Lecturer
W. Douglas Gubler, Ph.D., Lecturer
Themis Michailides, Ph.D., Lecturer
Adib Rowhani, Ph.D., Lecturer
Krishna Subbarao, Ph.D., Lecturer
Jerry K. Uyemoto, Ph.D., Lecturer *(USDA)*

Related Major Program. See the major in Plant Biology.

Graduate Study. The Department of Plant Pathology offers programs of study and research leading to the M.S. and Ph.D. degrees. Information can be obtained from the graduate adviser. See also the Graduate Studies section in this catalog.

Graduate Advisers. J.M. Duniway, L. Epstein, T.R. Gordon, R. M. Davis.

Courses in Plant Pathology (PLP)

Lower Division Course

40. Edible Mushroom Cultivation (2)
Lecture—1 hour; laboratory/discussion—3 hours. Prerequisite: Biological Sciences 10 or Microbiology 20 recommended. Principles and practices of growing edible mushrooms, including culture maintenance, basic mushroom substrate preparation, composting, spawn generation techniques, inoculation methods, harvesting, and pests and pest management.—II. (II.) Davis

Upper Division Courses

120. Introduction to Plant Pathology (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1C; Microbiology 102 recommended. The nature, cause, and control of plant diseases.—I, III. (I, III.) Duniway, Falk, Gilbertson, Bostock

123. Plant-Virus-Vector Interaction (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1C, 101; Plant Biology 105, course 120, and Entomology 100 recommended. Analysis of the interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern experimental approaches to the interdiction of viral movement. Offered alternate years. (Same course as Entomology 123/Plant Biology 123.)—I. Lucas, Gilbertson, Ullman

130. Fungal Biotechnology and Biochemistry (3)
Lecture—3 hours. Prerequisite: Plant Biology 119, Biological Sciences 103. How fundamental physiological and biochemical activities of fungi impact the destructive and beneficial roles of these organisms in nature. Utilization and manipulation of fungi for biotechnological and industrial applications.—II. (II.) Gilchrist, Bostock

135. Field Identification of Mushrooms (1)
Field work; three-day mandatory field trip. Prerequisite: introductory course in biological sciences; course in mycology recommended. Collection and identification of mushrooms and other fleshy fungi based on macro and microscopic features. (P/NP grading only.)—II. (II.) Davis

140. Agricultural Biotechnology, Ethics and Public Policy (4)
Lecture—3 hours; term paper or discussion—1 hour. Examination of agricultural biotechnology within a moral/ethical framework. Public policy development and implementation. GE credit: SciEng, Wrt.—III. (III.) Bruening

148. Introductory Mycology (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Systematics, ecology, evolution, and morphology of fungi. Importance of fungi to humans. (Same course as Plant Biology 148.)—I. MacDonald, Rizzo

150. Fungal Ecology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1C or equivalent. The ecological roles of fungi as saprobes, mutualists and parasites in native and managed ecosystems. Physiological and reproductive strategies associated with adaptations to diverse habitats.—II. (II.) Gordon

151A-151B. Fungal Biodiversity in Natural Environments (4-4)
Lecture—1 hour; laboratory—6 hours; field work—three or four one-day-long weekend field trips. Prerequisite: introductory course in mycology (e.g., Plant Biology 148/course 148); Plant Pathology 150 (may be taken concurrently). Fungal biodiversity within a natural habitat. Fungi collected on field trips will be identified during laboratory periods. The ecological roles of the various fungal taxa are emphasized. Offered in alternate years.—(II-III.) MacDonald

155. Ecology of Forest Diseases (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Tree diseases and their role in temperate and tropical forest ecosystems. Impacts of both native and exotic pathogens. Interactions between forest pathogens and insects. Approaches to management and regulation. One field trip is required. Offered in alternate years.—III. Rizzo

185. Advanced Mushroom Taxonomy (2)
Laboratory/discussion—3 hours; fieldwork—1 hour. Prerequisite: course 135 or 148, and Biological Sciences 101 or the equivalent. Microscopic and molecular methods used in the identification of mushroom species; molecular characterization including PCR-amplification of ribosomal nuclear DNA, digestion of the product with restriction enzymes, and DNA sequencing; a one-day field trip is required. Offered in alternate years.—I. Davis

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: course 120 and consent of instructor. Work experience off and on campus, supervised by a member of the faculty. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

205A-205B. Diseases of Vegetable and Field Crops (2-2)
Lecture/discussion—2 hours; fieldwork—6 hours. Prerequisite: course 120. Field trips, including an extended summer field trip, required. Clinical study of diseases of vegetable and field crops with emphasis on etiology, epidemiology, diagnosis, and control. (Deferred grading only, pending completion of sequence.) Offered in alternate years.—III. Davis, Webster

206A-206B. Diseases of Fruit, Nut, and Vine Crops (3-1)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 120; Plant Biology 119. Course 205 may be taken concurrently. Clinical study of fruit, nut, and vine crops diseases with emphasis on etiology, epidemiology, diagnosis, and control. Offered in alternate years. (Deferred grading only, pending completion of sequence.)—III-summer. (III-summer.)

208. Ecology of Plant Pathogens and Epidemiology of Plant Diseases (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 120 or the equivalent. Interaction between higher plants, plant pathogens, and the environment which is important in the occurrence and severity of plant disease. Emphasis is placed on the population dynamics and ecology of plant pathogens in the aerial and soil environment. Offered in alternate years.—III. Duniway

209. Principles of Plant Disease Control (3)
Lecture—3 hours. Prerequisite: course 120 or the equivalent. Discussion of the underlying principles and methods used for the control of plant diseases. Emphasis placed on application of epidemiological principles, biological (including host resistance), and chemical strategies to achieve disease control. Offered in alternate years.—II.

210. Biochemistry and Molecular Biology of Plant–Microbe Interaction (4)
Lecture/discussion—4 hours. Prerequisite: Biological Sciences 101, 102, 103, and 104, or the equivalent. Discussion of plant–microbe interactions, focused on the underlying cellular, biochemical, and molecular events that determine the diseased state. Offered in alternate years.—I. Gilchrist, Bostock

215X. Genetics and Molecular Biology of Plant Pathogens (4)
Lecture—3 hours; laboratory/discussion—3 hours. Prerequisite: course 120 and Biological Sciences 101. Genetic analysis of pathogenicity, cultivar-specificity, and host-specificity in plant pathogens, particularly fungi; application of molecular biology to the isolation and characterization of the genes involved; and to aspects of pathogen identification; emphasis on research techniques and problem-solving. Offered in alternate years.—(II.)

217. Molecular Genetics of Fungi (3)
Lecture—3 hours. Prerequisite: graduate standing in a biological science, Biological Sciences 101, 103, Molecular and Cellular Biology 161, Plant Biology 119, courses 130, 215X; Microbiology 215 recommended. Advanced treatment of molecular biology and genetics of filamentous fungi and yeasts, including gene structure, organization and regulation; plant pathogenesis; secretion; control of reproduction; molecular evolution; transformation; and gene manipulation. Offered in alternate years. (Same course as Biological Chemistry 217.)—II. Holland

222. Experimental Approaches in Plant Pathology (2)
Lecture—2 hours. Prerequisite: course 120 or the equivalent. Experimental approaches, methods of analysis and techniques used in current research in plant pathology, particularly with fungi. Avoiding common research pitfalls. Offered in alternate years.—II. Epstein

224. Advanced Mycology (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 148 or Plant Biology 148 or consent of instructor. Systematics, evolution, and ecology of the fungi. Topics include modern techniques and theories on classification of fungi, species concepts, sexual compatibility and vegetative compatibility. Laboratories emphasize various approaches to fungal identification. Offered in alternate years.—III. Rizzo

228. Plant Bacteriology (5)
Lecture—2 hours; laboratory—9 hours. Prerequisite: course 120; Microbiology 2 or the equivalent; Biological Sciences 102, 103. Study of bacteria which have a saprophytic, symbiotic, or parasitic association with higher and lower plants. Clinical and molecular methods for identification and classification of these bacteria. Offered in alternate years.—(I.) Kirkpatrick, Gilbertson

230. Plant Virology (3)
Lecture—3 hours. Prerequisite: upper division or graduate course in molecular biology or graduate student in plant pathology. Viruses as causal agents of plant disease and as tools for manipulating plants; structures of virus particles; mechanisms of transmission, replication, and spread in the plant; cytology and molecular biology in susceptible and resistant reactions to virus infection; virus disease control. Only 2 units of credit to students who have completed Microbiology 262. Not open for credit to students who have completed course 226. Offered in alternate years.—II. Bruening, Falk

230L. Plant Pathology Laboratory (2)
Laboratory—6 hours. Prerequisite: course 230 (may be taken concurrently). Experimental approaches and methods for plant virus identification; investigation of plant virus infection cycles, disease induction, plant reaction to infection, and the structure of virus particles. Not open for credit to students who have completed course 226.—Bruening, Falk

290. Seminar (1)
Seminar—1 hour. Review and evaluation of current research in plant pathology. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Advanced Research Conference (1)
Seminar—1 hour. Prerequisite: course 120 or consent of instructor. Presentation, evaluation, and critical discussions of research activities in the area of advanced plant pathology; primarily designed for graduate students. (S/U grading only.)—I, II, III. (I, II, III.)

291. Seminar in Molecular Plant Pathology (1)
Seminar—1 hour. Prerequisite: course 120 or consent of instructor. Review and evaluation of current literature and research in biochemistry and molecular biology of plant microbe interactions. May be

repeated for credit. (S/U grading only.)—I, II. (I, II.) Bostock, Gilchrist, Cook, VanAlfen

293. Seminar on Soil Microbiology and Root Diseases (1)
Seminar—1 hour. Prerequisite: basic knowledge of soil microbiology and plant pathology. Critical reviews of current research papers related to soil microbiology and ecology, soil-borne plant pathogens, and/or biological control. May be repeated for credit. (S/U grading only.)—II. Duniway, Epstein

295. Seminar in Mycology (1)
Seminar—1 hour. Review and evaluation of current literature and research in mycology. May be repeated for credit. (S/U grading only.)—III. (III.) Rizzo

298. Special Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Plant Physiology

See Plant Biology; and Plant Biology (A Graduate Group)

Plant Protection and Pest Management

See Integrated Pest Management (A Graduate Group)

Plant Science

See Plant Biology; and Plant Biology (A Graduate Group)

Plastic Surgery

See Medicine, School of

Political Science

(College of Letters and Science)

Walter Stone, Ph.D., Chairperson of the Department

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James Fowler, Ph.D., Assistant Professor
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John B. Gates, Ph.D., Associate Professor
Jeffrey Gill, Ph.D., Associate Professor
Emily O. Goldman, Ph.D., Associate Professor
Benjamin Highton, Ph.D., Assistant Professor
Stuart L. Hill, Ph.D., Associate Professor
Robert Huckfeldt, Ph.D., Professor
Robert W. Jackman, Ph.D., Professor
Cindy Kam, Ph.D., Assistant Professor
Daniel Y. Kono, Ph.D., Assistant Professor
Jeannette Money, Ph.D., Associate Professor
Gabriella R. Montinola, Ph.D., Assistant Professor
Miroslav Nincic, Ph.D., Professor
Larry I. Peterman, Ph.D., Professor
Donald S. Rothchild, Ph.D., Professor
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Ethan Scheiner, Ph.D., Assistant Professor
John T. Scott, Ph.D., Associate Professor
Randolph M. Siverson, Ph.D., Professor
James F. Spriggs II, Ph.D., Associate Professor
Walter Stone, Ph.D., Professor
Robert Taylor, Ph.D., Assistant Professor
Elizabeth Zechmeister, Ph.D., Assistant Professor

Emeriti Faculty

Edmond Costantini, Ph.D., Professor Emeritus
Richard W. Gable, Ph.D., Professor Emeritus
Alexander J. Groth, Ph.D., Professor Emeritus
Clyde E. Jacobs, Ph.D., Professor Emeritus
Joyce K. Kallgren, Ph.D., Professor Emerita
Lloyd D. Musolf, Ph.D., Professor Emeritus
John R. Owens, Ph.D., Professor Emeritus
Larry L. Wade, Ph.D., Professor Emeritus
Geoffrey A. Wandesforde-Smith, Ph.D., Professor Emeritus
Paul E. Zinner, Ph.D., Professor Emeritus

The Major Programs

Political science is the study of politics and political systems at the local, national, and international levels. It concerns not only the institutions of government but also the analysis of such phenomena as political behavior, political values, political change and stability, parties, pressure groups, bureaucracies, administrative behavior, justice, national security, and international affairs.

The Program. The Department of Political Science offers two major programs: political science and political science–public service. The political science major aims to provide the student with a broad understanding of political concepts, political institutions, political behavior, and political processes. The political science–public service major is for students who desire opportunities for practical hands-on experience in their major. It differs in particular from the political science major in its internship requirement and its focus on the American political system.

Internships and Career Alternatives. Both the proximity of UC Davis to the state capitol and the programs offered by the UC Davis Washington Center afford exceptional internship possibilities in local, state, and national government offices, providing students with actual experience in politics and government service while still attending school. A student who majors in political science acquires research and analytic skills relevant to many professional fields. Consequently, the majors offered in political science are valuable not only in providing students with a better understanding of politics and political systems, but also as a first step toward careers in teaching, law, management, government, urban planning, journalism, politics, administration, or for graduate studies in numerous fields.

Political Science

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 28-29
Three lower division Political Science courses from: 1, 2, 3, 4 12
Political Science 51 (required course) 4
Statistics 13, 32, 102 (or equivalent) 4
One course from Economics 1A, Economics 1B or Philosophy 5 4-5
One course from History 4C, 8, 9A, 10C, 15, 17A or 17 B 4

Depth Subject Matter..... 44-45
Four courses in one of the fields of concentration listed below 16
Three courses in another field of concentration listed below 12
Two courses in another field of concentration listed below 8
Two other upper division courses in Political Science. Only 5 units of Political Science 192 may be counted toward the depth subject matter..... 8-9

Fields of Concentration

American Politics (courses with Political Science 1 as a prerequisite): Political Science 100, 102, 105-109, 150-155, 160-166, 168, 170-171, 174-176, 180, 183, 187, 195, 196D

Comparative Politics (courses with Political Science 2 as a prerequisite): Political Science 126, 140, 142, 144-145, 147-149, 178-179, 196B.

International Relations (courses with Political Science 3 as a prerequisite): Political Science 120-126, 129, 130-132, 134, 137, 139, 196C, International Relations 131.

Political Theory (courses with Political Science 4 as a prerequisite): Political Science 111-119,187, 196D

Total Units for the Major 72-74

Political Science—Public Service

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 20
One course from Political Science 1, 5, or 7 4
Two courses from Political Science 2, 3, or 4 8
Statistics 13 (or equivalent) 4
Political Science 111 4
Recommended: Economics 1A-1B.

Depth Subject Matter..... 45-50
Core program 12
Two courses chosen from Political Science 100, 104, 105, 106, 113, 180; and one course from Political Science 108, 109, 114.
Internship, Political Science 192A, 192B, or 192W 7-10
Research paper, Political Science 193.... 2-4
Fields of concentration 24
Select six upper division courses from two or three fields of concentration listed below with at least two courses in each field selected; at least 16 of the units must be in political science. (Core Program courses may not be counted toward this requirement.)

Fields of Concentration
Field (1) Policy formulation: Political Science 100, 104, 105, 106, 108, 109, 160, 161, 162, 163, 164, 165, 166, 168, 170, 171, 174, 175, 195; Economics 130
Field (2) Policy implementation and evaluation: Political Science 180, 183, 187; Economics 131
Field (3) Policy interpretation—Substance and procedures (public/pre-law): Political Science 150, 151, 152, 153, 155
Field (4) Policy areas:
a) Urban policy and implementation: Political Science 100, 102, Environmental Horticulture 110, Environmental Science and Policy 173

b) Environmental policy and implementation: Political Science 107, Environmental Science and Policy 160, 161, 166, 168A-168B, 172, 179

c) Environmental policy and implementation: open field that might include courses relevant to health care, welfare, education, community development, transportation, science and technology, etc. (requires approval of Political Science–Public Service adviser)

Total Units for the Major 68

Major Advisers. Consult Department Office.

Minor Program Requirements:

Students electing a minor in Political Science may choose one of two plans.

UNITS

Political Science 24
Six upper division courses: Three courses in one of the fields of concentration and three courses outside of that field.

Public Affairs Internship Program. This program is open to upper division students in any major who want to obtain an internship in the area of government and public service. Information and applications are available from the Political Science Department, 1273 Social Sciences and Humanities Building.

Graduate Study. The Department of Political Science offers a program of graduate study and research leading to a Ph.D. degree or an M.A./J.D. joint degree. The M.A./J.D. joint degree is done only in conjunction with UC Davis School of Law. Information concerning admission to these programs and requirements for completion are available in the Graduate Program Coordinator Office.

Graduate Adviser. Consult Graduate Program Coordinator Office.

American History and Institutions. This University requirement may be satisfied by passing any one of the following Political Science courses: 1, 5, 100, 101, 102, 103, 104, 105, 106, 108, 109, 113, 130, 131, 160, 163. (See also under University requirements.)

Courses in Political Science (POL)

Lower Division Courses

1. American National Government (4)
Lecture—3 hours; discussion—1 hour. Survey of American national government, including the constitutional system, political culture, parties, elections, the presidency, Congress, and the courts. GE credit: SocSci, Wrt.—I, II, III.

2. Introduction to Comparative Politics (4)
Lecture—3 hours; discussion—1 hour. Introduction to basic concepts in political analysis and application of them in comparative studies of selected countries. Coverage is given to cultural and other informal dimensions of politics as well as to more formal political and governmental structures. GE credit: SocSci, Wrt.—I, III.

3. International Relations (4)
Lecture—3 hours; discussion—1 hour. International conflict and cooperation, including the Cold War, nuclear weapons, and new techniques for understanding international politics. GE credit: SocSci, Wrt.—I, II, III. (I, II, III.)

4. Basic Concepts in Political Theory (4)
Lecture—3 hours; discussion—1 hour. Analysis of such concepts as the individual, community, liberty, equality, justice, and natural law as developed in the works of the major political philosophers. GE credit: SocSci, Wrt.—I.

5. Contemporary Problems of the American Political System (4)
Lecture—3 hours; discussion—1 hour. In-depth treatment of selected problems and issues of American politics, governmental institutions, and policies. GE credit: SocSci, Wrt.—II.

7. Contemporary Issues in Law and Politics (4)
Seminar—4 hours. A seminar which focuses on the political dimensions of American law and institutions. Examines the role of courts in resolving contemporary issues of law and politics including abortion, capital punishment, and civil rights. Limited enrollment. Open to students having no more than 40.1 units. GE credit: SocSci, Wrt.—III.

51. Scientific Study of Politics (4)
Lecture/discussion—4 hours. Introduction to the basic principles of the scientific study of politics. Research design and empirical analysis of data with applications to different methodological approaches and different substantive areas in political science. GE credit: SocSci.—I, II, III.

90X. Lower Division Seminar (4)
Seminar—4 hours. Prerequisite: lower division standing and consent of instructor. Examines fundamental issues and concepts that shape the study and practice of politics. Students will read, discuss and write about some of the most significant texts in political science in order to develop a foundation for the study of politics. Limited enrollment.

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Local Government and Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, upper division standing or consent of instructor. Politics and government of local communities in the United States, including cities, counties, and special districts. Emphasizes sources and varieties of community conflict, legislative and executive patterns, expertise, decision making, and the politics of structure. Observation of local governing boards. GE credit: SocSci, Wrt.

102. Urban Public Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, upper division standing in Political Science or consent of instructor. Political and economic relationships among central cities, suburbs, and regional, state, and federal governments. Focuses upon policy areas such as poverty, transportation, welfare, and housing, and upon who governs and who benefits from the policies in these areas. GE credit: SocSci, Wrt.—I.

104. California State Government and Politics (4)
Lecture—3 hours; research paper. Prerequisite: course 1. The California political system. Political culture, constitution, elections and parties, direct democracy, legislature, governor, executive branch, courts, finances, state-local relations, and policy issues.

105. The Legislative Process (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Analysis of the legislative process with emphasis on the United States Congress; legislative organization and procedures, legislative leadership and policy making, legislators and constituents, relations between Congress and other agencies. GE credit: SocSci, Wrt.—II.

106. The Presidency (4)
Lecture—3 hours; discussion—1 hour; optional term paper. Prerequisite: course 1. The American presidency's origins and development; presidential power and influence as manifest in relationships with Congress, courts, parties, and the public in the formulation and administration of foreign and domestic policy; nominations, campaigns, and elections. GE credit: SocSci, Wrt.—II, III.

107. Environmental Politics and Administration (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. Introduction to the environment as a political issue in the United States and to the development of administrative mechanisms for handling environmental problems. Changing role of Congress, the presidency, the bureaucracy, and the courts in environmental policy formulation and implementation. GE credit: SocSci, Wrt.

108. Policy Making in the Public Sector (4)
Lecture—3 hours; research paper. Prerequisite: course 1. The theoretical rationale for governmental activity, program evaluation, PPBS, positive theories of policy making, the quantitative study of policy determinants, implementation, and proposals for improved decision making. GE credit: SocSci, Wrt.

109. Public Policy and the Governmental Process (4)
Lecture—3 hours; research paper. Prerequisite: course 1. The processes of formulating public policy, including individual and collective decision making, political exchange, competition, bargaining, coalition formation and the allocation of public goods, resources and opportunities. GE credit: SocSci, Wrt.—I.

111. Systematic Political Science (4)
Lecture/discussion—4 hours. Philosophical basis of modern political science; major specific approaches; selected concepts relevant to modern political concerns; and research design and execution.—I, III.

112. Contemporary Democratic Theory (4)
Lecture—3 hours; term paper. Prerequisite: course 4. Major contemporary attempts to reformulate traditional democratic theory, attempts to replace traditional theory by conceptual models derived from modern social science findings. Offered in alternate years. GE credit: SocSci, Wrt.

113. American Political Thought (4)
Lecture—3 hours; term paper. Prerequisite: course 4. Origins and nature of American political thought. Principles of American thought as they emerge from the founding period to the present. GE credit: SocSci, Wrt.

114. Quantitative Analysis of Political Data (4)
Lecture—3 hours; term paper. Logic and methods of analyzing quantitative political data. Topics covered include central tendency, probability, correlation, and non-parametric statistics. Particular emphasis will be placed on understanding the use of statistics in political science research. Offered in alternate years. GE credit: SocSci, Wrt.

115. Medieval Political Thought (4)
Lecture—3 hours; term paper. Prerequisite: course 118A. Examination of the ideas central to medieval political thinking. Emphasis will be upon the thoughts of the major political thinkers of the period, rather than upon political history. GE credit: SocSci, Wrt.

116. Foundations of Political Thought (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 4. Analysis and evaluation of the seminal works of a major political philosopher or of a major problem in political philosophy. May be repeated once when topic differs. Offered in alternate years. GE credit: SocSci, Wrt.—II.

117. Marxism (4)
Lecture—3 hours; discussion—1 hour. Examination of the political and social philosophy of Karl Marx, with reference to the evolution of Marxism in the nineteenth and twentieth centuries.

118A. History of Political Theory: Ancient (4)
Lecture—3 hours; term paper. Prerequisite: course 4. Critical analyses of classical and medieval political philosophers such as Plato, Aristotle, Cicero and St. Thomas. GE credit: SocSci, Wrt.—I.

118B. History of Political Theory: Early Modern (4)
Lecture—3 hours; term paper. Prerequisite: course 4. Critical analysis of the works of early modern political philosophers such as Machiavelli, Montaigne, Hobbes, Locke and Hume. GE credit: SocSci, Wrt.—II.

118C. History of Political Theory: Late Modern (4)
Lecture—3 hours; term paper. Prerequisite: course 4. Critical analyses of the works of late modern political philosophers such as Rousseau, Kant, Hegel, Tocqueville, Mill, Marx and Nietzsche. GE credit: SocSci, Wrt.—III.

119. Contemporary Political Thought (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 4. Contemporary political thought from the end of the nineteenth century to the present. Emphasis upon an individual philosopher, concept, or philosophical movement, e.g., Nietzsche, Continental political thought, Rawls and critics, theories of distributive justice, feminist theory.—III.

120. Theories of International Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3, upper division standing or consent of instructor. Major contemporary approaches to the study of international politics, including balance of power, game theory, Marxist-Leninist theory, systems theory, and decision-making analysis.

121. The Scientific Study of War (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3, course 51 or Statistics 13, upper division standing. Analysis of political processes involved in the initiation, conduct and termination of modern interstate warfare. GE credit: SocSci, Wrt.—II.

122. International Law (4)
Lecture—4 hours. Prerequisite: course 3. Selected topics in international law; territory, sovereign immunity, responsibility, the peaceful settlement or nonsettlement of international disputes. GE credit: SocSci, Wrt.—III.

123. The Politics of Interdependence (4)
Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing or consent of instructor. In the past several decades, growing economic interdependence has generated new problems in international relations. Course deals with difficulties in managing complex interdependence and its implication on national policies and politics. GE credit: SocSci, Wrt.—II, III.

124. The Politics of Global Inequality (4)
Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing; course 123 recommended. Long-standing division of the global system into richer and poorer regions poses many important problems in international political economy. Course presents a theoretical background to North-South issues and analyses of current problems in economic and political relations. GE credit: SocSci, Div, Wrt.—I, III.

126. Ethnic Self-Determination and International Conflict (4)
Lecture—3 hours; individual meetings with students to discuss term papers. Prerequisite: course 3. Compares the claims of the state and ethnic peoples in countries undergoing internal conflicts, e.g., South Africa, Northern Ireland. Analyzes the role of the international community in facilitating the peaceful resolution of conflicts. GE credit: SocSci, Div, Wrt.—I. (I.)

129. Special Studies in International Politics (4)
Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing. Intensive examination of one or more special problems in international politics. May be repeated once for credit when different topic is studied. GE credit: SocSci, Wrt.—II.

130. Recent U.S. Foreign Policy (4)
Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing or consent of instructor. Broad survey of the development of U.S. foreign policy in twentieth century with emphasis on transformation of policy during and after World War II, and the introduction to analytic tools and concepts useful for understanding of current foreign policy issues. GE credit: SocSci, Wrt.—III.

131. Analysis of U.S. Foreign Policy (4)
Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing or consent of instructor. Detailed presentation and examination of the formulation of execution of U.S. foreign policy. Survey of numerous factors influencing policy outcomes and how such determinants vary according to policy issue areas. GE credit: SocSci, Wrt.

132. National Security Policy (4)
Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing. Development of national security policies since 1945. Analysis of deterrence and assumptions upon which it is based. Effects of nuclear weapons upon conduct of war, alliance systems, and the international system. Prospects of security and stability through arms control. GE credit: SocSci, Wrt.—II.

134. Africa and U.S. Foreign Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or consent of instructor, upper division standing. Overview of American foreign policy toward Africa. Relationship to global adversaries. Legacies of colonialism. Challenge of national self-determination and white racism. Policies on non-alignment, producer cartels, multinational corporations, continental integration and trade and aid relations.—I.

137. International Relations in Western Europe (4)
Lecture—4 hours. Prerequisite: course 3, upper division standing. Analysis of European unity, problems of the Atlantic alliance, Atlantic political economy, East-West relations, communism in Western Europe and the relationship between domestic politics and foreign policy.—I.

139. Special Studies in Foreign Policy (4)
Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing or consent of instructor. Extensive examination of one or more special problems in foreign policy. May be repeated once for credit when topic differs.

140. Comparative Public Policy (4)
Lecture—3 hours; term paper. Prerequisite: course 2. Ideological orientations, institutions, processes, and public policies of modern states. Emphasis on democratic, socialist, communist and fascist experience.

142. Politics and Inequality (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2. Examines the linkages between politics and the distribution of social and economic goods. Topics include the impact of civil rights legislation, the politics of welfare states, and the effects of political participation on the distribution of goods. GE credit: SocSci, Div.—II.

143. Latin American Politics (4)
Lecture—3 hours; term paper. Prerequisite: course 2. Issues related to democratic consolidation in Latin America. Topics include transitions to democracy, the role of the military, political economy, and political behavior. GE credit: SocSci, Wrt.—Zechmeister

144. Russian Politics and Policy (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing and course 2 or consent of instructor. Democratization, state-building and economic reform; creation of new institutions; impacts of Soviet rule.—II.

145. Government and Politics in Emergent Nations (4)
Lecture—4 hours. Prerequisite: course 2. Conceptual study of problems of political organization and procedure in the context of rapid change engendered by social revolution in "emergent countries" and liberation from colonial oppression. Offered in alternate years.

147. Politics and Policy in Western Europe (4)
Lecture—4 hours. Prerequisite: course 2. The evolution, politics, and contemporary problems of selected political systems of Western Europe.

148A. Government and Politics in East Asia: China (4)
Lecture—4 hours. Prerequisite: course 2 or consent of instructor. Evolution of political institutions and political culture in China with emphasis on the post-1949 period. Primary attention to nationalism, modernization and political efficacy.—I. (II.)

148B. Government and Politics in East Asia: Pacific Rim (4)
Lecture—4 hours. Prerequisite: course 2 or consent of instructor. Establishment and evolution of political cultures and establishment of political institutions in selected countries of the Pacific Rim, namely Japan, Korea, Taiwan. Emphasis on post World War—II, III.

148C. Government and Politics in East Asia: Southeast Asia (4)
Lecture—3 hours; term paper. Prerequisite: course 2 or consent of instructor. Evolution of political culture, institutions, economy of selected nations in Southeast Asia including Vietnam plus two or three other examples. Emphasis on imperialist legacy, nation building in multi-ethnic communities, contrasts between socialist and non-socialist development models. Offered in alternate years.—III.

149. Politics of Development in Africa (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor; course 134 recommended. Political and economic development within Sub-Saharan Africa. States and institutions, democracy, party systems, military coups/rule, bureaucracy/corruption, race/ethnicity, national/regional integrations, trade unions, economic development strategies, class formation, and women's roles and ideology.

150. Judicial Politics and Constitutional Interpretation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, upper division standing. Politics of judicial policymaking; issues surrounding constitutional interpretation and decision making; prerequisite for courses on the politics of constitutional law.—I, II.

151. The Constitutional Politics of the First Amendment and the Right to Privacy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150. The constitutional politics surrounding such issues as the right to free expression, associational rights, the right to free exercise of religious beliefs, and the right to privacy. GE credit: SocSci, Wrt.—II.

152. The Constitutional Politics of Equality (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150. Constitutional politics of equality in the American political system; issues surrounding constitutional doctrine and judicial policymaking; special attention on racial and sexual equality. Offered in alternate years. GE credit: SocSci, Div, Wrt.—III.

153. The Constitutional Politics of the Justice System (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150. Constitutional politics of the American criminal justice system; the issues surrounding constitutional doctrine and judicial policymaking on issues such as search and seizure, arrest, trial, incarceration, and other issues of due process. Offered in alternate years.—III.

154. Legal Philosophy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 4, upper division standing. Analysis of the nature and functions of law; law as an instrument of social control and the relationship between law and morality. Offered in alternate years.

155. Judicial Process and Behavior (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, upper division standing. Analysis of the behavior of judges and courts in the political process. Techniques of judicial decision making. Relationships among courts and other decision-making bodies. Offered in alternate years. GE credit: SocSci, Wrt.—II.

160. American Political Parties (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Analysis of the structured operations of the party system in the United States; party functions and organizations, nomination processes, campaigns and elections, party trends and reforms. GE credit: SocSci, Wrt.—II.

161. Comparative Political Parties (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Organization, operation, governmental function and social bases of political parties especially in Great Britain and France but with some reference to other Western European countries.

162. Elections and Voting Behavior (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Analysis of American elections and partisan behavior; political socialization, political participation, partisanship and individual and group determinants of voting. GE credit: SocSci, Wrt.—I.

163. Group Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Groups, institutions, and individuals, especially in American politics. Historical and analytical treatment of group theories as applied to interest groups (especially labor, business, agriculture, science, military); to racial, ethnic, and sectional groups; to parties, public and legislative groups, bureaucracies. GE credit: SocSci, Wrt.—I.

164. Public Opinion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing and course 1 or 5, or consent of instructor. Nature of public opinion in America as it is "supposed to be" and as it is. Distribution of opinions among different publics and the signifi-

cance of that distribution for system stability and institutions. Opinion polling and its problems. GE credit: SocSci, Wrt.—II.

165. Mass Media and Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Organization of and decision making within the media; media audiences and the effect of the media on attitudes and behavior; the relationship of the government to the media (censorship, secrecy, freedom of the press, government regulation); the media in election campaigns. GE credit: SocSci, Wrt.—I.

166. Women in Politics (4)
Lecture—3 hours; discussion—1 hour or seminar—1 hour. Prerequisite: course 1. The role of women in American politics. Historical experiences; contemporary organizations and strategies; areas of legislative concern; the impact of differences in social class, race, and ethnicity upon the involvement of women in politics. GE credit: SocSci, Div.

168. Chicano Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Political aspects of Chicano life in America; examines the Chicano's political role as it has been historically defined by different groups in society and the Chicano's responses to his/her political environment. GE credit: SocSci, Div.

170. Political Psychology (4)
Seminar—3 hours; term paper. Prerequisite: course 1. Social psychological theories of how voters form political attitudes and to what extent such attitudes translate into behaviors.

171. The Politics of Energy (4)
Lecture/discussion—4 hours. Prerequisite: course 1, upper division standing. Analysis of nature and performance of political processes for making energy choices at the international, national and state levels. Emphasizes interaction of energy policy with other political goals and the ability of governmental institutions to overcome constraints on policy innovation.

172. American Political Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, some background in American politics is strongly recommended. Systematic analysis of contemporary issues in American political development: historical determinants of political change; the timing and character of institutional development; conditions for successful political action. Topics may include democratization, cultural change, party formation, state-building, constitutionalism, race relations.

174. Government and the Economy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, upper division standing in Political Science or consent of instructor. Political basis of economic policy (taxation, spending and regulation); impact of prices, employment and growth on political demands; elite responses to economic conditions; policy alternatives and the public interest. GE credit: SocSci, Wrt.

175. Science, Technology, and Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Analysis of policymaking for science and the use of scientific expertise for making decisions about technology. Topics include funding of basic research, relationship of science to technological development, science and military policy, technological risks, technology assessment and scientists and politics. GE credit: SocSci, Wrt.—III.

176. Racial Politics (4)
Seminar—3 hours; term paper. Prerequisite: Course 1. Race, racial attitudes and racial policies in the United States with a specific emphasis on African Americans. GE credit: SocSci, Div.

178. Political Development in Modernizing Societies (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Nature and sequence of political development; its economic and social concomitants; role of elites, military, bureaucracy, and party systems; social stratification and group politics; social mobilization and political participation; instability, violence, and the politics of integration.—I.

179. Special Studies in Comparative Politics (4)
Seminar—4 hours. Prerequisite: course 2, consent of instructor and upper division standing. Intensive examination of one or more special problems appropriate to comparative politics. May be repeated once for credit.

180. Bureaucracy in Modern Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 2, upper division standing in Political Science or consent of instructor. Role of bureaucracy in a complex society, with emphasis upon changing relationships between government and the economy; consequences of rapid technological and social change for bureaucratic structures and processes; the problems of reconciling expertise and democracy and increasing the responsiveness of public bureaucracy. GE credit: SocSci, Wrt.

183. Administrative Behavior (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. The implications for American public administration of evolving concepts about behavior in organizations.

187. Administrative Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. Historical and critical analysis of the principal theories of organization and management of public agencies in the light of such concepts as decision making, bureaucracy, authority and power, communication and control; an examination of the role of government bureaucracies in the total society. GE credit: SocSci, Wrt.—III.

190. International Relations (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: open to majors in International Relations, or consent of instructor. Analysis and evaluation of substantive issues in contemporary international relations. Readings drawn from current academic and non-academic periodicals.

192A. Internship in Public Affairs (5)
Prerequisite: enrollment dependent on availability of intern positions with highest priority assigned to students with Political Science–Public Service major; upper division standing. Supervised internship and study in political, governmental, or related organizations. (P/NP grading only.) GE credit: SocSci, Wrt.

192B. Internship in Public Affairs (5)
Prerequisite: course 192A; enrollment dependent on availability of intern positions with highest priority assigned to students with Political Science–Public Service major; upper division standing. Supervised internship and study in political, governmental, or related organizations. (P/NP grading only.) GE credit: SocSci, Wrt.

192W. Internship in the UC Davis Washington Center Program (7)
Internship—28 hours. Prerequisite: junior or senior standing, admission in the UC Davis Washington Center undergraduate program, course 193W concurrently. Internship in Washington, DC with associated, supervised research project. (Same course as UC Davis Washington Center 192.) (P/NP grading only.)—I, II, III.

193. Research in Practical Politics (2)
Research project—6 hours. Prerequisite: courses 192A, 192B; open only to Political Science–Public Service majors, for whom it is required. Supervised preparation of an extensive paper relating internship experience to concepts, literature, and theory of political science.—I, II, III.

193W. Washington Center Research Seminar (4)
Lecture/discussion—1 hour; independent study—3 hours; tutorial—0.5 hour. Prerequisite: course 192W concurrently. Core academic component of Washington Program. Topics coordinated with internships. Research draws on resources uniquely available in Washington, DC. Supervised preparation of extensive paper. (Same course as UC Davis Washington Center 193.) GE credit: Wrt.—I, II, III.

194HA-194HB. Special Study for Honors Students (4-4)
Seminar—2 hours; independent study—2 hours. Prerequisite: major in Political Science with upper division standing and a GPA of 3.5 in the major. Directed reading, research and writing culminating in preparation of a senior honors thesis under the direction of faculty adviser. (Deferred grading only, pending completion of sequence.)—II-III.

195. Special Studies in American Politics (4)
Seminar—4 hours. Prerequisite: consent of instructor and upper division standing. Intensive examination of one or more special problems appropriate to American politics. May be repeated once for credit when topic differs.—I.

196A. Seminar in American Politics (4)
Seminar—3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, writing in American politics. Topics may include Congress, the Presidency, the Supreme Court, federalism, voting behavior, interest groups, ethnic groups or other topics with a more specialized content than normal course offerings. May be repeated once for credit when topic differs.—I, II, III.

196B. Seminar in Comparative Politics (4)
Seminar—3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, writing in comparative politics. Topics may include one country or geographical area, political institutions or behavior across countries, political development, or other topics that are more specialized than normal course offerings. May be repeated once for credit when topic differs.—I, II, III.

196C. Seminar in International Relations (4)
Seminar—3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, writing in international relations including study of international political institutions (UN, EU, or NATO) or interstate relations (war, trade, immigration) and other topics with more specialized content than normal course offerings. May be repeated once for credit when topic differs.—I, II, III.

196D. Seminar in Political Theory (4)
Seminar—3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, writing in political theory. Topics may include study of a single political thinker, a group of related thinkers, development of political concepts, or other topics with more specialized content than normal course offerings. May be repeated once for credit when topic differs.—I, II, III.

196E. Seminar in Research Methods (4)
Seminar—3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, and writing in selected topics in research methods such as research design, statistics, game theory. May be repeated once for credit when topic differs.—I, II, III.

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

201. Urban Government and Politics (4)
Seminar—4 hours. Survey and analysis of the literature in the field of local government and politics in the United States. Approaches to the study of political reform, local autonomy, community power, representation, expertise, service delivery, policymaking and political change. Offered in alternate years.

202. American State Government and Politics (4)
Seminar—4 hours. Survey and analysis of the literature in the field of state government, politics, and policy. Approaches to the study of the American states as political systems, including their governing

institutions and processes and their role in the Federal system. Offered in alternate years.

203A. American Government: The Presidency (4)
Seminar—4 hours. Thorough overview of the current research on political executives, with particular emphasis on the American presidency. Two principal goals: the development of important and innovative student research programs; and adequate preparation for qualifying examinations.—II. (II.)

203B. American Government: Congress (4)
Seminar—4 hours. Thorough overview of the current research on Congress, with particular emphasis on political representation. Two principal goals: the development of important and innovative student research programs; and adequate preparation for qualifying examinations.—III.

203C. American Government: Courts (4)
Seminar—4 hours. Survey and analysis of the literature in the field of American government with a focus on courts. Emphasis on the development and testing of theories of behavior and processes.

207. Environmental Public Policy (4)
Seminar—4 hours. Analysis of the interface between the world of academic reflection about ecological and environmental problems and the world of political action. Evaluation of alternative approaches to policy analysis and recommendation. Individual research, including field research, will parallel discussion of the literature.

208. Policy Analysis (4)
Seminar—4 hours. Social science techniques applied to public policy formation and evaluation.—II. (II.)

209. The American Political System (4)
Seminar—4 hours. Analysis of selected theoretical and empirical issues posed by contemporary research in American government and politics.—II.

211. Research Methods in Political Science (4)
Seminar—4 hours. Prerequisite: Statistics 13; graduate standing or permission of instructor. Introduction to philosophy of science, research design for experimental and quasi-experimental settings, and data analysis. Topics include: logic of empirical research, measurement problems, research design, sampling, descriptive statistics, tabular analysis, measures of association, and introduction to correlation and regression.—I.

212. Quantitative Analysis in Political Science (4)
Seminar—4 hours. Prerequisite: course 211. Topics usually covered in an introductory statistics course with an emphasis on applications in political science—descriptive statistics for samples, probability and probability distributions, hypothesis testing, ANOVA, bivariate regression, and introduction to multiple regression.—II.

213. Quantitative Analysis in Political Science II (4)
Seminar—4 hours. Prerequisite: courses 211, 212. More advanced topics in the use of statistical methods, with emphasis on political applications. Topics include: properties of least squares estimates, problems in multiple regression, and advanced topics (probit analysis, simultaneous models, time-series analysis, etc.).—III.

214A. Research in Political Science (4)
Discussion—2 hours; lecture—1 hour; term paper. Prerequisite: course 213. Research seminar sequence required of all Ph.D. students. Design, execution, and defense of an original piece of research in political science, culminating in a paper of publishable quality. (Deferred grading only, pending completion of sequence.)—II. (II.) Highton

214B. Research in Political Science (2)
Seminar—2 hours. Prerequisite: courses 211, 212. Research seminar sequence required of all Ph.D. students. Design, execution and defense of an original piece of research in political science, culminating in a paper of publishable quality. (Deferred grading only, pending completion of sequence.)—II, III.

215. Introduction to Modeling Political Behavior (4)
Seminar—3 hours. Prerequisite: courses 211 and 212. Introduction to formal and game theoretic analyses of politics. Students will learn basic game theory and modeling skills. We examine the benefits of modeling, and look at examples of formal analysis in a variety of political science sub-fields. Offered in alternate years.—I.

216. Qualitative Research Methods (4)
Seminar—3 hours; term paper. Methodology for utilizing theoretically-oriented case studies and controlled comparison of a small number of cases to develop and test theories. Examination of how the case study method compliments experimental, statistical and deductive modes of research. Offered in alternate years.

217. Social Choice Theory and Spatial Modeling (4)
Seminar—4 hours. Introduction to social choice theory and formal spatial modeling including Arrow's Theorem, the paradox of voting, cycling and agenda control. Focus on mastering modeling techniques as well as interpretation of classic works. Offered in alternate years.

218. Topics in Political Theory (4)
Seminar—3 hours; term paper. Topics will vary and may be the work of a single theorist, time period, or political concept, such as justice. Offered in alternate years.—II.

219A. Political Theory Sequence (4)
Seminar—3 hours; term paper. Survey of the great works in ancient and medieval political theory including such writers as Plato, Aristotle, Cicero, St. Augustine, Aquinas, Alfarabi and Marsilius. Discussion of various interpretations of these authors. Offered in alternate years.—II.

219B. Political Theory Sequence (4)
Seminar—3 hours; term paper. Survey of the great works in early modern to contemporary political theory including such writers as Machiavelli, Hobbes, Locke, Rousseau, Marx, Mill, Nietzsche, and Rawls. Discussion of various interpretations of these authors. Offered in alternate years.—I. (III.)

220. Seminar in Political Theory (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Introduction to political theory and current debates over its study. Readings from and textual interpretations of political theory including the Federalist Papers and major works by thinkers such as Plato, Aristotle, Machiavelli, Hobbes, Locke, Rousseau, and Rawls. Other readings addressing issues of textual interpretation.—I.

223. International Relations (4)
Seminar—3 hours; term paper.—I.

225. The International System (4)
Seminar—3 hours; term paper. Analysis of the international system by means of theory formulation and integration; critique of research designs; use of various techniques of data generation and analysis.—III.

226. Seminar in International Political Economy (4)
Seminar—4 hours. Research in international political economy. Structure of the global economy, as well as specific dimensions of international economic relations, including trade, capital flows, global production structures, and migration. Offered in alternate years.—III.

230. American Foreign Policy (4)
Seminar—3 hours; term paper.—III.

231. U.S. Political Culture and Foreign Relations (4)
Seminar—3 hours; term paper. Relates U.S. political culture to formulation of foreign policy. Analyzes American ideological preferences in historical perspective, contemporary public opinion, decision-making and implementation. Concludes by examining linkages between foreign policy behavior and democratic process. Offered in alternate years.—II.

241. Communist Political Systems (4)
Seminar—4 hours. Prerequisite: course 141 or the equivalent, or consent of instructor. Systematic analysis of selected topics dealing with the political process of communist political systems.

242. Seminar in Comparative Politics (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Systematic survey of theories and methods used in the study of comparative politics.

243. Comparative Institutional Change (4)
Seminar—4 hours. Comparison of institutional changes in countries of the former Soviet Union and Eastern Europe during the period of transition to democracy. Special attention to institutions of mass representation—electoral and party systems and national legislatures. Offered in alternate years.

246. Policymaking in Third-World Societies (4)
Seminar—3 hours. Prerequisite: graduate standing or consent of instructor. Included in an analysis of policymaking process in Third-World countries are such topics as political resources, institutional resources, decision making, resource allocations, planning, and budgeting, implementation, and distribution of world resources. Offered in alternate years.

250. Policy Development and Impact in U.S. Courts (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Thorough overview of the literature regarding courts as policymaking institutions of government, with emphasis on the formation and implementation of judicial policy. Differences and similarities across the judicial, congressional, and executive branch policy processes. Offered in alternate years.

260. Political Parties (4)
Seminar—3 hours; term paper. Survey of selected topics in American and comparative parties.

261. Political Behavior (4)
Seminar—3 hours; term paper. Survey of selected topics in political behavior and public opinion.—III.

274. Political Economy (4)
Seminar—4 hours. Politics of economic policy as reflected in taxation, spending and regulation; impact of prices, employment, and growth on political demands; government responses to economic conditions; electoral politics and the political business cycle. Offered in alternate years.—III.

283. Organizational Behavior (4)
Seminar—4 hours. Organizational behavior as it relates to public sector decision making.

290A. Research in American Government and Public Policy (4)
Seminar—4 hours. Special research seminar on selected problems and issues in the study of American government and public policy. May be repeated up to 6 times for credit if taught by different instructor.—I, II, III

290B. Research in Political Theory (4)
Seminar—4 hours. Special research seminar on selected problems and issues in the study of political theory.—I, II, III.

290C. Research in International Relations (4)
Seminar—4 hours. Special research seminar on selected problems and issues in the study of international relations.—I, II, III.

290D. Research in Judicial Politics (4)
Seminar—4 hours. Prerequisite: graduate standing in political science or consent of instructor. Contemporary research on judicial politics, judicial institutions, jurisprudence, and judicial behavior.—I, II, III.

290E. Research in Political Parties, Politics, and Political Behavior (4)
Seminar—4 hours. Special research seminar on selected problems and issues in the study of political parties, politics, and political behavior.—I, II, III.

290F. Research in Comparative Government and Policy (4)
Seminar—4 hours. Special research seminar on selected problems and issues in the study of comparative government and policy.—I, II, III.

297. Internships in Political Science (2)
Seminar—2 hours. Prerequisite: open only to persons who have internships or other positions in governmental agencies, political parties, etc. Application and evaluation of theoretical concepts through work experience or systematic observation in public and political agencies. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

299D. Directed Reading (1-12)
(S/U grading only.)

Professional Courses

390. The Teaching of Political Science (1)
Seminar—1 hour. Prerequisite: graduate student standing in Political Science. Methods and problems of teaching political science at the undergraduate level. (S/U grading only.)—I, II, III.

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III.

Pomology

(College of Agricultural and Environmental Sciences)

Vito S. Polito, Ph.D., Chairperson of the Department

Department Office, 1035 Wickson Hall (530-752-0123)

http://pom.ucdavis.edu

Faculty

Eduardo Blumwald, Ph.D., Professor
Patrick H. Brown, Ph.D., Professor
Abhaya M. Dandekar, Ph.D., Professor
Theodore M. DeJong, Ph.D., Professor
Thomas M. Gradziel, Ph.D., Professor
Kentaro Inoue, Ph.D., Assistant Professor
Adel A. Kader, Ph.D., Professor
John M. Labavitch, Ph.D., Professor
Vito S. Polito, Ph.D., Professor
Daniel Potter, Ph.D., Associate Professor
Kenneth A. Shackel, Ph.D., Professor
Douglas V. Shaw, Ph.D., Professor
Ellen G. Sutter, Ph.D., Professor
Steven A. Weinbaum, Ph.D., Professor

Affiliated Faculty

Carlos H. Crisosto, Ph.D., Lecturer
Louise Ferguson, Ph.D., Lecturer
Scott Johnson, Ph.D., Lecturer
Gale McGranahan, Ph.D., Lecturer
Elizabeth J. Mitcham, Ph.D., Lecturer
Dan E. Parfitt, Ph.D., Lecturer
Stephen M. Southwick, Ph.D., Lecturer

Emeriti Faculty

Fredrick A. Bliss, Ph.D., Professor Emeritus
Royce S. Bringhurst, Ph.D., Professor Emeritus
Robert M. Carlson, Ph.D., Lecturer Emeritus
Peter B. Catlin, Ph.D., Lecturer Emeritus
William H. Griggs, Ph.D., Professor Emeritus
George C. Martin, Ph.D., Professor Emeritus
Warren C. Micke, M.S., Lecturer Emeritus
F. Gordon Mitchell, M.S., Lecturer Emeritus
David E. Ramos, Ph.D., Lecturer Emeritus
Roger J. Romani, Ph.D., Professor Emeritus
Kay Ryugo, Ph.D., Professor Emeritus
Kiyoto Uriu, Ph.D., Professor Emeritus

Related Major Programs. See the majors in Plant Biology, Agricultural Management and Rangeland Resources, Crop Science and Management, and Biotechnology.

Related Courses. Pomology faculty also teach the following courses that contribute to majors and graduate programs in Agricultural Management and Rangeland Resources, Horticulture, and Plant Biology:

Agricultural Management and Rangeland Resources 1, 98, 107, 160, 170A, 170B, Biological Sciences 1C, Horticulture 203, Hydrologic Science 124, Integrated Studies 9, Plant Biology 119, 144, 151, 153, 158, 160, 161A, 171, 172, 172L, 173, 174, 175, 196, 201, 202, 208, 214, 290A, 291, 293, Science and Society 90C, 90F, 90X.

Graduate Study. For graduate study related to the field of pomology, see the M.S. degree program in Horticulture and Agronomy, International Agricultural Development, and the M.S. and Ph.D. degree programs in the graduate groups of Plant Biology, Ecology, and Genetics.

Courses in Pomology (POM)

Lower Division Courses

10. Fruits and Nuts of California and the World (3)
Lecture—3 hours. Field trip on seventh Saturday of quarter (1/2 day). Biological and environmental principles of tree-crop agriculture emphasizing California production. Topics include temperate and subtropical species, biotechnology and genetic improvement, environmental physiology, plant and crop growth, pest and disease control, consumer issues. GE credit: SciEng.—II. Polito

92. Internship in Pomology (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience on and/or off campus in the production and management of orchard crops or closely related enterprises. (P/NP grading only.)

Upper Division Courses

162. Field Course in Tropical Ecology and Sustainable Agricultural Development (13)
Lecture—15 hours; discussion—7.5 hours; fieldwork—30 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Students accepted based on academic merit, personal experience, and academic discipline to provide a multidisciplinary atmosphere. Course in Panama. Sustainable agricultural systems to protect tropical rainforest ecosystems, sustainable agriculture in the Panama Canal watershed, language and culture of Panama and the U.S.A. (Same course as International Agricultural Development 162.) GE credit: SciEng, Div, Wrt.—Brown

192. Internship in Pomology (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience on and off campus in the production and management of orchard crops or closely related enterprises. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

212. Postharvest Biology and Biotechnology of Fruits and Nuts (3)
Lecture—3 hours. Prerequisite: Plant Science 112 or the equivalent. Review of postharvest biology of fruits and nuts in relation to biotechnological procedures used in handling, emphasizing research needs. Offered in alternate years.—(III.) Kader, Mitcham

290. Seminar (1)
Seminar—1 hour. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Population Biology (A Graduate Group)

Peter Wainwright, Ph.D., Chairperson of the Group

Group Office, 2320 Storer Hall (530-752-1274)

http://www-eve.ucdavis.edu/eve/pbg/

Faculty

David J. Begun, Ph.D., Associate Professor
Monique Borgerhoff Mulder, Ph.D., Professor
Louis W. Botsford, Ph.D., Professor
Tim Caro, Ph.D., Professor
Peter L. Chesson, Ph.D., Professor
John H. Gillespie, Ph.D., Professor
Leslie D. Gottlieb, Ph.D., Professor
James R. Griesemer, Ph.D., Professor
Richard K. Grosberg, Ph.D., Professor
Susan P. Harrison, Ph.D., Professor
Alan M. Hastings, Ph.D., Professor
Richard Karban, Ph.D., Professor
Artyom Kopp, Ph.D., Assistant Professor
Charles H. Langley, Ph.D., Professor
Sharon P. Lawler, Ph.D., Associate Professor
Sergey V. Nuzhdin, Ph.D., Associate Professor
Robert E. Page, Ph.D., Professor
Marcel Rejmánek, Ph.D., Professor
Kevin J. Rice, Ph.D., Professor
Jay A. Rosenheim, Ph.D., Professor
Michael J. Sanderson, Ph.D., Professor
Thomas W. Schoener, Ph.D., Professor
Mark W. Schwartz, Ph.D., Professor
H. Bradley Shaffer, Ph.D., Professor
Arthur M. Shapiro, Ph.D., Professor
Andrew Sih, Ph.D., Professor
John J. Stachowicz, Ph.D., Assistant Professor
Judy A. Stamps, Ph.D., Professor
Maureen L. Stanton, Ph.D., Professor
Sharon Y. Strauss, Ph.D., Professor
Donald R. Strong, Ph.D., Professor
Catherine A. Toft, Ph.D., Professor
Michael Turelli, Ph.D., Professor
Geerat J. Vermeij, Ph.D., Professor
Peter C. Wainwright, Ph.D., Professor
Philip S. Ward, Ph.D., Professor
Truman P. Young, Ph.D., Professor

Emeriti Faculty

Timothy G. Prout, Ph.D., Professor Emeritus
Hugh Dingle, Ph.D., Professor Emeritus

Graduate Study. The Graduate Group in Population Biology emphasizes programs of study and research leading to the Ph.D. degree. The Group concentrates on population biology as the broad discipline that blends ecology, evolution, population genetics and systematics into a unified field. The course curriculum consists of first-year core courses offered by the Group faculty, seminars, and advanced courses in population biology, and related disciplines, chosen in consultation with a guiding committee.

Graduate Adviser. Consult the Population Biology Graduate Group Office.

Courses in Population Biology (PBG)

Graduate Courses

200A. Principles of Population Biology (5)
Lecture—3 hours; discussion—2 hours. Prerequisite: course 231 concurrently and consent of instructor. Principles of single-species ecology and evolution. Topics include ecology of individuals, population growth models, structured populations, life history strategies, stochastic populations, basic population genetics theory, deleterious alleles in natural populations, and molecular population genetics.—I. (I.)

200B. Principles of Population Biology (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: course 200A, 231. Principles of multi-species communities. Topics include competition, mutualism, metapopulations, food webs and trophic cascades, interactions between simple ecological communities, island biogeography, succession, and large-scale patterns.—II. (II.)

200C. Principles of Population Biology (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: course 200B. Principles of microevolution and macroevolution. Topics include evolutionary quantitative genetics, analysis of hybrid zones, speciation, the fossil record, biogeography, and phylogeny reconstruction.—III. (III.)

203. Advanced Evolution (3)
Lecture—1 hour; discussion—2 hours. Prerequisite: graduate standing. Adaptation and speciation, and biochemical and morphological evolution in plants and animals with emphasis on the appropriateness of different methods of analysis. Offered in alternate years.—(II.)

206. Ecology of Insect Parasitoids (4)
Lecture—3 hours; seminar—1 hour. Prerequisite: introductory animal ecology or behavior. Insect parasitoids will be investigated as model systems to address current topics in behavioral, population, and evolutionary ecology. Theory will be synthesized and critical empirical tests of ecological hypotheses emphasized. (Same course as Entomology 206.) Offered in alternate years.

207. Plant Population Biology (3)
Lecture—2 hours; laboratory/discussion—1 hour. Prerequisite: advanced undergraduate ecology course (e.g., Environmental Science and Policy 100, Evolution and Ecology 101, Entomology 104, Plant Biology 117), and advanced undergraduate course in genetics and/or evolution (e.g., Biological Sciences 101 or Evolution and Ecology 100). Introduction to theoretical and empirical research in plant population biology. Emphasis placed on linking ecological and genetic approaches to plant population biology. (Same course as Ecology 207.) Offered in alternate years.—II. Rice

212. Topics in Invertebrate Evolution (2)
Seminar—2 hours. Prerequisite: graduate standing or consent of instructor and Evolution and Ecology 112-112L; courses in evolutionary biology, systematics, and ecology highly recommended. Advanced seminar that critically examines problems relevant to evolutionary patterns among the invertebrates. May be repeated for credit when topic differs. (S/U grading only.)—III. (III.) Grosberg, Stachowicz

220. Spatio-Temporal Ecology (2)
Lecture/discussion—2 hours. Prerequisite: course 200B or Ecology 204 or Evolution and Ecology 104 or Environmental Science and Policy 121 or consent of instructor. Spatiotemporal ecological theory focusing on population persistence and stability, predator-prey and host-parasitoid interactions, species coexistence and diversity maintenance, including effects of environmental variation, spatial and temporal scale, life-history traits and nonlinear dynamics. Topics vary. (Same course as Ecology 220.) May be repeated once for credit. (S/U grading only.)—II. Chesson

221. Animal Behavior, Ecology and Evolution (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 102, Evolution and Ecology 100, 101 or the equivalent, graduate standing, and consent of instructor. The interface between animal behavior, ecology and evolution. New developments in behavioral ecology and development and testing of hypotheses in this discipline. (Same course as Animal Behavior 221.)—I. (I.) Stamps

224. Field Reconnaissance for Population Biologists (2)
Fieldwork—6 hours. Prerequisite: graduate student in Population Biology, or consent of instructor. Biweekly field trips to acquaint students with plant and animal communities, biodiversity, and ecological and evolutionary research opportunities in northern and central California. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

225. Terrestrial Field Ecology (4)
Seminar—1 hour; field work—12 hours. Prerequisite: introductory ecology and introductory statistics, or consent of instructor. A field course conducted over spring break and four weekends at Bodega Bay emphasizing student projects. Ecological hypothesis testing, data gathering, analysis, and written and oral presentation of results will be stressed. (Same course as Ecology/Entomology 225.)—III. (III.) Karban

231. Mathematical Methods in Population Biology (3)
Lecture—3 hours. Prerequisite: Mathematics 16C or 21C or the equivalent. Mathematical methods used in population biology. Linear and nonlinear difference equation and differential equation models are studied, using stability analysis and qualitative methods. Partial differential equation models are introduced. Applications to population biology models are stressed. (Same course as Ecology 231.)—I. (I.) Hastings

270. Research Conference in Evolutionary Biology (1)
Seminar—1 hour. Prerequisite: consent of instructor. Critical presentation and evaluation of current literature and ongoing research in evolutionary biology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

287. Advanced Animal Behavior (2)
Seminar—2 hours. Prerequisite: graduate standing and consent of instructor, courses in animal behavior (Neurobiology, Physiology, and Behavior 102 or the equivalent), and either evolution (Evolution and Ecology 100 or the equivalent) or ecology (Evolution and Ecology 101 or the equivalent). Reading, reports and discussion on current topics in animal behavior, with a focus on topics that lie at the interface between animal behavior, ecology and evolution. (Same course as Animal Behavior 287.) May be repeated twice for credit.—III. (III.) Stamps

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Seminars presented by visiting lecturers, UCD graduate students and faculty. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Conference in Population Biology (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor; concurrent enrollment in course 299. Presentation and discussion of faculty and graduate student research in population biology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

292. Topics in Ecology and Evolution (1)
Seminar—1 hour. Prerequisite: graduate standing. Seminar presented by visiting lecturers, UC Davis faculty and graduate students. May be repeated for credit. (Same course as Ecology 296.) (S/U grading only.)—I, II, III. (I, II, III.)

296. Seminar in Geographical Ecology (2)
Seminar—2 hours. Prerequisite: Evolution and Ecology 100 or 101 or consent of instructor. Recent developments in theoretical and experimental biogeography, historical biogeography and related themes in systematics, the biology of colonizing species, and related topics. May be repeated for credit. (S/U grading only.)—III. (III.) Shapiro

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Population Health and Reproduction

See Veterinary Medicine, School of

Precision Agriculture

(College of Agricultural and Environmental Sciences)

The Department of Biological and Agricultural Engineering offers a minor in Precision Agriculture, the latest farming concept that optimizes fertilizer, pesticide and water use, while minimizing environmental concerns.

Minor Program Requirements:

This minor acquaints students with recent developments and their applications to agriculture, in geographic information systems (GIS), global positioning systems (GPS), variable rate technologies (VRT), crop and soil sensors, and remote sensing. The minor prepares students for challenging positions in site-specific crop management as we enter the "information age" in agriculture.

	UNITS
Precision Agriculture	**20**
Applied Biological Systems Technology 145, 175, 180	10
Select 10 or more units from Agricultural Management and Rangeland Resources 120 or Statistics 100, Agricultural Management and Rangeland Resources110A or Plant Biology 112, Environmental and Resource Sciences 186, Soil Science 109	10

Minor Advisers. S.K. Upadhyaya, D.K. Giles.

Preventive Veterinary Medicine

See Veterinary Medicine, School of

Psychiatry

See Medicine, School of

Psychology

(College of Letters and Science)

Phillip R. Shaver, Ph.D., Chairperson of the Department

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Shelley Blozis, Ph.D., Assistant Professor
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John P. Capitanio, Ph.D., Associate Professor
Cameron S. Carter, M.D., Professor *(Psychiatry and Behavioral Sciences)*
Richard G. Coss, Ph.D., Professor
Robert A. Emmons, Ph.D., Professor
Emilio Ferrer, Ph.D., Assistant Professor
Gail S. Goodman, Ph.D., Professor
Albert A. Harrison, Ph.D., Professor
Kenneth R. Henry, Ph.D., Professor
Gregory M. Herek, Ph.D., Professor
Joel T. Johnson, Ph.D., Professor

Neal E. A. Kroll, Ph.D., Professor
Leah A. Krubitzer, Ph.D., Professor
Kristin Lagattuta, Ph.D., Assistant Professor
Debra L. Long, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
George R. Mangun, Ph.D., Professor
Sally P. Mendoza, Ph.D., Professor
Donald H. Owings, Ph.D., Professor
Robert B. Post, Ph.D., Professor
Charan Ranganath, Ph.D., Assistant Professor
Susan Rivera, Ph.D., Assistant Professor
Richard W. Robins, Ph.D., Associate Professor
Jeffrey Schank, Ph.D., Associate Professor
Phillip R. Shaver, Ph.D., Professor
Dean K. Simonton, Ph.D., Professor, *UC Davis Prize for Teaching and Scholarly Achievement*
Stanley Sue, Ph.D., Professor, *UC Davis Prize for Teaching and Scholarly Achievement*
Tamara Swaab, Ph.D., Assistant Professor
Ross Thompson, Ph.D., Professor
Matthew Traxler, Ph.D., Assistant Professor
Keith F. Widaman, Ph.D., Professor
Ewa Wojciulik, Ph.D., Assistant Professor
Andrew P. Yonelinas, Ph.D., Professor
Nolan Zane, Ph.D., Professor

Emeriti Faculty

Linda P. Acredolo, Professor Emerita
Jarvis R. Bastian, Ph.D., Professor Emeritus
William F. Dukes, Ph.D., Professor Emeritus
Alan C. Elms, Ph.D., Professor Emeritus
Karen P. Ericksen, Ph.D., Professor Emerita
Peter R. Marler, Ph.D., Professor Emeritus
William A. Mason, Ph.D., Professor Emeritus
G. Mitchell, Ph.D., Professor Emeritus
Robert M. Murphey, Ph.D., Professor Emeritus
Thomas Natsoulas, Ph.D., Professor Emeritus
Theodore E. Parks, Ph.D., Professor Emeritus
Robert Sommer, Ph.D., Professor Emeritus
Charles T. Tart, Ph.D., Professor Emeritus

Affiliated Faculty

Jacqueline Horn, Ph.D., Lecturer
Joanna Scheib, Ph.D., Adjunct Assistant Professor

The Major Programs

The psychology program at UC Davis is broad and includes students and faculty with a variety of interests. The department has developed around five major areas of emphasis: Developmental Psychology, which involves the study of changes in behavior and abilities that occur as development proceeds and includes such topics as imaging the developing brain, development of self esteem, problem solving, attachment theory, symbolic representation in infants and children, development of children's understanding of mental states; Perception-Cognition, which involves the study of awareness and thought, and includes such topics as perception, learning, memory, and consciousness; Psychobiology, which involves the study of the biological correlates of behavior and includes such topics as physiological psychology, sensory processes, health psychology, and animal behavior; Social-Personality Psychology, which involves the study of the individual in his or her social environment and includes such topics as personality theory, abnormal psychology, individual differences, developmental psychology, and social psychology; and Quantitative which involves the study of linear models and psychometrics which includes topics, such as experimental design and the analysis of variance, regression analysis, and multivariate analysis.

The department offers the Bachelor of Arts (A.B.) program for students interested in the liberal arts and the Bachelor of Science (B.S.) program geared for students with an interest in either biology or mathematics. The main objective of both programs is a broad introduction to the scope of contemporary psychology. In addition to completing a number of common core courses for their degree, students may take specialty courses on such far-ranging topics as sex differences, genius and creativity, environmental awareness, and organization psychology. The department strongly encourages students to become involved in individual research projects under the direction of faculty members and to participate in our internship program to broaden your experiences and understanding of the field of psychology.

Preparatory Requirements. Before declaring a major in psychology, students must complete the following courses with a combined grade point average of at least 2.50. All courses must be taken for a letter grade. (Students in the Bachelor of Science, Biology program must complete Biological Sciences 1A.):

Psychology 1, 41 ..... 8 units
Statistics 13 or 102 ..... 4 units
Biological Sciences 1A
or
Biological Sciences 10 and one course from Anthropology 1, Molecular and Cellular Biology 10, Neurobiology, Physiology, and Behavior 10 ..... 5 or 8 units
Sociology or cultural anthropology ..... 4 units

Career Alternatives. A degree in psychology provides broad intellectual foundations which are useful to the graduate for the development of careers in a variety of areas, including social work, the ministry, teaching, business, and counseling. An undergraduate education in psychology also provides excellent preparation for graduate study. Individuals with degrees in psychology may enter graduate programs to prepare for teaching, research, or clinical/counseling careers in psychology, or may go on to professional schools for training in veterinary and human medicine, law, and other professions.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 21-25
Psychology 1 or the equivalent 4
Psychology 41 4
Statistics 13 or 102 4
(Strongly recommended that Psychology 41 and Statistics 13 or 102 be completed in the first year.)
Biological Sciences 1A; or a combination of Biological Sciences 10 and one course from Anthropology 1, Molecular and Cellular Biology 10, or Neurobiology, Physiology, and Behavior 10 5-8
One course in sociology or cultural anthropology (may be lower or upper division), minimum of 4 units 4-5

Depth Subject Matter 40
Two courses from two of the following four groups and one course from the remaining two groups 23-24
Group A: Psychology 100, 130, 131, 132, 135
Group B: Psychology 101, 113, 121, 122, 123, 126, 127, 129
Group C: Psychology 151, 154, 162, 168
Group D: Psychology 140 (or Human Development 100A or 100B), Psychology 141/Human Development 101, Psychology 142/Human Development 102
Additional units to achieve a total of 40 upper division units in psychology 16-17
(A maximum of 12 approved upper division Human Development units can be credited toward satisfaction of the 40-unit requirement.)

Total Units for the Major 61-65

Biology Emphasis

B.S. Major Requirements:

..... UNITS

Preparatory Subject Matter 52-61
Psychology 1 or the equivalent 4
Psychology 41 4
Statistics 13 or 102 4
(Strongly recommended that Psychology 41 and Statistics 13 or 102 be completed in the first year.)
Mathematics 16A-16B or 17A-17B or 21A-21B 6-8
Physics 10 or 7A-7B 4-8
Biological Sciences 1A, 1B 10
Chemistry 2A, 2B 10
Chemistry 8A-8B or 118A-118B or 128A-128B 6-8
One course in sociology or cultural anthropology (may be lower or upper division), minimum of 4 units 4-5

Depth Subject Matter 49
Seven Psychology courses distributed as specified:
Group A: two courses from Psychology 100, 130, 131, 132, 135 8
Group B: three courses from Psychology 101, 113, 121, 122, 123, 126, 127, 129 11-12
Group C: one course from Psychology 151, 154, 162, 168 4
Group D: one course from Psychology 140 (or Human Development 100A or 100B), Psychology 141/Human Development 101, Psychology 142/Human Development 102 4
Additional units to achieve a total of 40 upper division units in psychology 12-13
(A maximum of 12 approved upper division Human Development units can be credited toward satisfaction of the 40-unit requirement.)
Biological Sciences 101 4
Neurobiology, Physiology, and Behavior 101 5

Total Units for the Major 101-110

Recommended
Psychology 180B, 199 (on a psychobiological topic), Anthropology 154A, Environmental Science and Policy 110, Evolution and Ecology 100, 101.

Mathematics Emphasis

B.S. Major Requirements

..... UNITS

Preparatory Subject Matter 45-59
Psychology 1 or the equivalent 4
Psychology 41 4
Statistics 13 or 102 4
(Strongly recommended that Psychology 41 and Statistics 13 or 102 be completed in the first year.)
Mathematics 21A, 21B, 21C, ... 12
Computer Science Engineering 30 or Engineering 5 4
Chemistry 10 or 2A-2B or 2AH-2BH 4-10
Physics 10 or 7A-7B 4-8
Biological Sciences 1A; or a combination of Biological Sciences 10 and one course from Anthropology 1, Molecular and Cellular Biology 10, or Neurobiology, Physiology, and Behavior 10 5-8
One course in sociology or cultural anthropology (may be lower or upper division), minimum of 4 units 4-5

Depth Subject Matter..... 48
Five Psychology courses, distributed as specified:
Group A: two courses from 100, 130, 131, 132, 135 8
Group B: two courses from Psychology 101, 113, 121, 122, 123, 126, 127, 129 7-8
Group C: one course from Psychology 151, 154, 162, 168
or
Group D: one course from Psychology 140 (or Human Development 100A or 100B), Psychology 141/Human Development 101, Psychology 142/Human Development 102..... 4
Additional units to achieve a total of 40 upper division units in psychology 11-12
(A maximum of 12 approved upper division Human Development units can be credited toward satisfaction of the 40-unit requirement.)
Psychology 103A..... 5
One course from Psychology 103B, 104, or the equivalent..... 4
One course sequence from Statistics 106–108, 130A-130B, 131A-131B 8
Total Units for the Major 93-107

Recommended for All Majors
Students who plan to do graduate work in any area of psychology are strongly encouraged to complete Statistics 13 and Psychology 103A or both Statistics 13 and 102. Psychology 41 is a prerequisite for most upper division courses. Psychology 41 and Statistics 13 or 102 should be completed in the first year.

Major Advisers. S. Blozis, S. Bunge, J.P. Capitanio, C.S. Carter, R.G. Coss, R.A. Emmons, E. Ferrer, G.S. Goodman, A.A. Harrison, K.R. Henry, G.M. Herek, J.T. Johnson, N.E.A. Kroll, L.A. Krubitzer, K. Lagattuta, D.L. Long, G.R. Mangun, S.P. Mendoza, D.H. Owings, , R.B. Post, C. Ranganath, S. Rivera, R.W. Robins, P.R. Shaver, D.K. Simonton, , S. Sue, T. Swaab, R. Thompson, M. Traxler, K.F. Widaman, E. Wojciulik, A.P. Yonelinas, N.W. Zane.

Human Development course credit. Human Development 100A, 100B, 100C, 101, 102, 120, and 121 can be used toward satisfying the 40-unit upper division major requirement to a maximum of 12 units. Students who have completed Human Development 100A or 100B will receive 2 units of credit for Psychology 140.

Minor Program Requirements:

UNITS

Psychology 24
Psychology 1 or the equivalent..... 4
One course from each of the following four groups..... 15-16
Group A: Psychology 100, 130, 131, 132, 135
Group B: Psychology 101, 113, 121, 122, 123, 126, 127, 129
Group C: Psychology 151, 154, 162, 168
Group D: Psychology 140, 141, 142
Additional units to achieve a total of 20 upper division units..... 4-5
One course selected from Human Development 100A, 100B, 100C, 101, 102, 120, 121 can be used toward satisfying the minor upper division unit requirement.

Honors and Honors Program. In order to be eligible for high or highest honors in Psychology, the student must both meet the college criteria and complete a research project involving a minimum of six units of course work over at least two quarters which represents an original analysis of data on psychological phenomena. Course 194HA-194HB or other approved courses can be used to satisfy the unit requirement. This project is to be written in thesis form and approved by the department. The quality of the thesis work will be the primary determinant for designating high or highest honors at graduation.

Graduate Study. The Department offers programs of study and research leading to the Ph.D. degree in psychology. Detailed information regarding graduate study may be obtained by writing the Graduate Adviser, Department of Psychology.

Graduate Adviser. See *Class Schedule and Registration Guide*.

Courses in Psychology (PSC)

Lower Division Courses

1. General Psychology (4)
Lecture—4 hours. Introduction emphasizing empirical approaches. Focus on perception, cognition, personality and social psychology, and biological aspects of behavior. Only 2 units of credit allowed for students who have completed course 15 or 16. Not open for credit to students who have completed course 15 and 16. GE credit: SocSci.—I, II, III. (I, II, III.) Shaver, Johnson, Capitanio, Thompson, Traxler

20. Freshman Psychology Seminar (4)
Seminar—4 hours. Prerequisite: freshman standing. Instructor will acquaint students with his or her program of research, the development of scientific questions from the literature, and the application of research methods to examine these questions. Critical thinking will be encouraged via expository writing and brief presentations.

41. Research Methods in Psychology (4)
Lecture—3 hours; autotutorial. Prerequisite: course 1 or the equivalent; Statistics 13 or 102 recommended. Introduction to experimental design, interviews, questionnaires, field and observational methods, reliability, and statistical inference.—I, II, III. (I, II, III.)

90X. Lower Division Seminar (1-2)
Seminar—1-2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Psychology through shared readings, discussions, written assignments, or special activities such as fieldwork or laboratory work. May not be repeated for credit. Limited enrollment.

98. Directed Group Study (1-5)
Primarily for lower division students. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)
(P/NP grading only.)

Upper Division Courses

100. Introduction to Cognitive Psychology (4)
Lecture—4 hours. Prerequisite: courses 1 and 41. Introduction to human information processing, mental representation and transformation, imagery, attention, memory, language processing, concept formation, problem solving, and computer simulation. Not open for credit to students who have completed former course 136.—I, II, III. (I, II, III.) Kroll, Long

101. Introduction to Psychobiology (4)
Lecture—4 hours. Prerequisite: courses 1, 41. Survey and integration of the relationships between behavior and biological processes, including physiology, genes, development, ecology, and evolution.—I, II, III. (I, II, III.) Coss, Henry, Krubitzer, Owings, Schank

103A. Statistical Analysis of Psychological Data (5)
Lecture—4 hours; laboratory—2 hours; term paper. Prerequisite: course 1, 41 and Statistics 13 or 102. Pass 1 open to Psychology majors. Design and statistical analysis of psychological investigations and the interpretation of quantitative data in psychology. Not open for credit to students who have completed course 103.—I. (I.) Widaman, Blozis

103B. Statistical Analysis of Psychological Data (4)
Lecture—4 hours. Prerequisite: course 103A and Statistics 13 or 102. Pass 1 open to Psychology majors. Probability theory, sampling distributions, hypothesis testing, statistical inference, one-way and two-way analysis of variance, nonparametric statistics, with applications in psychology. Not open for credit to students who have completed course 105.—II, III. (II, III.) Widaman, Blozis, Ferrer

104. Applied Psychometrics: An Introduction to Measurement Theory (4)
Lecture—4 hours. Prerequisite: upper division standing in Psychology, courses 41 and 103, Statistics 13. Examination of the basic principles and applications of classical and modern test theory. Topics include test construction, reliability theory, validity theory, factor analysis and latent trait theory.

109. Interactive Computer Programming for Psychological Experiments (4)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 41 and one of course 100, 130, or 132 and consent of instructor. Instruction in programming with an emphasis on programming desktop computers as an interactive research tool. Not open for credit to students who have completed course 181. (Former course 181.)—Kroll

113. Developmental Psychobiology (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 101. The biology of behavioral development; survey and integration of the organismic and environmental processes that regulate the development of behavior.—I, II. (II, III.) Mendoza, Schank, Owings

121. Physiological Psychology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 1, 41, 101. Pass 1 open to Psychology majors. Relationship of brain structure and function to behavior, motivation, emotion, language, and learning in humans and other animals. Methodology of physiological psychology and neuroscience. Not open for credit to students who have completed course 108. (Former course 108.)—I, II, III. (I, II, III.) Henry, Krubitzer, Mendoza

122. Advanced Animal Behavior (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 101 or Neurobiology, Physiology, and Behavior 102. Pass 1 open to Psychology majors. Advanced integrative survey of biological principles of behavioral organization, emphasizing historical roots, current research directions, conceptual issues and controversies. Laboratory exercises on the description and analysis of the behavior of captive and free living animals. (Same course as Neurobiology, Physiology, and Behavior 150.) Not open for credit to students who have completed course 150. (Former course 150.)—III. (III.) Owngs, Scheib

123. Hormones and Behavior (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101 and either course 101 or Neurobiology, Physiology, and Behavior 102. Pass 1 open to Psychology majors. Endocrine physiology with an emphasis on the principles of behavior. Fundamental relationships between hormones and various behaviors engaged in by the organism during its lifetime. Role of hormones in behavioral homeostasis, social behavior, reproductive behavior, parental behavior, adaptation to stress. (Same course as Neurobiology, Physiology, and Behavior 152.) Not open for credit to students who have completed course 152. (Former course 152.)—III. (III.) Mendoza

124. Comparative Neuroanatomy (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 101 or Neurobiology, Physiology and Behavior 100 or 101. Overview of the neuroanatomy of the nervous system in a variety of mammalian and non-mammalian vertebrates. Examine changes or modifications to neural structures as a result of morphological or behavioral specializations. (Same course as Neurobiology, Physiology and Behavior 124.)—II. (II.) Krubitzer, Recanzone

126. Health Psychology (4)
Lecture—4 hours. Prerequisite: course 1, 41, 101. Pass 1 open to Psychology majors only. Psychological factors influencing health and illness. Topics include stress and coping, personality and health, symptom perception and reporting, heart disease,

cancer, compliance, and health maintenance and promotion. Not open for credit to students who have completed course 160.—II, III. (II, III.) Capitanio, Emmons

127. Animal Cognition (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 1, 41, 101. Pass 1 open to Psychology majors. Integrative review of the historical backdrop, theoretical issues, and scientific methods of studying animal cognition in a wide range of species. Emphasis on learning processes, pattern recognition, and the neurobiology of learning and memory. Not open for credit to students who have completed course 134. (Former course 134.)—II. (II.) Coss

128. Information Processing Models in Neuroscience and Psychology (4)
Lecture—3 hours; term paper. Prerequisite: Mathematics 16B, Physics 7B, course 101 or Neurobiology, Physiology, and Behavior 100. Pass 1 open to Psychology majors. Basic mathematical modeling techniques used in neuroscience and psychology. Specific topics include linear systems theory, Fourier transforms, neural networks, adaptive systems, probabilistic inference and information theory. Emphasis on understanding information processing in neural systems. (Same course as Neurobiology, Physiology, and Behavior 163.) Not open for credit to students who have completed course 163. (Former course 163.)—(II.) Olshausen

129. Sensory Processes (4)
Lecture—3 hours; term paper. Prerequisite: course 1, 41, 101. Pass 1 open to Psychology majors. Psychobiology of sensory systems in humans and other animals. The relationship of behavior to the physiology, structure, and function of the senses. GE credit: Wrt.—I, II, III. (I, II, III) Henry, Krubitzer

130. Human Learning and Memory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1, 41, 100, and either Statistics 13 or 102; or consent of instructor. Consideration of major theories of human learning and memory with critical examination of relevant experimental data.—I, II, III. (I, II, III.) Goodman, Kroll, Ranganath, Yonelinas

131. Perception (4)
Lecture—3 hours; independent library work. Prerequisite: courses 1, 41. The cognitive organizations related to measurable physical energy changes mediated through sensory channels. The perception of objects, space, motion, events.—I, II, III. (I, II, III.) Post

132. Language and Cognition (4)
Lecture—3 hours; term paper. Prerequisite: courses 1, 41, 100; or consent of instructor. Introduction to the cognitive processes involved in language comprehension and production. Topics include the biological foundations of language, speech perception, word recognition, syntax, reading ability, and pragmatics.—I, II, III. (II, III.) Long, Swaab, Traxler

135. Cognitive Neuroscience: The Biological Foundations of the Mind (4)
Lecture—3 hours; term paper. Prerequisite: courses 1, 41, and 100; or consent of instructor; courses 108, 129, or 131 highly recommended. Neuroscientific foundations of higher mental processes including attention, memory, language, higher-level perceptual and motor processes and consciousness. Emphasis on the neural mechanisms which form the substrates of human cognition, and the relationships of mind to brain.—I, II. (II, III.) Bunge, Wojciulik, Raganath

140. Developmental Psychology (4)
Lecture—4 hours. Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Ontogenetic account of human behavior through adolescence with emphasis on motor skills, mental abilities, motivation, and social interaction. Two units of credit allowed to students who have completed Human Development 100A or 100B. Not open for credit to students who have completed course 112. (Former course 112.)—I, II, III. (I, II, III.) Goodman

141. Cognitive Development (4)
Lecture—3 hours; term paper. Prerequisite: Human Development 100A or 100B or course 140. Pass 1 restricted to Human Development or Psychology majors. Theories, methods, evidence, and debates in the field of cognitive development, such as nature/nurture, constraints on learning, and the role of plasticity. Topics include attention, memory, concepts about the physical and social world, and language. (Same course as Human Development 101.) GE credit: Wrt.—I, II, III. (I, II, III.) Chen, Goodman, Lagattuta, Rivera

142. Social and Personality Development (4)
Lecture—3 hours; term paper. Prerequisite: Human Development 100A or 100B or course 140. Pass 1 open to Human Development or Psychology majors. Social and personality development of children, infancy through adolescence. Topics include the development of personality, achievement motivation, self-understanding, sex-role identity, and antisocial behavior. Emphasis on the interface between biological and social factors. (Same course as Human Development 102.) GE credit: SocSci, Wrt.—I, II, III. (I, II, III.) Conger, Lagattuta, Rivera, Robins, Rodning

146. The Development of Memory (4)
Lecture—3 hours; term paper. Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Theory and research on memory development with focus on infancy and childhood. Not open for credit to students who have completed course 133. (Former course 133.)—II. (III.) Goodman, Rivera

151. Social Psychology (4)
Lecture—4 hours. Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Behavior of the individual in the group. Examination of basic psychological processes in social situations, surveying various problems of social interaction; group tensions, norm-development, attitudes, values, public opinion, status. Not open for credit to students who have completed course 145. (Former course 145.)—I, II, III. (I, II, III.) Simonton, Johnson, Robins, Shaver

153. Psychology and Law (4)
Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Current theoretical and empirical issues in the study of psychology and law. Topics include eyewitness testimony, child abuse, jury decision making, juvenile delinquency and criminology, prediction of violence, insanity defense, and memory for traumatic events. Not open for credit to students who have completed course 115. (Former course 115.) Offered in alternate years.—III. Goodman, Johnson

154. Psychology of Emotion (4)
Lecture—4 hours. Prerequisite: course 1, 41. Pass 1 open to Psychology majors. Introduction to current theories and research on emotion and bodily feelings with special reference to self-knowledge. Not open for credit to students who have completed course 143. (Former course 143.)—I, II, III. (I, II, III.) Shaver

155. Environmental Awareness (4)
Lecture—4 hours. Prerequisite: course 1. Pass 1 open to Psychology majors. Interactions of people and the environments they construct. Research methods for evaluating designed environments and reviews of current research in environmental psychology. Not open for credit to students who have completed course 144. (Former course 144.) GE credit: SocSci—I. (I.) Coss

156. Organizational Psychology (4)
Lecture—4 hours. Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Survey of interrelationships among psychological processes, interpersonal dynamics, and organizational forms. Topics include motivation, communication, decision making, leadership, personnel selection and training, stress and conflict, career development, organizational development, and organization-community relations. Not open for credit to students who have completed course 183. (Former course 183.)—III. (III.) Harrison

158. Sexual Orientation and Prejudice (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 41. Pass 1 open to Psychology majors. Current scientific knowledge about sexual orientation and prejudice based on sexual orientation. Emphasis on learning the skills necessary for a critical understanding of science and public policy issues relevant to sexuality. GE credit: SocSci, Div, Wrt.—II. (III.) Herek

159. Gender and Human Reproduction (4)
Lecture—4 hours. Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Social psychology of human reproduction. Examines gender relations over the course of the individual's reproductive cycle. Not open for credit to students who have completed course 149. (Former course 149.)—I. (I.) Scheib

162. Personality Theory (4)
Lecture—4 hours. Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. The theories of Freud, Erikson, and other major twentieth-century contemporary approaches to personality. Not open for credit to students who have completed course 147. (Former course 147.) GE credit: SocSci, Wrt.—I, II, III. (I, II, III.) Emmons, Robins

162V. Personality Theory (4)
Online lecture—4 hours. Prerequisite: course 1, 41. The theories of Freud, Erikson, and other major twentieth-century contemporary approaches to personality. Not open for credit to students who have completed former course 147. GE credit: SocSci, Wrt.

165. Introduction to Clinical Psychology (4)
Lecture—4 hours. Prerequisite: courses 1, 41, 168, and either 112 or 145. Major theoretical formulations in the history of clinical psychology, from classical psychoanalysis to contemporary existentialism and behavior modification. A survey, based on lectures, films, and tapes, of what clinical psychologists do, including methods of appraisal, professional roles, and approaches to treatment.—I, II, III. (I, II, III.) Sue

168. Abnormal Psychology (4)
Lecture—4 hours. Prerequisite: courses 1, 41. Descriptive and functional account of behavioral disorders, with primary consideration given to neurotic and psychotic behavior. GE credit: SocSci.—I, II, III. (I, II, III.) Emmons, Zane

170. Psychology of Religion (4)
Lecture—4 hours. Prerequisite: courses 1 and 41. Major theories, issues, data, and research methodologies of the psychology of religion. Religious experience and expression; religious development in childhood, adolescence, and adulthood; conversion; religious influences on physical and mental health; cross-cultural perspectives. GE credit: Div, Wrt.—II, III. (II, III.) Emmons

175. Genius, Creativity, and Leadership (4)
Lecture—3 hours; term paper. Prerequisite: course 1 and 41 or the equivalent or consent of instructor. The phenomenon of genius examined from a diversity of theoretical, methodological, and disciplinary perspectives, with an emphasis on outstanding creativity and leadership in art, music, literature, philosophy, science, war, and politics. GE credit: SocSci, Wrt.—I, III. (I, III.) Simonton

177. Psychobiography and Life History (4)
Lecture—4 hours. Prerequisite: course 1 or 16 or consent of instructor; course 41. Case-history research as a nonquantitative approach to studying personality. Psychological interpretation of life histories of outstanding individuals in the arts, politics, science and other areas. GE credit: SocSci, Wrt.

180A. Research in Cognitive and Perceptual Psychology (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 41, and four upper division Psychology courses and consent of instructor. Empirical research on selected topics in general experimental psychology (general research design and analysis, perception, cognition, cognitive development, etc.). Specific content will vary from quarter to quarter. May be repeated once for credit when content differs.—I. (II, III.)

180B. Research in Psychobiology (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 101, three additional upper division courses in Psychology, and consent of instructor. Empirical research on selected topics in psychobiology

(animal learning, animal behavior, physiological and sensory psychology, developmental psychobiology, computer modeling of neural systems). Content varies. May be repeated once for credit when content differs.—III. (III.)

180C. Research in Personality and Social Psychology (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 41, and four upper division Psychology courses and consent of instructor. Empirical research on selected topics in personality and social psychology (personality, social psychology, organizational psychology, etc.). Content will vary from quarter to quarter. May be repeated once for credit when specific content differs.

185. History of Psychology (4)
Lecture—3 hours; term paper. Prerequisite: courses 1, 41, upper division standing or consent of instructor. Pass 1 open to Psychology majors. Development of psychological thought and research in context of history of philosophy and science. Not open for credit to students who have completed course 120. (Former course 120.) GE credit: SocSci, Wrt.—II. (II.) Simonton

190. Seminar in Psychology (4)
Seminar—4 hours. Prerequisite: junior or senior standing; major in psychology or consent of instructor. Intensive treatment of a special topic or problem of psychological interest. May be repeated for credit in different subject area.—II, III. (I, III.)

190X. Upper Division Seminar (1-2)
Seminar—1-2 hours. Prerequisite: upper division standing and consent of instructor. In-depth examination at an upper division level of a special topic in Psychology. Emphasis on student participation in learning. May not be repeated for credit. Limited enrollment.

192. Fieldwork in Psychology (1-6)
Fieldwork—1-6 hours. Prerequisite: upper division standing in psychology and consent of instructor. Supervised internship off and on campus, in community and institutional settings. Maximum of four units may be used towards satisfaction of upper division major requirement. May be repeated once for credit. Limited enrollment (P/NP grading only.)—Harrison

194HA-194HB. Special Study for Honors Students (3-3)
Independent study—9 hours. Prerequisite: senior standing in Psychology and qualifications for admission into college honors program, and consent of instructor; at least one course from 180A, 180B, 180C or 199 strongly recommended. Directed research. Supervised reading, research and writing leading to submission of a Senior Honors thesis under the direction of faculty sponsor. (Deferred grading only, pending completion of sequence.)

197T. Tutoring in Psychology (1-3)
Tutoring—1-3 hours. Prerequisite: upper division standing and consent of instructor. Intended for advanced undergraduate students who will lead discussion sections in Psychology courses. May be repeated for credit for a total of 8 units. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

200. Proseminar in Psychology (3)
Seminar—2 hours; independent study—1 hour. Prerequisite: graduate standing in Psychology or consent of instructor. Introduces matriculating graduate students to research activities of departmental faculty. (S/U grading only.)—I. (I.)

201. Research Preceptorship (4)
Laboratory—3-4 hours; discussion—3-5 hours. Prerequisite: consent of instructor. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

202. Research Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing in psychology. Presentation of graduate research to program faculty and graduate students. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

204A. Statistical Analysis of Psychological Experiments (4)
Lecture—4 hours. Prerequisite: Statistics 102 or the equivalent and graduate standing in Psychology or consent of instructor. Probability theory, sampling distributions, statistical inference, and hypothesis testing using standard parametric and correlational approaches. Analysis of variance, factorial and repeated measures, and tests of trends. Not open for credit to students who have completed course 206.—I.

204B. Causal Modeling of Correlational Data (4)
Lecture—4 hours. Prerequisite: course 204A or the equivalent or consent of instructor. Examination of how to make causal inferences from correlational data in the behavioral sciences. Emphasis on testing rival causal models using correlations among observed variables. Beginning with multiple regression analysis, discussion advances to path analysis and related techniques.—II. Simonton

204C. Applied Psychometrics and Measurement Theory (4)
Lecture—4 hours. Prerequisite: course 204A or the equivalent or consent of instructor. Examination of the basic principles and applications of classical and modern test theory. Topics include test construction, reliability theory, validity theory, factor analysis, and latent trait theory. Not open for credit to students who have completed course 204. (Former course 204.) Offered in alternate years.—III. Widaman

204D. Advanced Statistical Inference from Psychological Experiments (4)
Lecture—4 hours. Prerequisite: course 204A or the equivalent or consent of instructor. Advanced topics in statistical inference, which may include probability theory, sampling distributions, statistical inference and hypothesis testing, nonparametric statistics, Bayesian approaches, and advanced issues in analysis of variance. Not open for credit to students who have completed course 205. (Former course 205.) Offered in alternate years.—III.

205A. Applied Multivariate Analysis of Psychological Data (4)
Lecture—4 hours. Prerequisite: three courses from 204A, 204B, 204C, 204D or the equivalents, or consent of instructor. Review of the major methods of multivariate data analysis for psychological data. Statistical routines using a linear algebra-based computing language. Topics include multivariate analysis of variance, discriminant analysis, canonical analysis factor analysis, and component analysis. Not open for credit to students who have completed course 207B. (Former course 207B.) Offered in alternate years.—II.

205B. Factor Analysis (4)
Lecture—4 hours. Prerequisite: graduate standing, course 204A and 204B or the equivalent or consent of instructor. Theory and methods of factor analysis, including exploratory factor analysis, confirmatory factor analysis, and principal component analysis. Offered in alternate years.—II. Widaman, Blozis

205C. Structural Equation Modeling (4)
Lecture—4 hours. Prerequisite: graduate standing, course 204A and 204B or the equivalent or consent of instructor. Theory and methods of structural equation modeling, including path analysis, confirmatory factor analysis, and multiple-group modeling. Offered in alternate years.—II. Widaman, Blozis

205D. Multilevel Models (4)
Lecture—4 hours. Prerequisite: course 204A, graduate standing or consent of instructor. Introduction to statistical techniques for the analysis of normal, hierarchically structured data, such as cross-sectional clustered data or repeated-measures data. Topics include hierarchical linear models, latent growth curve models, and how these methods handle unbalanced and/or missing data.—II. (II.) Blozis

207. Survey and Questionnaire Research Methods (4)
Lecture/discussion—4 hours. Prerequisite: completion of a course on social or behavioral research methods, graduate standing. Survey and questionnaire research methods with emphasis on how to ask questions. Cognitive, motivational, and social processes that influence how respondents answer questions; sampling techniques; internet resources; practical aspects of fielding survey and questionnaire research. Not offered every year.—I. Herek

208. Physiological Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. A conceptual analysis of the contributions of neuroanatomy, neurophysiology and neurochemistry to an understanding of animal and human behavior.—Henry, Mendoza

212A. Developmental Psychology: Cognitive and Perceptual Development (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor, completion of undergraduate or graduate course on developmental psychology or human development. Theories and empirical findings concerning human cognitive and perceptual development. Development of perception, memory, concepts (e.g., theory of mind, concepts about number), problem solving, and language from infancy to adolescence.—II.

212B. Developmental Psychology: Social, Emotional, and Personality Development (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor, completion of an undergraduate or graduate course on developmental psychology or human development. Theories and empirical findings concerning human social, emotional, and personality development. Development of emotions, moral reasoning and behavior, personality, self-concept, and social cognition from infancy to adolescence(may include adulthood).

220. History of Psychology (4)
Lecture—2 hours; seminar—2 hours. Prerequisite: graduate standing in psychology or consent of instructor. A lecture-seminar on the history of psychology and on the applicability of early psychological theory and research to contemporary investigations. Offered in alternate years.

230. Cognitive Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Analysis of the mental processes by which knowledge is acquired, manipulated, stored, retrieved and used. Offered in alternate years.—I. Long

231. Sensation and Perception (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Analysis of the role of sensory processes and perception in experience and their effects on behavior. Offered in alternate years.—III. Post

245. Social Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Theory and research in social psychology.—I. (III.) Robins, Johnson

247. Personality (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Theory and research in human personality.—II. (II.) Emmons, Robins

250. Comparative Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. The study of animal behavior in an evolutionary and comparative framework.—II. Owings

251. Topics in Genetic Correlates of Behavior (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Theory and experiment in the genetic contributions to animal and human behavior. May be repeated for credit when topic differs. Offered in alternate years.

252. Topics in Psychobiology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Critical study in a selected area of psychobiology. May be repeated for credit when content differs. Offered in alternate years.—(I.)

261. Cognitive Neuroscience (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate student standing in Psychology or Neuroscience or consent of instructor. Graduate core course for neuroscience. Neurobiological bases of higher mental function including attention, memory, language. One of three in three-quarter sequence. (Same course as Neuroscience 223.)—III. (III.) Olshausen, Wojciulik, Ranganath

263. Topics in Cognitive Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Selected topics in language processing, memory, perception, problem solving, and thinking, with an emphasis on the common underlying cognitive processes. May be repeated for credit when content differs. Offered in alternate years.—(I.) Goodman, Kroll, Long, Post, Yonelinas, Rivera, Lagattuta

264. Topics in Psycholinguistics (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Discussion of fundamental issues in the psychology of language. May be repeated for credit when content differs. Offered in alternate years.—Long, Traxler

265. Topics in Psychology of Consciousness (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Theory and research in the psychology of consciousness. May be repeated for credit when content differs. Offered in alternate years.

270. Topics in Personality Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Critical study of a selected area of personality psychology. May be repeated for credit when content differs.—I. Emmons, Shaver

290. Seminar (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Seminar devoted to a highly specific research topic in any area of basic psychology. Special topic selected for a quarter will vary depending on interests of instructor and students.—I, II, III. (I, II, III.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (2-9)
(S/U grading only.)

299D. Dissertation Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Course

390A-390B. The Teaching of Psychology (6-4)
Discussion, lecture, practice. Prerequisite: advanced graduate standing in psychology or a closely related discipline and consent of instructor. Methods and problems of teaching psychology at the undergraduate and graduate levels; curriculum design and evaluation. Practical experience in the preparation and presentation of material. (S/U grading only; deferred grading only, pending completion of sequence.)—II-III. (II-III.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Radiation Oncology

See Medicine, School of

Radiology

See Medicine, School of

Range and Wildlands Science

See Agronomy and Range Science; and Range Science

Range and Wildlands Science

(College of Agricultural and Environmental Sciences)

Admission into the Range and Wildlands Science major has been discontinued. Students interested in this area should refer to the Agricultural Management and Rangeland Resources major, Range and Natural Resources specialization.

The Major Program

Range and wildlands science is the study of the biological and physical components of land resources which are used mostly for grazing domestic livestock, but which also provide wildlife habitats, watersheds, recreation, and open space.

The Program. The major provides background in the biological, physical, and social sciences. Comprehensive study in the plant, animal, soil, and resource sciences supplements the core of range management courses. Integration of the knowledge of a variety of specialized fields is learned as a basis for land management oriented toward the multiple use concept and the maintenance of environmental quality.

Career Alternatives. Range and wildlands science graduates, especially those with some experience, may be employed as consultants, extension specialists, ranch managers, or ranchers. They may also qualify for the position of Range Conservationist in governmental agencies such as the Forest Service, Soil Conservation Service, and the Bureau of Land Management. If career work with such an agency is desired, it is recommended that trainee or apprenticeship experience with that agency be included in the major program of study as an internship. In addition, the training provided by this major should give an excellent background for natural resource management positions.

B.S. Major Requirements:

	UNITS
English Composition Requirement	**0-8**
See College requirement	
Preparatory Subject Matter	**63-67**
Animal Science 2	4
Biological Sciences 1A, 1B, 1C	15
Chemistry 2A, 2B, 8A, 8B	16
Agricultural Science and Management 21, Engineering 5, or Computer Science Engineering 10	3
Agricultural and Resource Economics 1, Economics 1A, or 1B	4-5
Geology 1-1L	4
Mathematics 16A; 16B recommended	3-6
Physics 1A, 1B	6
Soil Science 100	4
Agricultural Science and Management 1504	
Breadth/General Education	**6-24**
Satisfaction of General Education requirement to include two non-introductory courses in Agricultural and Resource Economics, Economics, Environmental Science and Policy, or Geography.	
Depth Subject Matter	**51-56**
Botany 111 or Water Science 104	3-4
Botany 117 or Plant Science 101	4
Geography 3, Atmospheric Science 105	3-4
Soil science, two upper division courses	6-8
Water Science 141	3
Nutrition 115	4
Wildlife ecology or management, one upper division course in wildlife, fish and conservation biology, or zoology	3-4
Agronomy 112	3
Select units from Range Science 100, 133, 134, 135, 105, 160, 145; and Range Science 192, 198, 199 (not more than a total of 3 units can be counted):	18
Geography 106	4
Restricted Electives	**6-8**
Two upper division natural science or applied biological science courses in one or two of the following: animal science, botany, entomology, genetics, geography, mathematics, nematology, plant pathology, plant science, environmental and resource sciences, water science, or weed science.	
Unrestricted Electives	**17-47**
Total Units for the Major	**180**

Major Adviser. Contact department office.

Advising Center for the major is in 1220A Plant and Environmental Sciences.

Graduate Study. See the Ecology Graduate Group.

Range Science

(College of Agricultural and Environmental Sciences)

Faculty. See under the Department of Agronomy and Range Science.

Related Courses. See Agricultural Management and Rangeland Resources 101, 112, 130, 131, 134, 135, 137, Nutrition 115, Soil Science 105, 120, Wildlife, Fish, and Conservation Biology 151.

Courses in Range Science (RMT)

Questions pertaining to the following courses should be directed to the instructor or to the Advising Center, 1220A Plant and Environmental Sciences.

Lower Division Course

92. Range Science Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience off or on campus in all subject areas pertaining to range management. Internships supervised by a member of the faculty. (P/NP grading only.)

Upper Division Courses

192. Range Science Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off or on campus in all subject areas pertaining to range management. Internships supervised by a member of the faculty. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: senior standing and consent of instructor. (P/NP grading only.)

Graduate Courses

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Religious Studies

(College of Letters and Science)
Naomi Janowitz, Ph.D., Program Director
Program Office, 622 Sproul Hall (530-752-4999)
http://religions.ucdavis.edu

Committee in Charge

David Biale, Ph.D. *(History)*
Lincoln D. Hurst, Ph.D. *(Religious Studies)*
Naomi Janowitz, Ph.D. *(Religious Studies)*
Whalen Lai, Ph.D. *(Religious Studies)*
Jay Mechling, Ph.D. *(American Studies)*
Jacob Olupona, Ph.D. *(African American and African Studies)*
Baki Tezcan, Ph.D. *(Religious Studies, History)*

Faculty

Lincoln D. Hurst, Ph.D., Associate Professor
Naomi Janowitz, Ph.D., Professor
Whalen W. Lai, Ph.D., Professor
Baki Tezcan, Ph.D., Assistant Professor

The Major Program

Majoring in religious studies provides an opportunity to explore and analyze, from an academic perspective, the written and oral traditions of diverse religions

The Program. The major introduces students to the academic study of religion. The religious studies major offers a broad choice of courses, including history, philosophy, sociology, anthropology, American studies, classics, and medieval studies. For some students, religious studies is an appropriate second major and might combine well with anything from philosophy to international agricultural development, from history to international relations.

Career Alternatives. The emphasis in religious studies courses on developing analytical thinking skills and clear written expression is an asset for many career goals. As a strong liberal arts program, the major can lead to research and/or teaching on all levels in the field of religion. Because the major integrates so many academic areas, it is also an excellent background for graduate programs, especially in the humanities, and for professional schools including law, business, and foreign service.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 24
At least one course from each of the following groups..... 20
(a) Religious Studies 1, 2
(b) Religious Studies 21, 23, 40, 60, 70, 75
Anthropology 2 or, with approval from adviser, a lower division course related to religion from African American and African Studies, American Studies, Philosophy, Native American Studies, or other departments..... 4

Depth Subject Matter..... 40
Five upper division Religious Studies courses plus Religious Studies 100... 24
Two upper division History courses related to religion..... 8
Sociology, philosophy, anthropology..... 8
Two upper division courses related to religion in the above disciplines such as Philosophy 105, 145, Sociology 146, 149, Anthropology 124; or, with approval from adviser, in other disciplines such as Medieval Studies, Native American Studies, African American and African Studies, Classics, or other departments.

Total Units for the Major 64

Recommended. A reading knowledge of a foreign language is highly recommended. Consult the major adviser for a complete list of recommended upper division courses.

Course Equivalents. The major advisers have a list of lower and upper division courses that can be substituted for courses suggested above.

Major Advisers. W.W. Lai, N. Janowitz, L. Hurst.

Minor Program Requirements:

The following four minor program options and others responsive to students' needs are subject to approval by the major adviser or the Curriculum Committee. The four areas of emphasis are Religious Studies, Asian Religions, Judaism, and Christian Studies.

UNITS

Religious Studies 20
Lower division course..... 4
Upper division courses 16
Religious Studies 100 required.
Some substitutions from other departments or programs allowed with consent of adviser.

Preministerial Adviser. L.D. Hurst.

Jewish Studies. Students interested in Jewish studies should contact M. Hoffman of Religious Studies or D. Biale of History.

Courses in Hebrew (HEB)

Lower Division Courses

1. Elementary Hebrew (5)
Lecture/discussion—4 hours; laboratory—1 hour. Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew. (Students who have successfully completed, with a C- or better, Hebrew 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.)—I. (I.)

2. Elementary Hebrew (5)
Lecture/discussion—4 hours; laboratory—1 hour. Prerequisite: course 1 or the equivalent. Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew.—II. (II.)

3. Elementary Hebrew (5)
Lecture/discussion—4 hours; laboratory—1 hour. Prerequisite: course 2 or the equivalent. Speaking, listening comprehension, reading and writing fundamentals of modern Hebrew.—III. (III.)

Upper Division Courses

100A. Advanced Modern Hebrew I (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 3 or the equivalent. Development and refinement of grammar, composition, and language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language. Not open for credit to students who have completed course 100.—I. (I.)

100B. Advanced Modern Hebrew II (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 100A or consent of instructor. Continued development and refinement of grammar, composition, and language skills. Continued study of history of the Hebrew language. Not open for credit to students who have completed course 101.—II. (II.)

100C. Advanced Modern Hebrew III (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 100B or consent of instructor. Development of writing skills by composition writing. Analytic review of literary genres. Introduction to the Book of Proverbs, post-Biblical writings, and modern Israeli poetry. Not open for credit to students who have completed course 102.—III. (III.)

Courses in Religious Studies (RST)

Lower Division Courses

1. Survey of Religion (4)
Lecture—3 hours; discussion—1 hour. Basic concepts introduced through readings of the primary religious literature. Discussion of central ideas (creation, history, law, prophecy, suffering, mysticism, asceticism, karma, reincarnation, moksha, etc.); readings from the Bible, Bhagavad Gita, the Koran, selections from Plato and early Buddhist writings. GE credit: ArtHum, Div, Wrt.—II. (II.)

2. Myth, Ritual, and Symbolism (4)
Lecture—3 hours, discussion—1 hour. Myths, rituals and religious symbols found in a variety of religious traditions including examples from ancient and contemporary religious life. Variety of religious phenomena; validity of different approaches to the study of religion. GE credit: ArtHum, Div, Wrt.—I, III. (I, III.) Lai, Janowitz

3A-C. Topics in Comparative Religion (4)
Lecture—3 hours; discussion—1 hour. Introduction to the methods used in comparative religion, focusing on a particular theme in a number of religious traditions: **(A)** The Experiential Dimension: Pilgrimage; **(B)** The Mythic Dimension: Death and the After-life; **(C)** The Ritual Dimension: Sacrifice. May be repeated for credit in a different subject area. GE credit: ArtHum, Div, Wrt.—I. (I.)

21. Hebrew Scriptures (4)
Lecture—3 hours; term paper. Selected texts from the Hebrew Scriptures (Genesis—II Chronicles) and review of modern scholarship on the texts from a variety of perspectives (historical, literary, sociological, psychological). Course work is based on an English translation and no knowledge of Hebrew is required. GE credit: ArtHum, Div, Wrt.—I. (I.)

23. Introduction to Judaism (4)
Lecture/discussion—3 hours; term paper. Introduction to the study of religion using examples from the rituals, art and holy texts of Judaism. No prior knowledge of either Judaism or the study of religion is necessary. GE credit: ArtHum, Div, Wrt.—II. (II.)

40. New Testament (4)
Lecture—3 hours; discussion—1 hour. New Testament literature from critical, historical, and theological perspectives. GE credit: ArtHum, Wrt.—I. (I.) Hurst

60. Introduction to Islam (4)
Lecture/discussion—4 hours. Introduction to topics at core of Islamic tradition including Muhammad, the Qur'an, Islamic law, Sufism and sects as well as to selected topics including Islamic revival.—III. (III.)

65C. Scriptures of Islam (4)
Lecture/discussion—3 hours; term paper. Examination of the scriptures (in translation) of Islam, with attention to its role as literature, as religious iconography, and as devotion. Scriptural interpretation and methods and institutions of scriptural learning. Not offered every year. GE credit: ArtHum, Div, Wrt.—III.

75. Chinese Philosophy: An Introduction (3)
Lecture—2 hours; discussion—1 hour. Introduction to Chinese philosophy from classical to modern times: emphasis on basic metaphysics and its change over time, including Confucian humanism, Taoist cosmologics, the Han synthesis of Tao, Yin-yang and Five Elements; its impact on Buddhism, Sung new synthesis and conflict with the West. Offered in alternate years.—I. Lai

98. Directed Group Study (1-5)
Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.)

99. Special Study for Lower Division Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

100. Study of Religion: Issues and Methods (4)
Lecture—3 hours; term paper. Principal issues and methods of Religious Studies and associated fields.—III. (III.)

102. Christian Origins (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 40; course 23 recommended. Beginning of the Christian faith seen in relation to milieu in which it originated. Offered in alternate years.—(I.) Hurst

110. Life, Meaning and Identity (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 2 or upper division standing. Study of religious lives, the quest for meaning and for personal identity; how religions frame the problems of life; how cultural and personal crises affect youthful identity; the nature and structure of dreams, myths, and ideals. Offered in alternate years.—II. Lai

115. Mysticism (4)
Lecture—3 hours; term paper. Prerequisite: one lower division Religious Studies course (except 10, 98, or 99). Historical and descriptive analysis of selected key figures in mystical traditions and readings of representative mystical texts. Analytic term paper. Offered every 3-4 years. GE credit: ArtHum, Div, Wrt.—(III.)

122. Studies in Biblical Texts (4)
Lecture—3 hours; term paper. Prerequisite: course 21. Study of a book from the Prophets or writings from critical, historical, and religious perspectives. May be repeated once for credit in different subject area.—III. (III.) Janowitz

124. Topics in Judaism (4)
Lecture—3 hours; term paper. Prerequisite: course 23. Examination of selected aspects of Jewish life, religion, or literature. Potential topics include: Jewish Perspectives on Jesus; The Golem: History and Legend; Sexuality and Gender in Late Antique Judaism and Early Christianity. May be repeated for credit when topic differs.—II.

125. Dead Sea Scrolls, Apocrypha, and Pseudepigrapha (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 21 or 40 or consent of instructor. Survey of the Dead Sea Scrolls, apocryphal and pseudepigraphical writings of Judaism and Christianity and their historical, social, and religious importance. GE credit: Wrt.—II. Janowitz

130. Topics in Religious Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one from course 1, 2, 3A, 3B, or 3C or consent of instructor. Thematic study of a phenomenon in more than one religious tradition or of the relationship between religion and another cultural phenomenon. Topics may include archeology and the Bible, women and religion, religion and violence. May be repeated for credit when topic differs.—II, III.

135. The Bible and Film (4)
Lecture—2 hours; term paper; film-viewing—3 hours. Prerequisite: Humanities 10 recommended. Examination of the uses of the Judeo-Christian scriptures in film. Topics include dramatic depictions of biblical stories, the tension between science and religion, allegorical treatments of biblical themes, and the problems of religious conviction.—III. Hurst

140. Christian Theology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 40; course 102 recommended. Historical and systematic introduction to Christian doctrine, with attention to divergent traditions and the problem of orthodoxy and heresy.—I. (I.) Hurst

141A. New Testament Literature: Synoptic Gospels (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40. Life and thought of the early Church as reflected by the Synoptic Tradition—Matthew, Mark, Luke and Acts. Offered every third year to alternate with 141B, 141C. GE credit: ArtHum, Wrt.—Hurst

141B. New Testament Literature: John (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40. Life and thought of the early Church as reflected by the Johannine Tradition—the Gospel and letters of John. Offered every third year to alternate with 141A, 141C. GE credit: ArtHum, Wrt.—III. Hurst

141C. New Testament Literature: Paul (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40. Life and thought of the early Church as reflected by the Pauline tradition—the letters of Paul. Offered every third year to alternate with 141A, 141B. GE credit: ArtHum, Wrt.—(II.) Hurst

142. Tyndale and the Beginnings of the English Bible (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 40 recommended. Study of Tyndale's New Testament translation as a literary and cultural monument in the context of previous Biblical translation, the historical situation in the 16th century, and the influence of this version on the English language and its literature. Offered in alternate years. GE credit: ArtHum, Wrt.—(I.)

145. Contemporary American Religion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40 and History 17B recommended. Examination of several major movements and phenomena in twentieth-century American religion. Offered in alternate years.—II.

150. Religious Ethics (4)
Lecture/discussion—4 hours. Prerequisite: course 4. Study of the religious bases to ethics through concentration on the ethical tracts of one major tradition, or through a comparison of the attitudes of two or more traditions to a common ethical issue. Offered every three years.—(II.) Lai

165. Islam in Asia (4)
Lecture/discussion—3 hours; extensive writing. Islam as a lived religion in the Indian sub-continent, Central Asia, China, and Southeast Asia. Emphasis is on primary sources studied comparatively and historically. GE credit: ArtHum, Div, Wrt.—III.

168. Hinduism (4)
Lecture—3 hours; term paper. Prerequisite: course 4. Hindu tradition from ancient to modern times. Multiplicity of religious forms within Hinduism with mention of Jainism, Buddhism, and Sikhism and their relation to the mainstream of Hindu religion. Offered in alternate years.—I.

170. Buddhism (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 4. Study of Buddhism in its pan-Asian manifestations, from its beginning in India to its development in Sri Lanka and Southeast Asia, Central Asia, China and Japan; teachings and practices, socio-political and cultural impact. Offered in alternate years.—(III.) Lai

172. Ch'an (Zen) Buddhism (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 4 recommended. Doctrines and methods of the Patriarchs and great masters, both ancient and modern, in the framework of the orthodox Buddhist tradition. Doctrinal basis of meditational techniques.—II. (II.) Lai

189. Senior Colloquium (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Primarily for seniors in Religious Studies. Discussion in depth of a problem in religion which requires the methods of several disciplines and is important in the encounter between religions.—II. (II.)

190. Seminar (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor; required of all Religious Studies majors. Allows majors to integrate their disciplined study of the field. Emphasis on current scholarly debate about the methods for analyzing and comparing diverse religious traditions.—(I.)

194HA-194HB. Special Study for Honors Students (1-5)
Independent study. Open only to majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis on a religious studies topic. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Russian

(College of Letters and Science)
Winder McConnell, Ph.D., Program Director
Program Office, 622 Sproul Hall (530-752-4999)
http://russian.ucdavis.edu

Committee in Charge

Yuri Druzhnikov, Ph.D. *(Russian)*
Winder McConnell, Ph.D. *(German and Russian)*

Faculty

Yuri Druzhnikov, Ph.D., Professor

Emeriti Faculty

James Gallant, Ph.D., Lecturer Emeritus
Daniel Rancour-Laferriere, Ph.D., Professor Emeritus
Valerie A. Tumins, Ph.D., Professor Emerita

The Major Program

The Russian major introduces students to a culture rich in art, music, theater, film, language, and literature. The major offers an opportunity to learn skills needed to enter the fields of foreign affairs, world politics, and international trade, or to begin graduate work in literature, history, cultural studies and international relations.

The Program. The major program instructs students in speaking, understanding, reading, and writing the Russian language. The program also acquaints students with the intellectual and cultural contributions of the Russian world through the study of its literature, traditions, and institutions.

Internships and Career Alternatives. Russian majors may participate in internships where they can serve as translators and interpreters for schools and business firms throughout Northern California. Upon graduation, many Russian majors enter the business world or enter graduate programs in Slavic studies and international relations. The program encourages students to supplement their Russian studies with courses in related fields such as international relations, political science, computer science, cultural studies, or economics in order to maximize their career possibilities.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter	**4-31**
Russian 1 through 6 (or the equivalent)	0-27
Russian 41 or 42	4
Depth Subject Matter	**40**
Russian 101A, 101B, 101C	12
Russian 102 or 103 or 104 or 105	4
Russian 150	4
Additional upper division units chosen in consultation with adviser	20
Total Units for the Major	**44-71**

Major Adviser_____.

Minor Program Requirements:

	UNITS
Russian	**20**
Russian 101A, 101B, 101C	12
Other upper division Russian courses	8

Honors and Honors Program. The honors program comprises at least one quarter of study under course 194H, which will include a research paper. See also the University and College requirements.

Study Abroad. Students who have completed one or two years of Russian language study can participate in the Education Abroad Program (EAP) in Moscow. Many of our students also participate in summer, semester, and year programs sponsored by CIEE and ACTR in St. Petersburg and Moscow.

Teaching Credential Subject Representative. Staff. See also under Teacher Education Program.

Prerequisite credit. Credit normally will not be given for a course if that course is the prerequisite for a course already completed.

Courses in Russian (RUS)

Lower Division Courses

Course Placement. Students who have learned Russian at home must consult the department for placement instructions. Students with two years of Russian in high school normally continue in Russian 2; those with three years, Russian 3; those with four years, Russian 4.

1. Elementary Russian (5)
Discussion—5 hours; laboratory—1 hour. Introduction to Russian grammar and development of all language skills in a cultural context with special emphasis on communication. (Students who have successfully completed Russian 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.)—I. (I.)

2. Elementary Russian (5)
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 1. Continuation of grammar and language skills developed in course 1.—II. (II.)

3. Elementary Russian (5)
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 2. Continuation of grammar and language skills developed in course 2.—III. (III.)

4. Intermediate Russian (4)
Discussion—4 hours; laboratory—1 hour. Prerequisite: course 3. Grammar review and conversational practice.—I. (I.)

5. Intermediate Russian (4)
Discussion—4 hours; laboratory—1 hour. Prerequisite: course 4. Grammar review. Introduction to literature. Conversational practice.—II. (II.)

6. Intermediate Russian (4)
Discussion—4 hours; laboratory—1 hour. Prerequisite: course 5. Grammar review. Intermediate conversation and continued reading of literature.—III. (III.)

10. Elementary Conversation (2)
Discussion—2 hours. Prerequisite: course 1; course 2 or 3 (concurrently). Conversational practice to improve pronunciation and master spoken idioms. May be repeated for credit up to a maximum of 6 units.—II, III. (II, III.)

15. Russia Today and Tomorrow (4)
Lecture/discussion—4 hours. Examination of basic issues that pertain to the former totalitarian superpower which is in transition to democracy, the conflicts in Russia, its civilization and intellectual history up to including the present day and its tendencies for the future. GE credit: ArtHum, Div.—III. Druzhnikov

41. Survey of Nineteenth-Century Russian Literature (in English) (4)
Lecture—3 hours. Introduction to dominant literary trends, major literary figures and landmarks of Russian prose and poetry from the period of Sentimentalism through Romanticism and Realism to the beginnings of Modernism. Offered in alternate years. GE credit: ArtHum, Wrt.—II.

42. Survey of Twentieth-Century Russian Literature (in English) (4)
Lecture—3 hours. Introduction to major literary trends such as Symbolism, Acmeism, Futurism, Neorealism, and Socialist Realism. Readings from representative writers such as Gorky, Bely, Pasternak, Solzhenitsyn, and Tertz. Offered in alternate years. GE credit: ArtHum, Wrt.—(II.)

44. Children's Literature in Russia (4)
Lecture—3 hours; term paper. Knowledge of Russian not required. History and theory of children's literature, with special reference to Russian and Soviet examples. Analysis of genres, technique, and folklore elements, contrasted with those of the West. Students will write their own literature for children. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—Druzhnikov

98. Directed Group Study (1-5)
Discussion—1-5 hours. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

101A. Advanced Russian (4)
Lecture—2 hours; discussion—1 hour; recitation—1 hour. Prerequisite: course 6. Topics in Russian grammar for the advanced student. Reading and discussion of journalistic texts and classic and contemporary literature. Conversation exercises utilizing literary and colloquial variants of current Russian speech.—I.

101B. Advanced Russian (4)
Lecture—2 hours; discussion—1 hour; recitation—1 hour. Prerequisite: course 101A. Continuation of course 101A. Topics in Russian grammar for the advanced student. Reading and discussion of journalistic texts and classic and contemporary literature. Conversational exercises utilizing literary and colloquial variants of current Russian speech.—II.

101C. Advanced Russian (4)
Lecture—2 hours; discussion—1 hour; recitation—1 hour. Prerequisite: course 101B. Continuation of course 101B. Topics in Russian grammar for the advanced student. Reading and discussion of journalistic texts and classic and contemporary literature. Conversational exercises utilizing literary and colloquial variants of current Russian speech.—III.

102. Russian Composition (4)
Lecture/discussion—3 hours; tutorial—1 hour. Prerequisite: course 6 or consent of instructor. Practice in writing Russian. One composition on a different topic each week. Topics include history, geography, politics, and literature of Russia; comparison of Russian and American lifestyles; current events. Conducted in Russian. Offered in alternate years. GE credit: ArtHum.—II. Druzhnikov

103. Literary Translation (4)
Discussion—3 hours. Prerequisite: course 101C. Translation of Russian literary texts into stylistically equivalent idiomatic English. Offered in alternate years.—(III.)

104. Scientific Translation (4)
Discussion—3 hours; individual translation projects—1 hour. Prerequisite: course 101A. Techniques of translating Russian scientific texts. Science students will select articles from their fields of interest; Russian students will work on materials assigned by instructor. Offered in alternate years.

105. Advanced Russian Conversation (4)
Conversation—3 hours; preparation of texts—1 hour. Prerequisite: course 6. Intensive conversational practice and discussion based on current events and contemporary texts. Offered in alternate years.—I. Druzhnikov

121. Nineteenth-Century Russian Prose (in English) (4)
Lecture—3 hours; term paper. Development of prose from Pushkin and Gogol, through Dostoevsky and Tolstoy, to Maxim Gorky. Other writers are selected sequentially: Turgenev, Goncharov, Pisemsky, Saltykov, Chekhov. Romanticism, the Natural School, critical realism, and psychological realism are covered. Offered in alternate years. GE credit: ArtHum.—(I.) Druzhnikov

123. Twentieth-Century Russian Prose (in English) (4)
Lecture—3 hours; term paper. Examination of various trends including Acmeism, Symbolism, Neorealism, and Socialist Realism in development of prose. Readings from such writers as Gorky, Zamiatin, Sholokhov, Pasternak, and Solzhenitsyn. Offered in alternate years. GE credit: ArtHum, Wrt.—Druzhnikov

126. The Russian Theater (in English) (4)
Lecture—3 hours; discussion—1 hour. The main works of Russian dramatists from Gogol to the present, including Turgenev, Tolstoy, Chekhov, Gorky, Mayakovsky, Bulgakov, Shvarts. Offered in alternate years. GE credit: ArtHum, Wrt.

127. Nineteenth-Century Russian Poetry (4)
Discussion—3 hours; term paper. Prerequisite: course 6. Introduction to the principles of Russian versification followed by historical and poetic analysis of the following figures: Derzhavin, Zhukovsky, Pushkin, Delvig, Baratynsky, Lermontov, Nekrasov, Tjutchev, and Fet. Conducted in Russian. Offered in alternate years. GE credit: ArtHum.

128. Twentieth-Century Russian Poetry (4)
Discussion—3 hours; term paper. Prerequisite: course 6. Introduction to principles of Russian versification followed by historical and poetic analysis of the following figures: Brjusov, Blok, Akhmatova, Mandelshtam, Esenin, Mayakovsky, Khlebnikov, Pas-ternak, Evtushenko, Voznesensky, and Brodsky. Conducted in Russian. Offered in alternate years. GE credit: ArtHum.—III. Druzhnikov

129. Russian Film (4)
Lecture/discussion—3 hours; term paper; film viewing—3 hours. Prerequisite: completion of Subject A requirement. History of Russian film; film and social revolution, the cult of Stalin, dissident visions; film and the collapse of the Soviet empire; gender and the nation in Russian film. In English; films with English subtitles. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II.

130. Contemporary Russian Culture (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Current trends in Russian culture and the relationship between artists and the government. Topics include history of censorship, official and dissident art, recent changes in the cultural scene. Knowledge of Russian not required. Offered in alternate years. GE credit: ArtHum, Wrt.—(III.)

131. Literature of Revolution (4)
Lecture—3 hours; essays. Prerequisite: History 3 or 4C, and/or any introductory literature course. Study of impact of revolution on society and culture; the major artistic, political and historical works surrounding the Russian revolutions of 1905 and 1917. Offered in alternate years. GE credit: ArtHum, Wrt.

132. Nature and Culture in Russia (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: any introductory course in environmental studies. History of the environmental movement in Russia from the 1920's to the present, showing the influence of Stalinism on environmental ethics; concepts of society and nature in Russian literature and film; international implications of Russian environmental policy. Knowledge of Russian is not required. GE credit: ArtHum, Wrt.—(I.)

139. Pushkin (in English) (4)
Lecture/discussion—3 hours; term paper. The life and works of Pushkin, the most prominent poet of Russia. Evaluations of Pushkin by both Russian and Western scholars. Images of Pushkin and the official myths that surround him. No knowledge of Russian required. GE credit: ArtHum, Div, Wrt.—(I.) Druzhnikov

140. Dostoevsky (in English) (4)
Lecture—3 hours. Reading and analysis of Dostoevsky's principal works such as Crime and Punishment, The Idiot, The Brothers Karamazov, and The Diary. Study of social and political views as reflected in Dostoevsky's works. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(III.)

141. Tolstoy (in English) (4)
Lecture—3 hours. Study of Leo Tolstoy's literary evolution and moral quest. Readings include his Confession, a major novel such as War and Peace or Anna Karenina, and representative shorter fiction. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I.

142. Women's Autobiography (in English) (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: any introductory course in literature. An examination of Russian women's autobiography from the 18th through the 20th centuries, emphasizing the way in which the genre of autobiography serves as a means of the writer's creation of herself, as opposed to her definition by others. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

143. Alexander Solzhenitsyn (4)
Lecture/discussion—3 hours; term paper. Prerequisite: any introductory literature course or consent of instructor. Examination of the literary and political writings of the major Russian dissident in the biographical context in which they were created. Knowledge of Russian not required. GE credit: ArtHum, Div, Wrt.—(II.)

144. Christ and Literature (4)
Lecture—3 hours; term paper. Consideration of the intersection of literature, culture, and (at times heretical/blasphemous) theology in Russia and elsewhere. Analysis of texts; discussion of historical contexts and related philosophical approaches to the New Testament. GE credit: ArtHum, Div, Wrt.—III. (III.)

150. Russian Culture (4)
Discussion—3 hours; term paper. Knowledge of Russian not required. Study of Russian culture in nineteenth and twentieth centuries. Brief introduction of the beginnings up to nineteenth century. Russian art, music, philosophy, church, traditions, and daily life. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. (II.)

151. Writers and Censorship in Russia and the Soviet Union (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: any introductory literature course or consent of instructor. Literature and censorship in Russia. Personal responsibility of the author vs. conformism to state morality. Russian myths and Russian realities. GE credit: ArtHum, Wrt.—I. Druzhnikov

154. Russian Folklore (4)
Lecture—3 hours; term paper. Knowledge of Russian not required. Russian folklore, rituals, and history will be analyzed and compared with folklore of other peoples. Sociological implications of attitudes toward family unit, children, etc. Influences of folklore on Russian literature and historiography. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. (II.)

159. Yiddish Literature in Translation (4)
Lecture/discussion—3 hours; term paper. Major writers of Yiddish in English translation; major genres of Yiddish literature from the mid-19th century to the present. GE credit: ArtHum, Div.—III.

166. Representations of Sexuality in Russian Literature (4)
Lecture—3 hours; term paper. Prerequisite: Women's Studies 50 or introductory psychology. Sexuality in Russian oral and written literature from a dual, feminist-psychoanalytic perspective. Monogamy, free love, sexism, homosexuality, incest, androgyny, and others as depicted by such writers as Pushkin, Gogol, Tolstoy, Dostoevsky, Akhmatova, Blok, Tolstaia, and others. GE credit: ArtHum, Div, Wrt.

192. Research Essay (2)
Prerequisite: a Russian literature course (may be taken concurrently). A research essay, based on primary and secondary sources, dealing in depth with a topic arising from or related to the prerequisite literature course. May be repeated for credit.

194H. Special Study for Honors Students (4)
Independent study—4 hours. Prerequisite: open only to majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Russian studies.

195H. Honors Thesis (4)
Independent study—4 hours. Prerequisite: course 194H. Writing an honors thesis, under the direction of a faculty member, on a topic in Russian studies.

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Science and Society

(College of Agricultural and Environmental Sciences)

Ross B. MacDonald, Ph.D., Program Director

Program Office, 143 Robbins Hall (530-752-8669)

Committee in Charge

Patrick Carroll-Burke, Ph.D. *(Sociology, History and Philosophy of Science)*
Lynette A. Hart, Ph.D. *(School of Veterinary Medicine)*
Susan B. Kaiser, Ph.D. *(Textiles and Clothing)*
Annie King, Ph.D. *(Animal Science)*
Ross B. MacDonald, Ph.D. *(Science and Society)*
Dan E. Parfitt, Ph.D. *(Pomology)*
David S. Reid, Ph.D. *(Food Science and Technology)*
Howard G. Schutz, Ph.D. *(Food Science and Technology)*
Steven A. Weinbaum, Ph.D. *(Pomology)*
Barry W. Wilson, Ph.D. *(Animal Science, Environmental Toxicology)*

Faculty

Douglas R. Cook, Ph.D., Professor *(Plant Pathology)*
Lynn Epstein, Ph.D., Associate Professor *(Plant Pathology)*
Thomas R. Gordon, Ph.D., Professor *(Plant Pathology)*
Bruce A. Jaffee, Ph.D., Professor *(Nematology)*
Adel A. Kader, Ph.D., Professor *(Pomology)*
Susan B. Kaiser, Ph.D., Professor *(Textiles and Clothing)*
James D. Murray, Ph.D., Professor *(Animal Science)*
Dan E. Parfitt, Ph.D., Professor *(Pomology)*
Kathryn Radke, Ph.D., Associate Professor *(Animal Science)*
David S. Reid, Ph.D., Professor *(Food Science and Technology)*
David Rizzo, Ph.D., Associate Professor *(Plant Pathology)*
Pamela C. Ronald, Ph.D., Associate Professor *(Plant Pathology)*
Steven A. Weinbaum, Ph.D., Professor *(Pomology)*
Barry W. Wilson, Ph.D., Professor *(Animal Science, Environmental Toxicology)*
Carl K. Winter, Ph.D., Specialist *(Food Science and Technology)*

Affiliated Faculty

Ross B. MacDonald, Ph.D., Academic Administrator

The Program. Science and Society is an interdepartmental teaching program administered by the College of Agricultural and Environmental Sciences that offers students throughout the campus the opportunity to discover the connections that link the social, biological, and physical sciences with societal issues and cultural discourses. Course work examines discovery processes in relation to societal values, public policy and ethics, including issues associated with cultural diversity. Whenever possible, opportunities outside the classroom are included as part of the learning experience.

The Science and Society teaching program serves students of all majors and interests. It can allow lower division students who have not yet declared a major a meaningful context for exploring diverse subject matters. The minor for the program includes, in addition to Science and Society courses, upper division courses from both the College of Agricultural and Environmental Sciences and the College of Letters and Science in the areas of history and philosophy of science, policy and decision making, communication of science, and culture, ethics and applications.

Minor Program Requirements:

	UNITS
Science and Society	**22-27**
Science and Society 1	4
Science and Society 2, 5, 15, 20, 30, 90A, 90B, 90C or 90X	2-4
One course from each of the four following areas:	
History and Philosophy of Science: Community and Regional Development 118, 162, History 185A, 185B, History and Philosophy of Science 150, Nature and Culture 100, Philosophy 107, 108, or 109	4
Policy and Decision Making: Agricultural and Resource Economics 120, 147, 150, Consumer Science 100, Environmental Science and Policy 160, 165, Political Science 175, Sociology 155, or 181	3-4
Communication of Science: Agricultural Education 172, Agricultural Management and Rangeland Resources 122, Anthropology 120, Communication 115, 130, 135, 138, 140, Community and Regional Development 174, Linguistics 163, Political Science 165	3-4
Culture, Ethics and Applications: Agricultural Management and Rangeland Resources 101, Community and Regional Development 142, Environmental Science and Policy 126, 164, Fiber and Polymer Science 110, International Agricultural Development 104, Plant Biology 151, Plant Pathology 140, or Sociology 144	3-4
Science and Society 120	3

Minor Adviser: R.B. MacDonald.

Related courses. See Agricutural and Resource Economics 120, 147, Agricultural Management and Rangeland Resources 1, 101, 122, Communication 115, 140, Community and Regional Development 118, 142, 162, 174, Avian Sciences 13, Environmental Science and Policy 126, 160, 164, 165, Fiber and Polymer Science 110, History 185A, 185B, History and Philosophy of Science 150, Nature and Culture 100, Plant Biology 12, Plant Pathology 140, Political Science 175, Wildlife, Fish, and Conservation Biology 10.

Courses in Science and Society (SAS)

Lower Division Courses

1. Critical Inquiry into Contemporary Issues (4)
Lecture/discussion—3 hours; discussion—1 hour. Contemporary issues, including global population trends, economic and environmental changes, cultural diversity and biodiversity, nutrition and food safety, fiber and textiles, changing consumer cultures. Inquiry processes emphasize ethics, multiple disciplines, and multiple perspectives. GE credit: SciEng or SocSci, Div, Wrt.—I. (I.) MacDonald, Winter

2. Feeding the Planet: Influences on the Global Food Supply (3)
Lecture/discussion—3 hours. Scientific principles and dynamic interactions involved in food production, food processing, nutrition, shelf life and marketing from differing viewpoints. Physical, biological and social science issues influencing the availability and safety of the food supply worldwide. GE credit: SciEng or SocSci, Wrt.—II. (II.) Reid

3. Science, Technology and Society (4)
Lecture—4 hours. Impact of developments in science and technology on the individual in society and how economics, politics, culture and values affect technological development. Not open for credit to students who have completed former course Applied Behavioral Sciences 18. GE credit: SciEng or SocSci, Wrt.—(III.)

5. Pathways to Discovery: Science and Society (3)
Lecture/discussion—3 hours. Highlights a current issue and/or controversy found in contemporary society and looks at how this problem impacts and is affected by the physical, social and biological sciences. Course varies with topic offered. May be repeated twice for credit. Course not offered every year. GE credit: SciEng or SocSci, Wrt.

7. Terrorism and War (4)
Lecture—3 hours; discussion—1 hour; term paper. Exploration of terrorism and war from science and social sciences perspectives. Terrorist cells and groups; biological, chemical, nuclear, and environmental terrorism; intelligence gathering and espionage; military strategy; genocide; epochal wars; clash of civilizations; nation building; and future global scenarios. GE credit: SciEng or SocSci, Wrt.—II. (II.) Carey

15. AIDS and Society (4)
Lecture—3 hours; discussion—1 hour. Biology of HIV transmission and AIDS and how a biological agent acts on and influences the structure of contemporary society. Includes the psychology of risk and stigma, gender issues, changes in social relationships and public policy, global implications. GE credit: SciEng or SocSci, Div, Wrt.—III. (III.) Radke

20. Genetics and Society (3)
Lecture/discussion—3 hours; two field trips. Examination of basic concepts of genetics, modern methods of biotechnology, the process of scientific discovery and the public perception of the process. Presentation, evaluation and critical discussions of the present and future impact of genetics on society. GE credit: SciEng or SocSci, Wrt.—I, II. (I, II.) Cook Epstein, Ronald, Tyler

30. Mushrooms, Molds, and Society (3)
Lecture/discussion—3 hours. Fungi as organisms with which humans interact daily, societal issues arising from these interactions. Fungi in medicine, religion, agriculture, and industry, as well as cultural perceptions of fungi. GE credit: SciEng or SocSci, Wrt.—I. (I.) Gordon, Rizzo

90A. Issues in Environmental and Resource Sciences (2)
Seminar—2 hours; two Saturday field trips. Prerequisite: limited to lower division students. Discussion of historical and current issues in environmental and resource sciences. Lectures, reading and field trips will provide background for selected topics.—I, II. (I, II.) Stasulat

90B. Observing and Writing in Biology (2)
Seminar—1 hour; laboratory—1 hour; term paper. Students will observe the interactions between microscopic organisms, conduct simple laboratory experiments, describe and analyze observations and discuss scientific observations and writing.—Jaffee

90C. Herbal Medicine: Relevance for the 21st Century (2)
Seminar—2 hours. Medicinal usage of plants from biological, historical, and cultural perspectives. Broad contexts of holistic and scientific paradigms for understanding herbal medicine. Saturday field trip to teach herb identification.—II. (II.) Weinbaum

90D. Saving Endangered Plant Species: Problems and Prospects (2)
Seminar—2 hours. Endangered plant species illustrate the value of conservation biology. Topics include societal issues and plant germplasm conservation, comparisons to animal conservation issues, and the economics of and justification for preserving endangered plants.—I. (I.) Parfitt

90E. Biotechnology—a New Era, a New Struggle (2)
Seminar—2 hours. Animal biotechnology and its applications. Discussion topics include potential societal impacts of various technologies, factors shaping public opinion, and ethical and moral questions arising from new biotechnology applications.—I. (I.) Murray

90F. Food Distribution in a Hungry World (2)
Seminar—2 hours. The biological, technological, environmental, and socioeconomic factors related to food distribution systems at local, regional, national, and international levels. The potential for increasing world food supply by reducing losses between harvest and consumption.—I. (I.) Kader

90G. Science, Society and the Environment (2)
Seminar—2 hours. Contemporary environmental issues, scientific approaches to addressing these issues, and accompanying societal and ethical considerations.—I. (I.) Wilson

90X. Lower Division Seminar (1-4)
Seminar—1-4 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Science and Society through shared readings, discussions, written assignments, or special activities such as fieldwork, laboratory work, etc. May be repeated for credit. Limited enrollment.

91A. Explorations in Science and Society: Cultures and Identities (2)
Seminar—1 hour; extensive writing or discussion—1 hour. Prerequisite: participation in the summer Special Transitional Enrichment Program (STEP) or consent of instructor; course 1 concurrently. Exploration of linkages among identity and culture, multi-disciplinary inquiry, and agricultural and environmental science issues.—I. (I.) MacDonald

91B. Explorations in Science and Society: Leadership and Collaboration (2)
Seminar—1 hour; extensive writing or discussion—1 hour. Prerequisite: course 91A or consent of instructor. Extends understanding of culture and identity to issues of leadership, collaboration, and social action in science and society. Includes a mandatory two and half day retreat.—II. (II.) MacDonald

91C. Explorations in Science and Society: Engagement (2)
Seminar—1 hour; internship—3 hours. Prerequisite: course 91B or consent of instructor. Explorations of the concept of engagement in science and society from philosophical and practical perspectives. Exploration of the concept of engagement based on lectures, self reflection, discussions and three hours of K-12 school internships per week.—III. (III.) MacDonald

92. Internship in Science and Society (1-12)
Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Supervised internship on and off campus, in the community, or in institutional settings. (P/NP grading only.)

97T. Tutoring in Science and Society (2-3)
Discussion/lecture—6-9 hours. Prerequisite: lower division standing; completion of course being tutored; consent of instructor. Tutoring in undergraduate Science and Society courses. Assisting with leading discussion groups under supervision of instructor(s) and teaching assistants. Acting as liaison between the students and course instructor(s) to foster effective communication and interaction. May not be repeated. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Discussion—3-15 hours. Prerequisite: lower division standing and consent of instructor. (P/NP grading only.)

Upper Division Courses

105. Organismal Interactions in Everyday Life (3)
Lecture—2 hours; discussion/laboratory—1 hour. Prerequisite: Biological Sciences 10 or 1A. Ecology and evolution of organismal interactions and the importance of these interactions to human health and welfare and a sustainable environment. Students will debate environmental issues on scientific, political, and ethical grounds. GE credit: SciEng, Wrt.

120. Science and Contemporary Societal Issues (3)
Lecture/discussion—3 hours. Prerequisite: upper division standing. Study of a contemporary societal issue/problem emphasizing critical thinking with information drawn from several disciplines. Multiple instructors illustrate the necessity of an interdisciplinary and cooperative approach in solving important issues. Topic will vary. May be repeated once for credit. Course not offered every year. GE credit: SciEng or SocSci, Wrt.—III. (III.) MacDonald

130. Contemporary Leadership (4)
Lecture/discussion—3 hours; discussion—1 hour. Leadership, including issues, skills, and practices as they relate to individuals, organizations, diverse social settings and communities. Written and verbal communications, styles for collaborative work, and ethics. (P/NP grading only.)—I, II, III. King

140. Genetics and Social Issues (4)
Lecture/discussion—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C. Social issues arising from the development and use of modern methods of biotechnology. Presentation, evaluation, and critical discussions of the present and future impact of genetics on society. Not open for credit to students who have completed course 20. GE credit: SocSci, Wrt.—II. (II.) Epstein

190X. Upper Division Seminar (1-4)
Seminar—1-4 hours. Prerequisite: upper division standing and consent of instructor. In-depth examination at an upper division level of a special topic in Science and Society. Emphasis upon student participation in learning. May be repeated for credit. Limited enrollment.

192. Internship in Science and Society (1-12)
Internship—3-36 hours. Prerequisite: upper division standing and consent of instructor. Supervised internship on or off campus, in the community, or in institutional settings. (P/NP grading only.)

197T. Tutoring in Science and Society (1-5)
Tutoring—3-15 hours. Prerequisite: upper division standing; completion of course being tutored or the equivalent. Tutoring of students in Science and Society courses. Assistance with discussion groups and laboratory sections under supervision of instructor. May be repeated for credit if tutoring another Science and Society course. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study in Science and Society (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Courses

298. Group Study (1-5)
Prerequisite: consent of instructor. May be repeated for credit when topic differs. (S/U grading only.)

299. Graduate Research (1-12)
Prerequisite: graduate student and consent of instructor. May be repeated for credit. (S/U grading only.)

Professional Course

390. Teaching Methods in Science and Society (1)
Discussion—1 hour. Prerequisite: graduate level and consent of instructor. Practical experience in methods and problems related to teaching Science and Society courses. Discussion of critical pedagogies specific to teaching of science-societal issues, preparing for and conducting discussion sessions,

analyses of texts and supporting material, formulation of assignments, exams. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Science and Technology Studies

(College of Letters and Science)

Joan Cadden, Ph.D., Program Director

Program Office, 1238 Social Sciences and Humanities Building (530-752-2224)

Committee in Charge

Ann Bonham, Ph.D. *(Internal Medicine, Pharmacology)*
Joan Cadden, Ph.D. *(History)*
Patrick Carroll, Ph.D. *(Sociology)*
Kevin D. Hoover, D. Phil. *(Economics)*
Catherine J. Kudlick, Ph.D. *(History)*
Benjamin S. Orlove, Ph.D. *(Environmental Science and Policy)*
Paul Teller, Ph.D. *(Philosophy)*
Jessica Utts, Ph.D. *(Statistics)*

The Program of Study

The program in Science and Technology Studies offers courses and undergraduate programs of study exploring the nature of science, technology, and medicine in relation to their economic, social, political, and cultural environments. The curriculum is oriented toward the analysis and synthesis of science, technology, and medicine in a way that actively creates connections between the varieties of perspectives and concerns in the humanities and the sciences.

The program will be of interest to undergraduate students who intend to pursue careers in which it will be useful to have a broad understanding of the nature and role of science, technology, and medicine; for example, careers in science teaching, medicine and other health care professions, technical writing and science journalism and science policy.

Courses in Science and Technology Studies (STS)

Lower Division Courses

1. Introduction to Science, Technology and Medicine Studies (4)
Lecture—3 hours; discussion—1 hour. History, philosophy, sociology, politics, and cultural studies of science, technology, and medicine. Emphasis on a broad range of perspectives. GE credit: SciEng or SocSci.—II. (II.) Carroll

20. Methods in Science, Technology and Medicine Studies (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 recommended. Methodological issues concerning the historical, philosophical, sociological, ethical, and political analysis of science, technology, and medicine. Detailed case studies to illustrate different methods of analysis. GE credit: SciEng or SocSci, Wrt.—(III.) Carroll

Upper Division Courses

130A. From Natural History to the History of Nature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: History 135A recommended. Evolution and demise of natural history as a discipline from Aristotle to Linnaeus. Considers ancient views of nature and its Renaissance rediscovery; the emergence of biology, botany, geology, and zoology; the history of taxonomy and classification. GE credit: ArtHum or SciEng, Wrt.

130B. History of Modern Biology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 130A recommended. Development of modern biology from pre-Darwinian roots to the present. Considers emergence of modern biological specialities and consolidation of biological theory around evolutionary ideas. History of allied fields such as genetics, paleontology, embryology, ecology, systematics and molecular biology. GE credit: ArtHum or SciEng, Wrt.—II. (II.)

131. Darwin (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Students will explore the life and times of Charles Darwin and will trace the development of evolutionary thinking before and after the *Origin of Species* to appreciate its place in Victorian society and in the corpus of Darwin's thought. GE credit: ArtHum or SciEng, Wrt.—III. (III.) Griesemer

150. Gender and Science (4)
Lecture/discussion—3 hours; term paper. An interdisciplinary approach to the relations between gender and science. Topics include the biological and cultural construction of sexual difference, the role of women as practitioners of science, and feminist approaches to science. GE credit: SocSci, Div, Wrt.

180. Topics in History and Philosophy of Science (4)
Seminar—3 hours; term paper. Prerequisite: course in History and Philosophy of Science or other coursework relevant to topic. In depth treatment of selected topics in the history and philosophy of science. Possible topics include history of modern physics, history of molecular biology, science and society, science and power, scientific explanation, technology and culture, theory testing. May be repeated for credit with consent of instructor.—I, II, III.

190. Seminar in Science, Technology and Medicine Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: open to junior and senior Science and Technology Studies majors only. Intensive reading, discussion, research and writing by small groups in selected topics of science, technology, and medicine studies scholarship. Emphasis on individual research projects.—III. (III.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

250. History and Philosophy of Science (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Interdisciplinary seminar in the history and philosophy of science. Focuses on issues such as historiography, methodology, and the conceptual foundations of science. May be repeated for credit with consent of instructor.

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Social and Ethnic Relations

(College of Letters and Science)

The interdisciplinary minor in Social and Ethnic Relations explores the racial, ethnic, class and gender aspects of human relations in the modern world. Students study human societies and cultures from a multi-ethnic perspective and across established academic departmental lines. The minor is jointly sponsored by African American and African Studies, Asian American Studies, Native American Studies, and Women's Studies.

Minor Program Requirements:

UNITS

Social and Ethnic Relations 24
Select one course from each of the following six groups to total 24 units. Courses applied toward the satisfaction of a major may not also be offered in satisfaction of the minor. No more than four units (one course) may be lower division.
(a) African American and African Studies 100; Anthropology/Native American Studies 134; Women's Studies 102
(b) African American and African Studies 123, 133, 145A
(c) Asian American Studies 1, 2, 100, 110, 130
(d) Chicana/o Studies 130, 132
(e) Native American Studies 1, 10, 115, 119, 130A, 130B, 130C, 157, 180
(f) Women's Studies 103, 104, 180

Advising. Contact Asian American Studies, 3102 Hart Hall, 530-752-3625.

Social Sciences

(College of Letters and Science)

Gregory Clark, Ph.D., Program Director

Program Office, 108 Sproul Hall (530-752-4001)

Committee in Charge

Gregory Clark, Ph.D. *(Economics)*
Dennis J. Dingemans, Ph.D. *(Social Sciences)*
Jack Goldstone, Ph.D. *(Sociology)*
Hilary Hoynes, Ph.D. *(Economics)*
Mary Jackman, Ph.D. *(Sociology)*
Jeanette Money, Ph.D. *(Political Science)*
Marianne Page, Ph.D. *(Economics)*
Randolph Siverson, Ph.D. *(Political Science)*
William Skinner, Ph.D. *(Anthropology)*

Faculty

Dennis J. Dingemans, Ph.D., Senior Lecturer, *Academic Senate Distinguished Teaching Award*

Emeriti Faculty

Howard F. Gregor, Ph.D., Professor Emeritus
Frederick J. Simoons, Ph.D., Professor Emeritus
Kenneth Thompson, Ph.D., Professor Emeritus

The Program of Study

The Program in Social Sciences promotes the development of innovative curricular initiatives across the social sciences, including offering broadly conceived, integrative undergraduate-level and graduate-level courses. Faculty affiliated with the program are often engaged in interdepartmental teaching and research.

Social Theory and Comparative History

John R. Hall, Ph.D., Program Director and Professor (Sociology)

Program Office, Center for History, Society, and Culture, 2231 Social Sciences and Humanities Building (530-754-8328)

Graduate Study. The program comprises course work and research leading to the Ph.D. with a designated emphasis in Social Theory and Comparative History. The program provides theoretical training and interdisciplinary perspective to Ph.D. candidates in the nine participating departments and graduate groups (Anthropology, Comparative Literature, Cultural Studies, Economics, English, Geography, History, Political Science, Sociology). Students from other departments are also welcome. All students must fulfill all Ph.D. requirements of their home department. The additional requirements leading to the designated emphasis include: (1) four graduate courses (Social Theory and Comparative History 250, Sociology 242A, and two courses sponsored by the Social Theory and Comparative History program, one of which must be offered by a department other than the student's home department); (2) presentation of a Social Theory and Comparative History field as one area of specialization in the departmental Ph.D. qualifying examination; (3) an oral discussion, following passage of the Ph.D. qualifying examination, based on the student's dissertation prospectus; (4) completion of the dissertation to the satisfaction of the student's thesis committee, one of whose members will be a representative of the Social Theory and Comparative History program.

Graduate Adviser. Consult the Program Director, Program Office, or web site (http://chsc.ucdavis.edu) for advising and detailed information on application and requirements.

Courses in Social Theory and Comparative History (STH)

Graduate Courses

250. Research in Social Theory and Comparative History (4)
Seminar—3 hours; term paper. Prerequisite: admission to Social Theory and Comparative History Designated Emphasis. Theoretically informed research in comparative history. Students read exemplary works and learn to frame their own research projects. Presentations include Center for History, Society, and Culture faculty and visitors discussing current research.—III. (III.)

290. Advanced Topics in Social Theory and Comparative History (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor and History 204 or Sociology 242A. Interdisciplinary study of particular substantive problems in social theory and comparative history. Topics vary.—I, II, III. (I, II, III.)

295. Advanced Group Research in Social Theory and Comparative History (1)
Discussion—1 hour. Prerequisite: consent of instructor. Participation in research workshops sponsored by the Center for Comparative Research in History, Society, and Culture. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

296. Theory and Society Journal Editorial Workshop (1-4)
Workshop—1 hour; independent study—3 hours. Reading and offering workshop critiques of papers submitted for publication. Reading and discussion of other relevant work in history and the social sciences. May be repeated for credit up to 36 units or with consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.) Gouldner

Sociology

(College of Letters and Science)

James C. Cramer, Ph.D., Chairperson of the Department

Department Office, 1282 Social Sciences and Humanities Building (530-752-0782)

http://sociology.ucdavis.edu

Faculty

Thomas D. Beamish, Ph.D., Assistant Professor
Nicole W. Biggart, Ph.D., Professor *(Sociology, Management)*
Fred Block, Ph.D., Professor
Patrick Carroll, Ph.D., Assistant Professor
Lawrence E. Cohen, Ph.D., Professor
James C. Cramer, Ph.D., Professor
Diane H. Felmlee, Ph.D., Professor
T. Ryken Grattet, Ph.D., Associate Professor
Laura Grindstaff, Ph.D., Associate Professor
Eric Grodsky, Ph.D., Assistant Professor
Luis Guarnizo, Ph.D., Associate Professor *(Human and Community Development)*
Drew Halfmann, Ph.D., Assistant Professor
John R. Hall, Ph.D., Professor
Bruce D. Haynes, Ph.D., Assistant Professor
Frank Hirtz, Ph.D., Associate Professor *(Human and Community Development)*
Mary Jackman, Ph.D., Professor
Carole E. Joffe, Ph.D., Professor
Carl C. Jorgensen, Ph.D., Associate Professor
David J. Kyle, Ph.D., Associate Professor
William B. Lacy, Professor *(Human and Community Development)*
Ming-Cheng Lo, Ph.D., Associate Professor
Lyn H. Lofland, Ph.D., Professor
William McCarthy, Ph.D., Professor
Dina G. Okamoto, Ph.D., Assistant Professor
Donald A. Palmer, Ph.D., Professor *(Management)*
Kimberlee A. Shauman, Ph.D., Assistant Professor
Xiaoling Shu, Ph.D., Assistant Professor
Michael P. Smith, Professor *(Human and Community Development)*
Vicki Smith, Ph.D., Professor
John T. Walton, Ph.D., Professor
Diane L. Wolf, Ph.D., Professor

Emeriti Faculty

Bruce M. Hackett, Ph.D., Professor Emeritus
John F. Lofland, Ph.D., Professor Emeritus
John F. Scott, Ph.D., Professor Emeritus

Affiliated Faculty

Debora Paterniti, Ph.D., Assistant. Adjunct Professor
Norman Skonovd, Ph.D., Lecturer

The Major Programs

Sociology is the study of human society in all its manifestations. Its aim is to discover the process and structure of human interaction, to identify the main forces that sustain or weaken social groups, and to determine the conditions that transform social life. Sociology, like any science, is a disciplined, intellectual quest for knowledge about the fundamental nature of things.

The Program. The Department of Sociology offers two major programs, Sociology and Sociology–Organizational Studies. Students selecting the Sociology major may choose from four options in the major. The General Sociology emphasis allows students to obtain a broad understanding of the concepts, methods, and theories of sociology. Students with a special interest in the areas of Law and Society or Social Services may choose a more specialized program of courses and practical experience within the sociology major. The Comparative Studies and World Development emphasis provides a sociological perspective on social and economic changes throughout the world, with a stress on relationships between "developed" and "underdeveloped" societies. In their junior year, students are encouraged to consider the Education Abroad Program , especially one in a developing country.

The Sociology–Organizational Studies major develops a broad understanding of the political, social, and economic organizations that comprise modern society. This major emphasizes a sociological perspective, but incorporates a multidisciplinary field of study. The major introduces students to a range of theories and methods that social scientists use in the analysis of organizations.

Career Opportunities. In the Sociology major, the General option is for students desiring a solid liberal arts education as well as those interested in graduate work in the social sciences. Options in Law and Society or Social Service prepare students for careers in such areas as law, corrections, social work or counseling. The Comparative Studies and World Development emphasis prepares students for graduate training leading to careers in international fields. Majors in Sociology–Organizational Studies will be prepared for a variety of career options, particularly in the field of management. The major specifically meets entry requirements for programs of professional training leading to a Masters degree in public or private management, and may also lead to further study in any of the disciplinary areas incorporated in the major.

Sociology

A.B. Degree Requirements:

General emphasis:

UNITS

Preparatory Subject Matter 29
Sociology 1, 46A, and 46B (or the equivalents)..... 13
Sociology 2, 3, 4 or 5..... 4
Anthropology 2 or 20..... 4
Select from History 4A, 4B, 4C, 8, 9A, 9B, 10C, 15, 16, 17A, 17B..... 4
Select from Philosophy 5, 14, 24..... 4

Depth Subject Matter..... 44
A. Sociology 100 4
B. Select one course from each of the following four clusters..... 16
Individual, Culture and Society: Sociology 125, 126, 135 4
Stratification and Social Differentiation: Sociology 130, 132, 140..... 4
Organizations and Institutions: Sociology 118, 131, 146, 180A..... 4
Social Dynamics: Sociology 104, 141, 143A, 170..... 4
C. Select three upper division courses from one of the following clusters (not counting courses taken to fulfill requirement B) 12
Individual, Culture and Society: Sociology 102, 120, 122, 125, 126, 127, 128, 129, 131, 132, 134, 135, 143B, 148, 150, 152, 172, 173, 174, 175, 176
Stratification and Social Differentiation: Sociology 118, 128, 129, 130, 132, 133, 134, 140, 145A, 145B, 172, 185, 188, and not more than one of the following courses: African American and African Studies 123, Asian American Studies 100, Chicana/o Studies 110, or Native American Studies 115
Organizations and Institutions: Sociology 118, 124, 131, 133, 139, 144, 146, 149, 150, 151, 154, 155, 159, 180A, 180B, 181, 182, 183, 185
Social Dynamics: Sociology 104, 123, 125, 138, 141, 143A, 145A, 145B, 147, 148, 156, 157, 170
Student-initiated thematic cluster: developed with a faculty adviser and approved by the Sociology Undergraduate Curriculum Committee

D. Eight units of Sociology beyond courses taken to fulfill above requirements, and outside of the course cluster used to fulfill requirement C 8
E. One integrative course (prerequisite: senior standing and completion of requirement for Preparatory Subject Matter, Depth Subject Matter, requirement A, and at least two of the courses for requirement B). Choose from Sociology 190X, 191, 192/193, 194HA-194HB, 195 4

Total Units for the Major 73

Law and Society emphasis:

UNITS

Preparatory Subject Matter 29
Sociology 1, 3, 46A and 46B (or the equivalents)..... 17
Anthropology 2 or 20..... 4
Select from History 4A, 4B, 4C, 8, 9A, 9B, 10C, 15, 17A, 17B..... 4
Philosophy 5 or 14..... 4

Depth Subject Matter..... 44
Sociology 100 and 155..... .8
Select courses from the following categories 32
Individual Culture and Society: Sociology 125, 126, 135 4
Stratification and Social Differentiation: Sociology 130, 132, 140..... 4
Organizations and Institutions: Sociology 118, 131, 146, 180A4
Crime and Social Dynamics: Sociology 120, 150, 151,152 ..... .12
Stratifications and Social Dynamics: Sociology 118, 148, 156, 157; African American and African Studies 121, 145A, 145B; Asian American Studies 155; Chicana/o Studies 130, 132; Native American Studies 117, 118..... 4
Legal Studies: Philosophy 119; Political Science 122, 154, Environmental Science and Policy 161, Psychology 153 4
Methodology: (prerequisite: senior standing and completion of requirement for preparatory subject matter): Select one course from Sociology 190X, 192/193, 194HA-194HB, 195 4

Total Units for the Major 73

Social Services emphasis:

Preparatory Subject Matter 28
Sociology 2, 3, 46A, and 46B (or the equivalents)..... 16
Psychology 1..... 4
Select from African American and African Studies 10, 15; Asian American Studies 1, 2; Chicana/o Studies 10, 20; Native American Studies 1, 10..... 8

Depth Subject Matter..... 44
Sociology 131, 140, 185..... 12
Select four units of upper division psychology: Psychology 140, 142, 151, 168.... 4
Select seven courses distributed as specified 28
Social Issues: Sociology 104, 120, 122, 124, 139, 143A, 144, 146, 150, 152, 154, 155, 170 8
Social Interaction: Sociology 126, 127, 128, 143B, 148, 157..... 4
Race and Ethnicity: African American and African Studies 100; Community and Regional Development 176; Asian American Studies 110, 111, 150; Chicana/o Studies 110; Native American Studies 115: Sociology 129, 130 134..... 4
Gender: Sociology 132, 133, 145B, 172 4
Organizational Behavior: Sociology 151, 180A, 180B, 181, 182, 183..... 4
Methodology: prerequisite—senior standing and completion of requirement for preparatory subject matter: Sociology 103, 106 (or the equivalents), 190X, 192/193, 194HA, 194B, 195..... 4

Total Units for the Major 72

Comparative Studies and World Development emphasis:

Preparatory Subject Matter 30–56
Sociology 1, 5, 46A, and 46B (or the equivalents)..... 17
Economics 1B, ... 5
Anthropology 2..... 4
At least 4 units from Geography 2-2G, History 10C, Political Science 2 4
Course work in language instruction in modern foreign language equivalent to 26 units at UC Davis..... 26

Depth Subject Matter..... 48
Sociology 100, 104, 141, 145A, 170 20
Economics 115A or Anthropology 126A 4
At least twelve units from Sociology 118, 130, 131, 143A, 144, 145A, 145B,156 12
Regional focus, three courses from one of the following groups..... 12
(a) Africa/Middle East: African American and African Studies 110, 111; Anthropology 140A, 140B, 142; Economics 175; History 115A, 115B, 115C, 116; Political Science 134, 146
(b) Latin America/Pacific: African American and African Studies 107A; Anthropology 144, 147; Economics 175; Geography 122A, 122B; History 161A, 161B, 162, 165; Spanish 170,171 (formerly 135 and 136)
(c) Asia: Anthropology 149; Economics 171, 172, 173; Geography 126, 127; History 193, 194A, 194B, 194C; Political Science 138, 148A, 148B; Religious Studies 168, 172; Sociology 147, 188

Total Units for the Major 78-104

Sociology—Organizational Studies

A.B. Degree Requirements:

UNITS

Preparatory Subject Matter 26-27
Sociology 1 or 2, 5, 46A, and 46B (or the equivalents)..... 16-17
Economics 1A, 1B..... 10

Depth Subject Matter..... 44
Sociology 180A, ... 4
Sociology 106..... 4
Select from Psychology 156, Communication 130 or 136..... 4
Select six courses from below, at least three courses from Sociology..... 24
Agricultural and Resource Economics 112; American Studies 125; Community and Regional Development 151/151L, 152, 154, 156, 158, 162, 164, 168; Economics 116, 121A, 121B, 151A, 151B; History 185B, 194D; Political Science 107, 180, 187; Sociology 100, 103, 124, 138, 139, 141, 159, 180B, 181, 183, 185
Select from Sociology 128, 130, 132, 134, 140, 145A, 145B, 172..... 4
Select from Sociology 190X, 192/193, 194HA-194HB, 195 (prerequisite: senior standing and completion of requirement for preparatory subject matter) 4

Total Units for the Major 70-71

Major Advisers. Consult the Departmental Advising Office, 1282 Social Sciences and Humanities Building.

Minor Program Requirements:

Students in other disciplines may elect to minor in Sociology by choosing a sociological subject emphasis listed below. On transcripts, the minor will appear as a minor in Sociology.

UNITS

Sociology 20

Sociology–General emphasis
Select from Sociology 100, 126, 140, 170, 180A..... 8
One course from any three clusters (see cluster lists under Sociology Major—General Emphasis)..... 12

Sociology–Organizational Studies emphasis
Sociology 180A and 180B..... 8
Select from Agricultural and Resource Economics 112; American Studies 125; Communication 134, 136; Community and Regional Development 162, 163, 164; Economics 100; Political Science 180, 181, 183, 187, 188; Psychology 183 8
Select from Anthropology 122; History 174A, 179, 187A, 187B, 194D; Sociology 118, 139, 141, 156, 159, 175, 181, 183 4

Sociology–Social Service emphasis
Sociology 185, plus 4 units selected from Sociology 131, 132, 133, 145B 8
Select from Sociology 129, 130, 133, 134, 140, 172 4
Four units from Social Issues cluster and four units from Social Interaction cluster (See cluster lists under Sociology Major—Social Services emphasis)..... 8

Sociology–Law and Society emphasis
Sociology 155, plus one of Sociology 120, 150, 152 8
One of Sociology 129, 130, 131, 132, 133, 134, or 172..... 4
One of Sociology 118, 139, 140, 141, 145A or 145B, 180A or 180B, or 185..... 4
One of Sociology 100, 122, 124, 126, 128, 143A or 143B, 156, 157, or 191 4

Minor Advisers. Consult the departmental Advising Office, 1282 Social Sciences and Humanities Building.

Honors Program. An Honors Program is available to Sociology and Sociology–Organizational Studies majors who have demonstrated excellence in their field of study. To be eligible for the program, students must have a grade-point average of 3.5 in the major and the recommendation of a faculty sponsor familiar with their work. In addition to meeting the standard major requirements, the honors student writes an honors thesis and participates in a two-quarter honors seminar (course 194HA-194HB). Successful completion of the Honors Program, when combined with College GPA requirements, enables the student to graduate with Highest Honors or with High Honors.

Graduate Study. The Department offers programs of study and research leading to the M.A. and Ph.D. degrees in sociology. Further information regarding graduate study may be obtained at the department office or on our Web site.

Graduate students in Sociology have the opportunity to pursue designated emphases in Critical Theory, Social Theory and Comparative History, Native American Studies, Economy, Justice and Society, or Feminist Theory and Research. See these headings for further details on these interdisciplinary programs.

Graduate Advisers. Consult the Graduate Program Coordinator, 1287 Social Sciences and Humanities Building.

Courses in Sociology (SOC)

Lower Division Courses

1. Introduction to Sociology (5)
Lecture—4 hours; discussion—1 hour. Principles and basic concepts of sociology. The study of groups, culture, collective behavior, classes and caste, community and ecology, role, status, and personality. GE credit: SocSci.—I, II, III. (I, II, III.)

2. Self and Society (4)
Lecture—3 hours; discussion—1 hour. Principles and basic concepts of sociological social psychology. Includes the study of the character of the self, identity, roles, socialization, identity change, emotion and social interaction. GE credit: SocSci, Wrt.—I, II, III. (I, II, III.)

3. Social Problems (4)
Lecture—3 hours; discussion—1 hour. General sociological consideration of contemporary social problems in relation to sociocultural change and programs for improvement. GE credit: SocSci, Wrt.—I, II, III. (I, II, III.)

4. Immigration and Opportunity (4)
Lecture—3 hours; discussion—1 hour or term paper. Social and demographic analysis of immigration: motives and experiences of immigrants; immigration and social mobility; immigration, assimilation, and social change; multicultural societies. Detailed study of immigration into the U.S., with comparative studies of Europe, Australia, and other host countries. GE credit: SocSci, Div, Wrt.—III. (III.)

5. Global Social Change: An Introduction to Macrosociology (4)
Lecture—3 hours; discussion—1 hour. An introduction to change and diversity in world history, including the United States. Examines population and family, technological change and economic development, power and status, culture and identity. GE credit: SocSci, Div, Wrt.—I. (I.)

25. Sociology of Popular Culture (4)
Lecture—3 hours; discussion—1 hour. Social mechanisms that shape modern popular culture. High, folk, and mass culture: historical emergence of popular culture. Mass media, commercialization, ideology and cultural styles. Theories and methods for analyzing cultural expressions in pop music, street art, film, television, and advertising. GE credit: SocSci, Wrt.—I. (I.)

30A. Intercultural Relations in Multicultural Societies (3)
Lecture—1.5 hours; discussion—1.5 hours. Macrostructural analysis of contemporary multicultural societies; immigration and assimilation in comparative perspective; social construction of racial and ethnic group identities; ethnicity and gender; group conflict and cooperation; controversies surrounding multiculturalism. First course in a 2-course Multicultural Immersion Program. GE credit: Div.—I. (I.)

30B. Intercultural Relations in Multicultural Societies (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: course 30A. Social-psychological analysis of personal experiences living in a multicultural society; conforming to or rejecting group identity or stereotypes; managing and reducing conflict; cross-cultural communication; promises and problems of diversity at UCD. Second course in 2-course Multicultural Immersion Program.—II. (II.)

46A. Introduction to Social Research (4)
Lecture—3 hours; discussion—1 hour or term paper or project (instructor's option). Examination of the methodological problems of social research. Selection and definition of problems of investigation, data-gathering techniques, and sampling.—I, II, III. (I, II, III.)

46B. Introduction to Social Research (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Data-analysis techniques, measurement, scaling, multivariate analysis, and quantitative measures of association.—I, II, III. (I, II, III.)

90X. Lower Division Seminar (1-2)
Seminar—1-2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in sociology through shared readings, discussions, written assignments, or special activities such as fieldwork, laboratory work, etc. May not be repeated for credit. Limited enrollment.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily intended for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Classical and Modern Sources of Sociological Theory (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Historical introduction of sociological thought, with special reference to its 19th-century origins and 20th-century lines of development. Consideration of theoretical texts may include works of Marx, Durkheim, Simmel, early critical theorists, Parsons, and the Chicago School. Not open for credit to students who have received credit for course 165A. GE credit: Wrt.—I, II, III. (I, II, III.)

102. Society and Culture of California (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: introductory course in Sociology recommended. California's distinctive society and culture; sociological analyses of topical issues concerning diversity, environment, cities.—(II.)

103. Evaluation Research Methods (4)
Lecture—3 hours; discussion—1 hour or field research (instructor's option). Prerequisite: course 46A and 46B, or Statistics 13 or the equivalent. Surveys applications of research methods to the evaluation of social programs, primarily emphasizing methodological issues, e.g., research design and data collection; uses of evaluation research are also discussed and placed in theoretical context. Participation in an evaluation project.—I, III. (I, III.)

104. The Political Economy of International Migration (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing. Analysis of worldwide migration patterns, and social scientific theories of international and transnational migration. Focus in economical, political, and social impact of immigration and potential for international and regional cooperation. (Same course as International Relations 104).—(II.)

106. Intermediate Social Statistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 46B or Statistics 13 or the equivalent. Intermediate level course in statistical analysis of social data, emphasizing the logic and use of statistical measures, procedures, and mathematical models especially relevant to sociological analysis.—I, II. (I, II.)

118. Political Sociology (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Relation of social cleavages and social cohesion to the functioning of political institutions; the social bases of local and national power structures; social sources of political movement, analysis of concepts of alienation, revolution, ideology, ruling class, and elite.—II, III (II, III.)

120. Deviance (4)
Lecture—3 hours; term paper or discussion. Social structural sources, institutional practices and microprocesses associated with illegality, evil, disease, immorality, disability, racial and class differences, citizenship, and the body. Special emphasis on expert knowledge and the production and management of social difference. GE credit: Wrt.—I, II. (I, II.)

122. Sociology of Adolescence (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Chronological age and social status; analysis of social processes bearing upon the socialization of children and adolescents. The emergence of "youth cultures." Generational succession as a cultural problem.

123. American Society (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. The demographic and social structure of American society and population, with emphasis on ethnic and class groups as bases for political and economic interest. Attention to selected current social controversies.

124. Sociology of Education (4)
Lecture—3 hours; term paper or discussion—1 hour (instructor's option). Education and the social structure. Class size, curriculum, and economies of scale. Relations between families and schools in socialization; familial ascription and educational achievement. Education and industrialization. Organizational and occupational structure of schools. Discussion of selected controversies.—I. (I.)

125. Sociology of Culture (4)
Lecture/discussion—3 hours; term paper. Sociological approaches to study of historical and contemporary culture and mass media, and their structuring in relation to social actors, institutions, stratification, power, the production of culture, audiences, and the significance of culture in processes of change. GE credit: SocSci.—I, II. (I, II.)

126. Social Interaction (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Prerequisite: course 2. Everyday interaction in natural settings; ethnographic approaches to the understanding of social meanings, situations, personal identity and human relationships. Particular attention to the work of Erving Goffman and to principles of field observation and qualitative analysis. GE credit: Wrt.—I, III. (I, III.)

127. Sociology of Death (4)
Lecture—3 hours; discussion—1 hour or term paper or project (instructor's option). Prerequisite: course 1 or the equivalent. Overview of attitudes toward, structural effects of, and methods of coping with death and death-related behaviors. Particular attention to social psychological aspects of death and dying, to death occupations, and to death rituals in various cultures. GE credit: Wrt.

128. Interracial Interpersonal Dynamics (4)
Lecture—3 hours; discussion—1 hour or term paper or project (instructor's option). Prerequisite: one course from courses 1, 2, 3, Afro-American Studies 10, Asian American Studies 1, 2, Chicano Studies 10, Native American Studies 1, 20. Analysis of the influences of cultural differences and racial stratification on interpersonal interaction in instrumental settings (e.g., work, education, political action) and intimate settings (e.g., friendship, love, marriage, family). Minority/majority relationships. GE credit: Div, Wrt.—III. (III.)

129. Sociology of Black Experience in America (4)
Lecture—3 hours; discussion—1 hour or research or term paper (instructor's option). Survey of historical and contemporary theoretical sociological perspectives on the Black experience in United States. Emphasis on comparisons of Black sociological perspectives and mainstream perspectives of specific sociologists. GE credit: Div.—I, III. (I, III.)

130. Race Relations (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Functions of the social definitions of race and racial groups. Analysis of racial conflict, oppression, and other forms of ethnic stratification. Models of ethnic interaction and social change. Emphasis on racial relationships within the U.S. GE credit: Div.—I, II. (I, II.)

131. The Family (4)
Lecture—3 hours; discussion—1 hour. Contemporary family life in historical and cross-cultural perspective. How different family forms arose, their significance today and prospects for further family change. Attention to power relations within and beyond the family and to the social implications of family transformation. GE credit: SocSci, Div, Wrt.—I, II, III. (I, II, III.)

132. The Sociology of Gender (4)
Lecture—3 hours; discussion—1 hour. Analysis of biological, psychological, cultural and structural conditions underlying the status and roles of men and women in contemporary society, drawing on a historical and comparative perspective. GE credit: SocSci, Div.—I, II, III. (I, II, III.)

133. Sexual Stratification and Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 132 or the equivalent or consent of instructor. Analysis of origins, dynamics, and social implications of sexual stratification. Examination of classical and contemporary theorists such as Engels, Freud, J.S. Mill, de Beauvoir, Juliet Mitchell, D. Dinnerstein. Attention to selected issues in social movements for and against sexual equality. GE credit: Div.

134. Sociology of Racial Ethnic Families (4)
Lecture—3 hours; discussion—1 hour or term paper. Asian American, Black, Chicano, and Native American family life in comparative historical perspective. Family structure and gender roles are considered in relation to socio-historical dynamics. Offered in alternate years. GE credit: Div, Wrt.

135. Social Relationships (4)
Lecture—3 hours; discussion—1 hour or term paper. Prerequisite: course 1, 2 or 3, and upper division standing. Social and cultural factors influencing friendships and intimate relationships. Topics include relationship development, relationship maintenance, and relationship loss. GE credit: Div, Wrt.—II. (II.)

138. Economic Sociology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A or 1B and upper division standing in the social sciences. Overview of the rapidly growing field of economic sociology. Focus on variations in the ways that markets are organized. The relationship between individual and collective rationality will also be emphasized.—I. II. (I, II.)

139. Corporations and Society (4)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1 or 2 or 3, and upper division standing. The study of the history and power of the modern corporation; corporate organization; politics, the state, and the corporation; labor unions and the labor process; competition, regulation and international markets; the multinational and conglomerate corporation; and mass markets and consumerism.—II, III. (II, III.)

140. Social Stratification (4)
Lecture—3 hours; discussion—1 hour or term paper or research project (instructor's option). Systems of social ranking, theories of stratification; power, prestige, culture, and styles of life of various social classes; social mobility and its consequences for social structure.—I, II, III. (I, II, III.)

141. Industrialization and Social Change (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Selected technological and social factors. Preconditions of economic development and industrialization. Social, political, and cultural issues at various levels of economic development. Major historical differences and major current trends. Emphasis either on highly industrialized countries or on less developed countries. GE credit: Wrt.—II. (II.)

143A. Urban Society (4)
Lecture—3 hours; discussion—1 hour or term paper or project (instructor's option). Prerequisite: course 1 or the equivalent. Theories of city origins. Analysis of the historic process of urbanization and of varying city types. Comparison of American and European experience of metropolitanization, counterurbanization, and neighborhood change. Consideration of competing theories of urban growth and change and competing visions of the urban future. Offered in alternate years.—III. (III.)

143B. Sociology of City Life (4)
Lecture—3 hours; discussion—1 hour or term paper or project (instructor's option). Prerequisite: course 1 or the equivalent; course 143A recommended. Critical dissection of the "loss of community" issue. Analysis of the organization of primary ties in the city, of the culture of urban public life and of the learning of city skills. Offered in alternate years. GE credit: Wrt.—III.

144. Agriculture and Society (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Prerequisite: advanced standing in the social sciences or one year of course work in agricultural and environmental sciences. Development of agriculture as a major enterprise in modern society with the concomitant reduction in the labor force and family farms. Analysis of issues including mechanization, migrant labor, corporate farming, and public resource policy. Offered in alternate years.

145A. Sociology of Third World Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1; upper division standing. Introduction to theories and contemporary issues in the sociology of development. Topics such as urbanization, rural/agrarian change, class, status groups, international division of labor, sectoral shifts, international capital, informal economy, gender, and political processes are analyzed within a comparative-historical framework. GE credit: Div, Wrt.—II. (II.)

145B. Gender and Rural Development in the Third World (4)
Seminar—4 hours. Prerequisite: course 1; upper division standing. Political-economic analysis of women and work during the process of socioeconomic change in the world with particular attention to the family/household context. Offered in alternate years. GE credit: Div, Wrt.—(II.)

146. Sociology of Religion (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Relationship between social structures and religions. The social setting of the major world religions. Religious innovators and institutionalization (churches, sects, cults). Secularization in the modern world and the rise of secular ideologies. Offered in alternate years. GE credit: SocSci, Div, Wrt.—III.

147. Sociological Perspectives on East Asia (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Sociological theories and concepts applied toward understanding East Asian society. Emphasis on the political structure, stratification, and economy in China and Japan. Analysis of historical and contemporary similarities and differences. Offered in alternate years.—(III.)

148. Collective Behavior (4)
Lecture—3 hours; discussion—1 hour or term paper or project (instructor's option). Prerequisite: course 1 or the equivalent. Study of behavior of human crowds and masses in extraordinary circumstances, including crowd panics, mass scares, collective protests, riots, revolutionary situations, ecstatic and revivalist gatherings, crazes, fads, and fashions.—III. (III.)

149. Religion and American Society (4)
Lecture—3 hours; class project. Historical, contemporary survey of religious traditions and organizations and their relation to U.S. social and cultural patterns. Civil religion, religious pluralism, minority and deviant communities, religious migration, U.S. religion as a social institution, and religion, politics, and social stratification. Offered in alternate years. GE credit: Div, Wrt.—(III.)

150. Criminology (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Sociological analysis of criminal behavior in relation to social structure and the criminalization process.—I, III. (I, III.)

151. The Criminal Justice System (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 150 and upper division standing. Sociological analysis of the different components of the criminal justice system including the emergence and interpretation of criminal laws, the contemporary roles and functions of the police, criminal courts and correctional institutions.—II. (II.)

152. Juvenile Delinquency (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Study of juvenile delinquency in relation to the family, peer groups, community, and institutional structures. Consideration of processing of the delinquent by formal agencies of control.—I, II, III. (I, II, III.)

154. Sociology of Health Care (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Overview of sociological research in medicine and health care, with emphasis on the organizational, institutional, and social psychological aspects.—II. (II.)

155. Sociology of Law (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Law considered as social control; relation of legal institutions to society as affecting judicial decision making and administration of justice. Lawyers as an occupational group. Legal reform.—II, III. (II, III.)

156. Social Movements (4)
Lecture—3 hours; discussion—1 hour or term paper or project (instructor's option). Analysis of several aspects of social movements: mobilization, forms of organization, ideology, recruitment, leadership, strategies and tactics, development, effects. Frequent use of sound and film materials. GE credit: SocSci.—II, III. (II, III.)

157. Social Conflict (4)
Lecture—3 hours; discussion—1 hour or term paper or project. Analysis of the causes, dynamics, and regulation of social conflict within and between various kinds of social groupings with particular reference to nonviolent methods of waging and regulating conflict.—I.

159. Sociology of Occupations (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Natural history of occupations; the institutional matrix of occupations; colleague and client relationships; occupational social controls; career lines, and occupational-related self-definitions; occupational politics.—I, II. (I, II.)

170. Population (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Introduction to the study of human population, including theories and statistical measures; social causes and consequences of population trends; changes in population structure; geographical distribution, migration, socio-psychological factors affecting fertility. GE credit: SocSci.—III. (III.)

172. Ideology of Class, Race and Gender (4)
Lecture—4 hours. Examination of popular belief systems that accompany relations between social classes, whites and blacks, and men and women in the United States. How do dominant groups attempt to justify each relationship, and is there ideological conflict or consensus between groups. GE credit: Div, Wrt.—II. (II.)

173. Sociology Through Literature (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Introduction to analysis of literature as sociological data. Reading of numerous works on American and other societies by authors such as Steinbeck, Lewis, Dreiser, Schulberg, Orwell, etc. Offered in alternate years.

174. Sociology of the Jewish Experience (4)
Seminar—3 hours; term paper. Prerequisite: upper division standing preferred. The sociology of Jewish life, analyzing challenges to Jewish identity and community in the diaspora. Diversity within the Jewish community, Americanization, women, new immigrants, post-Holocaust Jewish identity, and Black-Jewish relations. Offered in alternate years.—III.

175. Mass Communication (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or 2. Examines the relationship between the media and social structures. History of media–state relations. Media as reflector and shaper of values. Emphasis on current European and Marxist and pluralist theories rather than on content analysis. Offered in alternate years.—(I).

176. Sociology of Knowledge (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Critical analysis of the social foundations of knowledge in society. The history, problems and dilemmas in classical sociology of knowledge. Contemporary applications. Natural and social sciences as social systems. Sociology of personal knowledge in everyday life.

180A. Complex Organizations (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Prerequisite: course 1; Economics 1A and 1B recommended. Develops a sociological approach to organizations theory. Designed to introduce sociological concepts, address the alternative psychological and economic models, and involve students in the practice of organizational analysis.—I, II. (I, II.)

180B. Complex Organizations (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Prerequisite: course 180A or consent of instructor. Builds on concepts and skills developed in course 180A. Deals with the issues of organizational decision making, design, and survival. Emphasis on relations between organizations and the effects of those relations in both the public and private sectors.—III. (III.)

181. Social Change Organizations (4)
Lecture—3 hours; discussion—1 hour or term paper. Prerequisite: course 1. Analysis of organizations with social change and improvement goals and programs, emphasizing voluntary associations and grassroots citizen groups. Topics treated include formation, decision making and leadership, strategies and tactics, factionalism and coalitions, effectiveness. Offered in alternate years. GE credit: Wrt.—III.

182. Experimental and Utopian Communities (4)
Lecture—3 hours; discussion—1 hour. The social structure of intentional, experimental or Utopian settlements and communitarian movements, including comparison with other small settlement forms: villages, neighborhoods, monasteries, encampments and nonsettlement communities based on occupation, ethnicity, and religion.

183. Comparative Organizations (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 180A or 180B; upper division standing. Examination of economic and political organizations of major industrial nations. Discussion of historical, cultural, social, and political influences on industrial patterns and practices, alternative theoretical models for explaining differential development. Societies may include Sweden, Japan, Germany, Taiwan, and South Korea. Offered in alternate years.—I. (I)

185. Sociology of Social Welfare (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Sociological analysis of the evolution and current organization of welfare functions in modern societies.—I, II. (I, II.)

188. Social Stratification in China (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. Social and political systems and patterns of social stratification in relation to change in state power and economic institutions in China since 1949. Offered in alternate years.—I.

189. Social Science Writing (4)
Lecture—3 hours; discussion—1 hour or term paper. Prerequisite: course 46A, upper division standing, and 12 units of social science. Improved analytic writing and methods for reporting social science research to a wider public. Sociological analysis of the conditions of good and bad writing.

190X. Seminar in Sociological Analysis (4)
Seminar—3 hours; term paper. Prerequisite: upper division standing and course 100 (former course 165A). In-depth examination at an upper division level of a special topic in Sociology. Emphasis on student participation in learning. May not be repeated for credit. Limited enrollment.—I, II, III. (I, II, III.)

191. Workshop in Contemporary Sociological Theory (4)
Lecture—2 hours; workshop—1 hour; term paper. Prerequisite: course 100 (former 165A) and senior standing. Workshop in contemporary sociological theory that allows students to explore the uses of theory in empirical inquiry on problems of interest to students. Contemporary theory considered in relation to classical and modern influences, concept formation, theory construction, and explanation. Not open for credit to students who have received credit for course 165B.—III. (III.)

192. Internship and Research Practicum (2-6)
Internship—6-18 hours. Prerequisite: course 46A, upper division standing, approval of proposed internship and course 193 concurrently or consent of instructor. Supervised internship and study in an agency, organization, or institution; application of sociological concepts to the work experience. May be repeated for credit with consent of instructor. Maximum of 4 units may be counted toward the major. (P/NP grading only.)—I, II, III. (I, II, III.)

193. Workshop in Field Research (2)
Lecture/discussion—2 hours. Prerequisite: course 46A, course 192 or 199 concurrently for 2-4 units, senior standing. Overview of the process of collecting, recording, analyzing, and reporting qualitative social data. Emphasis on application of principles; each participant completes an original research project. Not open for credit to students who have completed course 194HA.—I, II, III. (I, II, III.)

194HA-194HB. Special Study for Honors Students (4-4)
Seminar—3 hours; term paper. Prerequisite: senior standing and admission to the Honors Program. Directed reading, research and writing culminating in the preparation of a Senior Honors Thesis under direction of faculty adviser. (Deferred grading only pending completion of sequence.)—I, II. (I, II.)

195. Special Topics in Sociological Analysis (4)
Seminar—3 hours; term paper. Prerequisite: upper division standing and consent of instructor. In-depth examination of topics in sociology. Emphasis on student research and writing. May be repeated for credit when topic differs.—I, II, III. (I, II, III.)

197T. Tutoring in Sociology (1-4)
Tutorial—3-12 hours. Prerequisite: upper division standing; completion of appropriate course with distinction. Activities vary depending on the nature of the course assignment. May include (but not limited to) tutoring on course material, advising on projects and papers, and leading discussion groups. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: open to seniors only. (P/NP grading only.)

Graduate Courses

201. Social Research (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing, or consent of instructor. Survey of sociological inquiry, taught as practicum. Philosophy of social science; values and research; research agendas and research problem formulation; research process; explanation vs. interpretation; study design; concept formation, measurement, sampling, data acquisition, inference; rhetoric and presentation of findings.—I. (I.)

206. Quantitative Analysis in Sociology (4)
Lecture—4 hours. Prerequisite: course 106. Survey of the statistical models and methods that serve as a foundation for quantitative research in sociology, with an emphasis on multivariate regression analysis, as well as measurement theory and time series analysis. (S/U grading only.)—II. (II.)

207A-207B. Methods of Quantitative Research (4-4)
Lecture—3 hours; paper. Prerequisite: course 106 or the equivalent. Principles of study design, examination of measurement, survey research methods and multivariate analysis. Course will stress actual practice of techniques. Students will carry out quantitative data analysis using packaged computer programs. (Deferred grading only, pending completion of sequence.)

208. Topics in Advanced Quantitative Methods in Social Sciences (4)
Seminar—3 hours; term paper. Prerequisite: course 206 or the equivalent and graduate standing. Analysis of the logic and application of an advanced statistical model; the model chosen may vary. Emphasis on the model's assumptions, its strengths and weaknesses, its application for social science inquiry, and the relationship between methods and social theory. May be repeated for credit when topic differs. Offered in alternate years.—II, III.

215. Economy, Polity, and Society (4)
Seminar—3 hours; paper. Prerequisite: consent of instructor. Open to graduate students in sociology and related disciplines. Course introduces students to topics and selected issues in the related fields of economic and political sociology and political economy

220. Deviance, Law, and Social Control (4)
Seminar—3 hours; projects. Prerequisite: course 120 or consent of instructor. Report and discussions of literature on selected forms of deviance in relation to law and formal social control. Agency contacts and exploratory research projects.

225. Cultural Sociology (4)
Seminar—3 hours, term paper. Explores the varied ways in which culture is understood in the social sciences and the research questions that follow from contrasting viewpoints. The approach is historically informed and focused on changing cultural forms in relation to industrialization and post-modernism. Offered in alternate years.—I.

226. Sociological Social Psychology (4)
Seminar—3 hours; seminar paper—1 hour. Prerequisite: graduate standing or consent of instructor. Advanced study of the varying approaches, methods, issues and topical concerns of sociological social psychology. Analysis of central and representative historical and contemporary works.

227. Sociology of Reproduction (4)
Lecture—3 hours; discussion—1 hour. Recent social science scholarship in such areas as teenage pregnancy, family planning, abortion, adoption, AIDS, and new reproductive technologies; focus on the current situation in the United States. Offered in alternate years.

230. Ethnic (Race) Relations (4)
Lecture—3 hours; paper. Advanced study of the determinants of ethnic groupings and their interrelationships. Major theme will be the patterns of ethnic stratification and causes of ethnic conflict. Specific focus upon dominance and resistance to dominance. Influence of social science research.

233. Gender, Culture, and Local/Global Transformation (4)
Seminar—3 hours; term paper. Focus on critical approach to women and development; analyze local transformations with global connections within specific cultural contexts. Course covers theory, methodological issues, and relationship between theory and practice. Offered in alternate years.

234. Gender, Family, and Society (4)
Seminar—3 hours; seminar paper. Prerequisite: graduate standing or consent of instructor. The major theoretical traditions and concerns in family sociology and sociology of gender. Analysis of selected classical and contemporary works representative of functionalist, Marxist, psychoanalytic, feminist and critical theoretical approaches to these subjects (e.g., Engels, Parsons, Freud, Horkheimer, Goode, Lasch, Mitchell). Emphasis on macro and historical questions.

242A-242B. Comparative Methods in Historical Sociology (4-4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative approaches to major historical phenomena such as nationalism, bureaucratization, feudalism, and capitalism; the relevance of psychological and sociological theories to historical interpretation; the verifiability of historically grounded hypothesis; the meaning of analogy, correspondence and causality. (If taken as a sequence, deferred grading only, pending completion of sequence.)—II, III. (II, III.)

243. Urban Society (4)
Seminar—3 hours; paper. Broad overview of the issues and concerns of the field of urban sociology. Special emphasis on the human experience of urban living in contemporary, cross-cultural or historical settings. I. (I.)

245. Developing Societies (4)
Seminar—3 hours; term paper or project. Prerequisite: graduate student status or familiarity with problems of developing societies. Analysis of social and economic problems of developing societies from the standpoint of theory and research on modernization and underdevelopment. Nature of third world dependency and interdependence in the global political economy. Offered in alternate years.

248. Social Movements (4)
Seminar—3 hours; paper. Analysis of current issues in and contributions to the study of collective behavior and social movements; particular focus upon the strategies and tactics of social movements.—III. (III.)

254. Sociological Issues in Health Care (4)
Seminar—3 hours; paper. Prerequisite: open to graduate or professional students. Sociological perspectives and methods directed to health care issues. Students select topics for supervised research. The course will have a theme (described in advance) each time it is offered. Paper on research will be required. (S/U grading only.)—(I.)

255. Sociology of Law (4)
Seminar—4 hours. Prerequisite: consent of instructor. Analysis of the nature of the legal process and its impact on social behavior. Will consider (1) nature and functions of law, (2) the organization and administration of law, and (3) the capacity of law to affect social behavior.

265A. Classical Sociological Theory (4)
Lecture—3 hours; discussion—1 hour. Introduces graduate students to the work of the main classical thinkers in the tradition of social theory, such as Marx, Durkheim, Weber, Simmel, Freud, G.H. Mead, and Parsons, locating them within the historical, cultural, and philosophical milieu in which their ideas originated.—II. (II)

265B. Theory in Contemporary Sociology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 265A. Explores the uses of theories in contemporary sociology by tracing their connections with classical sociological writings and their relations to broader theoretical concerns of contemporary social thought, with particular emphasis on relevance to the current historical, cultural and social milieu.—III. (III.)

270. Social Demography (4)
Seminar—4 hours. Prerequisite: course 170 or consent of instructor. How social institutions affect and are affected by the level and variation of mortality, migration, and fertility. Special emphases on the determinants of fertility-related attitudes and behavior, on less-developed countries, and on contemporary empirical studies.

280. Organizations and Institutions (4)
Seminar—4 hours. Theory of formal organizations and bureaucracy. Methods of research in organizational and institutional studies. Historical and comparative analysis of political, religious, educational, military, and economic structure.—III. (III.)

290. Seminar (4)
Seminar—3 hours; term paper. (S/U grading only.)—II. (II.)

292A-292B. Field Research (4-4)
Seminar—3 hours; field trips. Prerequisite: graduate standing in Sociology or consent of instructor. The process of collecting, analyzing and reporting qualitative social data: techniques of intensive interviewing, participant-observation and document analysis; generating, developing, and evaluating analytic frameworks; recording, storing, retrieving, and writing up qualitative data. Emphasis on application of principles; each participant completes a fieldwork project. (Deferred grading only, pending completion of sequence.)—I, II. (II.)

293. Proseminar in Sociology (2)
Seminar—2 hours. Prerequisite: first-year Sociology graduate students only. Introduction to graduate training in sociology. A seminar designed to introduce students entering graduate work in the department to its ongoing research activities. (S/U grading only.)—I. (I.)

295. Special Topics Seminar. (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Research topics in Sociology. Specific topic will vary according to faculty interest and student demand. May be repeated for credit when topic differs.—I, II, III. (I, II, III).

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Individual Study (1-12)
(S/U grading only.)

Professional Courses

390A. The Teaching of Sociology (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing; required for first-time teaching assistants. Practical instruction in teaching methods for qualitative and quantitative courses. Pedagogical issues involved in critical sociological analysis. (S/U grading only.)—I. (I.)

390B. The Teaching of Sociology (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing. Practical instruction in devising course syllabi, lectures and assignments for Associate-Instructors and others interested in college teaching. Discussion of pedagogical methods of teaching qualitative and quantitative courses. (S/U grading only.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Professional Course

466. Research Paper Workshop (2)
Workshop—1.5 hours; discussion—0.5 hours. Prerequisite: Master of Arts standing. A workshop to assist advanced graduate students in the preparation of an original research paper. Students present their research papers and discuss issues in theory, research design, data, empirical inference, and verbal and written presentation of a professional research paper. (S/U grading only.)

Soil Science

See Geology; Soil Science; Soil Science (A Graduate Group); and Soil and Water Science

Soil Science

(College of Agricultural and Environmental Sciences)

Faculty

See under the Department of Land, Air and Water Resources.

Major Programs. See the major in Soil and Water Science.

Minor Program Requirements

The Department of Land, Air and Water Resources, Soils and Biogeochemisty Program, offers a minor program in soil science. The minor is especially geared toward students in the environmental sciences including Hydrologic Science, Environmental and Resource Sciences, Environmental Toxicology, Agricultural Management and Rangeland Resources, International Agricultural Development, Crop Science and Management, Environmental Biology and Management, Environmental Horticulture and Urban Forestry, Geology, and Plant Biology.

	UNITS
Soil Science	**21**
Soil Science 100	5
Courses selected from Soil Science 105, 107, 109, 111, 112, 118, 120, Plant Biology 158, Hydrologic Science 124, 134	16

Minor Adviser. R.J. Southard.

Graduate Study. Programs of study leading to the M.S. and Ph.D. degrees in Soil Science are available. Information regarding these programs can be obtained from the graduate adviser and the Graduate Announcement. See also the Graduate Studies chapter of this catalog.

Graduate Adviser. R. Zasoski *(Land, Air, and Water Resources)*

Courses in Soil Science (SSC)

Questions pertaining to the following courses should be directed to the instructor or to the Resource Sciences Teaching Center, 148 Hoagland Hall (530-752-1669) or check the Soils and Biogeochemistry Web site at http://lawr.ucdavis.edu/ssc.

Lower Division Courses

10. Concepts of Soil Science (4)
Lecture—3 hours; extensive writing; extensive problem solving. Field trip required. The global ecosystem; soils as natural bodies formed by interactive environmental processes; soil response to use and management; conservation practices for sustainable use of soil resources; role of soils in current agricultural and environmental issues. GE credit: SciEng, Wrt.—I. Dahlgren

92. Soil Science Internship (1-12)
Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in soil science. Internship supervised by a member of the faculty. (P/NP grading only.)

Upper Division Courses

100. Principles of Soil Science (5)
Lecture—3 hours; laboratory—3 hours; term paper. Prerequisite: Chemistry 2A-2B, Physics 1A-1B, Biological Sciences 1A; Geology 50, Biological Sciences 1C recommended. Soil as part of natural and managed ecosystems and landscapes. Solid, liquid, and gas phases and their interactions in the soil. Water, gas and heat movement in soil. Soil biology. Plant nutrient acquisition and use. Soil development, management and use.—I. (I.) Singer

102. Soil and Water Chemistry (5)
Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 100 or the equivalent. Soil solution and solid-phase chemistry of soils in relation to agricultural and environmental concerns. Interactions between soil solids, precipitates

and solution phases: mineralogy, ion exchange, adsorption, weathering and buffering, soil colloidal behavior, models of solution and solid-phase interactions.—II. (II.) Zasoski

105. Field Studies of Soil Resources (8)
Fieldwork—daily for five weeks, off campus; lecture—1 week, on campus. Prerequisite: consent of instructor; course 120 recommended. Study of soils in the field throughout California. Emphasis on identification, description and classification of soils; relation of soils to geology, vegetation, climate and human activities; role of soils in land use and as components of California ecosystems.—summer. Dahlgren, Singer, Southard

107. Soil Physics (5)
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 100, Environmental and Resource Sciences 100, Mathematics 16A, or the equivalent. Physical properties of soil. Principles of water, gas, heat, and solute movement in soil with selected examples related to soil and water management. Influence of soil properties on transfer processes.—I. (I.) Rolston, Hopmans

109. Nutrient Cycling and Management (5)
Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 100 or the equivalent. Plant nutrients in soil; effects of fertilizers, cover crops, compost and other amendments on plant productivity and soil quality; nutrient sustainability in alternative agricultural and natural ecosystems; soil fertility assays.—III. (III.) Horwath

111. Soil Microbiology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 1C and Biological Sciences 1C. Major groups of microorganisms in soil, their interrelationships, and their responses to environmental variables. Role of microorganisms in cycling of nutrients. Plant-microbe relationships. Transformations of organic and inorganic pollutants.—II. (II.) Scow

112. Soil Ecology (3)
Lecture—2 hours; laboratory/discussion—2 hours. Prerequisite: Biological Sciences 1B, 1C, course 100. The biology and ecology of soil communities, emphasizing the soil food web and litter decomposition. Role of specific biota, ranging from microorganisms to earthworms. Applications to restoration, remediation, ecosystem science, and agriculture. GE credit: Wrt.—I. (I.) Scoe, Jaffee

118. Soils in Land Use and the Environment (4)
Lecture—3 hours; discussion—1 hour; one one-day field trip. Prerequisite: course 100 or consent of instructor. Soils are considered as elements in land use planning and environmental quality. Topics include: soil survey reports, remote sensing, land capability classification, soil erosion/conservation, waste disposal on soils and soil reclamation.—III. (III.) Singer

120. Soil Genesis, Morphology, and Classification (5)
Lecture—4 hours; laboratory—3 hours (includes five one-day weekend field trips). Prerequisite: course 100; Geology 50 recommended. Recognition and description of soils; chemical, biological and physical processes of soil formation. Factors of soil formation. Interactions of soils with diverse ecosystems. Introduction to soil classification. Practice using soil taxonomy. Practical experience describing soil properties in the field.—III. (III.) Southard

192. Soil Science Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in soil science. Internship supervised by a member of the faculty. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

202. Topics in Advanced Soil Chemistry (3)
Lecture/discussion—3 hours. Prerequisite: undergraduate course in soil chemistry, water chemistry, or consent of instructor. Reviews of current research in soil chemistry. Topics include double layer theory; clay mineral and oxide surface chemistry; adsorption on soil surfaces; speciation and modeling of solution ions; solubility and mineral stability diagrams. Discussion of current journal articles. May be repeated once for credit when topic differs. Offered in alternate years.—III. Zasoski

208. Soil-Plant Interrelationships (3)
Lecture—3 hours. Prerequisite: course 100, Plant Biology 111B, or consent of instructor. Plant needs, occurrence and reactions of water and mineral nutrients in soils; root systems and their growth in soils; mass flow and diffusion mechanisms in nutrient acquisition; models relating nutrient uptake to soil and plant characteristics; nutrient assimilation and crop quality. Offered in alternate years.—(II.) Richards

209. Physiology and Ecology of Mycorrhizal Symbioses (3)
Lecture/discussion—3 hours. Prerequisite: Plant Biology 111 or consent of instructor; course 100 recommended. Structure, function and evolutionary development of mycorrhizal fungi and the root-fungal symbiosis. Emphasis on regulation of carbon and nutrient exchanges between host and symbiont. Course integrates mycorrhizal physiology and ecology in an ecosystem context. Offered in alternate years.—(I.) Bledsoe

211. Advanced Soil Microbiology (3)
Lecture—3 hours. Prerequisite: Chemistry 8A-8B; course 111; Biological Sciences 102, 103 or an equivalent course recommended. Microbial metabolism of organic chemicals in soil, both natural and xenobiotic. Decomposition of organic matter. Kinetics of microbial processes in soil. Offered in alternate years.—(III.) Scow

216. Physical Geochemistry (3)
Lecture—3 hours. Prerequisite: course 102 or Chemistry 110A or Geology 115 and Mathematics 119. First half emphasizes equilibrium thermodynamics, including choices of standard states, ideal solutions, and use of the Gibbs-Duhem relation. Second half covers geochemical kinetics including simple rate laws, transition state theory, solute diffusion, and experimental methods.—I. (I.) Casey

218. Soil Erosion and Conservation (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: graduate standing; courses 118, 120. Processes of soil erosion by wind and water in agricultural areas, and methods of soil conservation will be discussed. Methods of predicting rates of soil erosion will be considered. Offered in alternate years.—(II.) Singer

219. Ecosystem Biogeochemistry (4)
Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: introductory courses in ecology/biology and soils recommended; undergraduates accepted with consent of instructor. Multidisciplinary analysis of energy and nutrient transfers within terrestrial ecosystems. Examination of processes and inter- and intra-system interactions between the atmosphere, biosphere, lithosphere and hydrosphere. Laboratory section uses biogeochemical simulation models to examine case studies. (Same course as Ecology 219.)—III. (III.) Dahlgren, Bledsoe

220. Pedology (3)
Lecture—3 hours. Prerequisite: consent of instructor; course 120 recommended. Topics selected from studies of soil-forming processes, soil-geomorphic relations, mineral weathering, new developments in soil classification, and development of pedologic theory. Topics vary from year to year. May be repeated once for credit. Offered in alternate years.—II. Southard

222. Organic Chemistry of Soil (3)
Lecture—3 hours. Prerequisite: Chemistry 8A, 8B, Mathematics 16A, 16B, course 100 or the equivalent. Structure and function of soil organic matter, biochemistry of humic substance formation, relationship of organic matter to nutrient cycling and sustainability in agricultural and natural ecosystems, reactions of organics with humic substances in soil and water, methods for characterization. Offered in alternate years.—II. Horwath

290. Special Topics in Soil Science (1)
Seminar—1 hour. Prerequisite: graduate standing. Oral presentation and discussion of scientific material and procedures for review and critique of publications. (S/U grading only.)—I, III. (I, III.)

298. Group Study (1-5)
Prerequisite: consent of instructor.

299. Research (1-12)
(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Soil Science (A Graduate Group)

William R. Horwath, Ph.D., Chairperson of the Group
Group Office, 148 Hoagland Hall (530-752-1669)
http://lawr.ucdavis.edu/ssgg/index.htm

Faculty

Conrad Bahre, Ph.D., Professor
Caroline Bledsoe, Ph.D., Professor
Eduardo Blumwald, Ph.D., Professor
Patrick Brown, Ph.D., Professor
William Casey, Ph.D., Professor
Randy Dahlgren, Ph.D., Professor
R. Ford Denison, Ph.D., Professor
Graham Fogg, Ph.D., Professor
Mark Grismer, Ph.D., Professor
Jan Hopmans, Ph.D., Professor
William Horwath, Ph.D., Associate Professor
Theodore Hsiao, Ph.D., Professor
Louise Jackson, Ph.D., Professor
Bruce Jaffee, Ph.D., Professor
André Läuchli, Ph.D., Professor
Miquel Marino, Ph.D., Professor
Mark Matthews, Ph.D., Professor
Alexandra Navrotsky, Ph.D., Professor
Gregory Pasternack, Ph.D., Assistant Professor
Kevin Rice, Ph.D., Professor
James Richards, Ph.D., Professor
Dennis Rolston, Ph.D., Professor
Kate Scow, Ph.D., Professor
Kenneth Shackel, Ph.D., Professor
Wendy Silk, Ph.D., Professor
Michael Singer, Ph.D., Professor
David R. Smart, Ph.D., Assistant Professor
Randal Southard, Ph.D., Professor
Shrinivasa Upadhyaya, Ph.D., Professor
Susan Ustin, Ph.D., Professor
Chris van Kessel, Ph.D., Professor
Robert Zasoski, Ph.D., Professor

Emeriti Faculty

Richard Burau, Ph.D., Professor Emeritus
Donald Grimes, Ph.D., Professor Emeritus
Gordon Huntington, Ph.D., Professor Emeritus
Mark Kliewer, Ph.D., Professor Emeritus
Kenneth Tanji, Ph.D., Professor Emeritus

Affiliated Faculty

Victor Claassen, Ph.D., Assistant Researcher
Theresa Fan, Ph.D., Associate Researcher
Stephen Grattan, Ph.D., Specialist in Cooperative Extension
Richard Higashi, Ph.D., Assistant Research Chemist
Roland Meyer, Ph.D., Soils Specialist in Cooperative Extension
Jeffrey P. Mitchell, Ph.D., Specialist in Cooperative Extension *(Vegetable Crops)*

G. Stuart Pettygrove, Ph.D., Soils Specialist in Cooperative Extension

Graduate Study. The Graduate Group in Soil Science offers programs of study and research leading to the M.S. and Ph.D. degrees. Soil science focuses on the physical, chemical and biological processes that govern the quality and distribution of soils in relation to landform evolution, geochemical environments, and ecosystems. Research in soil science includes the study of soil as a global natural resource, as a critical component of the environment, and as a resource to sustain agricultural, forest and wildland ecosystems. Students may specialize in environmental quality; soil physics; soil chemistry; soil genesis, morphology and classification; nutrient cycling and management; soil microbiology and biochemistry; soil-plant-water relationships; or general soil science. For detailed information regarding the programs, address the chairperson of the group.

Graduate Advisers. C.S. Bledsoe, R.J. Zasoski *(Land, Air and Water Resources).*

Graduate Admissions Officer. Chris van Kessel *(Agronomy and Range Science),* 530-752-4377, cvankessel@ucdavis.edu.

Soil and Water Science

(College of Agricultural and Environmental Sciences)

The Major Program

Soil and water science is concerned with the use and protection of our land and water resources. The major teaches graduates sound scientific principles for managing soil and water resources to benefit both agriculture, forestry and the environment.

The Program. Major programs include land use, soil survey, soil management and conservation, plant nutrition, diagnostic technology, irrigation and drainage, water resources management, water quality, and related environmental problems. (For example, the emphasis on water quality would include more than the minimum number of units of physical and biological sciences, while an emphasis in resource allocation and land-use planning would include more courses in the social, political, and economic areas.)

Internships and Career Alternatives. Before they graduate, many students receive practical work experience through student internships with state and federal agencies, soil and plant labs, and growers. Students also have the opportunity to work on research projects with faculty members and to develop individual research or study topics. Graduates are qualified for managerial and technical positions with environmental and agricultural businesses. They are also prepared for positions in advising, planning, land appraisal, and research and teaching with private, government, and international organizations involved with soil and water development, use, and conservation. Some graduates also continue in master's and doctoral programs in soil science, hydrologic science, ecology, and plant physiology.

B.S. Major Requirements:

UNITS

English Composition Requirement..... 4-12
See College requirement..... 0-8
Communication 1 4

Preparatory Subject Matter 74
Biological Sciences 1A, 1B, 1C..... 15
Chemistry 2A-2B-2C and a more advanced course 18
Agricultural Management and Rangeland Resources 21 or Engineering 5 or one Ecology course with adviser's approval 3
Economics 1A, 1B..... 5
Geology 50..... 3
Mathematics 16A, 16B..... 6
Physics 7A-7B-7C 12
Statistics 13, 100 or Agricultural Management and Rangeland Resources 120 .. 4
Additional physical sciences, biological sciences, and/or mathematics with approval of adviser..... 8

Breadth/General Education 15-33
Satisfaction of General Education requirement 6-24
At least one upper division course from each of the following areas, with approval of adviser, (1) resource management, (2) environmental law, (3) environmental economics and decision making 9

Depth Subject Matter..... 30
Soil Science 100..... 4
Environmental and Resource Sciences 100, 100L 6
Additional upper division units in soil science and hydrologic science..... 20

Restricted Electives 27
To supplement or expand areas of student interest selected with approval of adviser 24
Special study or experience (192 or 199 course in the major area) 3

Unrestricted electives 4-30

Total Units for the Degree 180

Major Adviser. W. Horwath

Advising Center for the major is located in 148 Hoagland Hall (530-752-1669). See Diane Swindall (dgswindall@ucdavis.edu).

Graduate Study. Graduate programs are available in Soil Science as well as Hydrologic Sciences. Detailed information can be obtained from the Graduate Adviser and the Graduate Announcement. See also the Graduate Studies chapter of this catalog.

Courses. For specific courses of instruction in this major, see course listings under Atmospheric Science, Plant Science, Environmental and Resource Sciences, Soil Science, and Hydrologic Science.

Related Courses. See courses in Agricultural and Resource Economics, Agricultural Management and Rangeland Resources, Applied Biological Systems Technology, Chemistry, Biological and Agricultural Engineering, Civil and Environmental Engineering, Environmental Science and Policy, Environmental Toxicology, Geology, International Agricultural Development, Plant Biology, Vegetable Crops, and Viticulture and Enology.

Spanish

(College of Letters and Science)

Emilio Bejel, Chairperson of the Department

Department Office (Spanish and Classics), 616 Sproul Hall (530-752-0835)

http://spanish.ucdavis.edu

Faculty

Marta E. Altisent, Ph.D., Associate Professor
Samuel G. Armistead, Ph.D., Professor
Emilio Bejel, Ph.D., Professor
Robert Blake, Ph.D., Professor
Travis Bradley, Ph.D., Assistant Professor
Cecilia Colombi, Ph.D., Associate Professor
Linda Egan, Ph.D., Associate Professor
Cristina González, Ph.D., Professor
Adrienne Martín, Ph.D., Associate Professor
Christine Martínez-Carzo, Assistant Professor
Almerindo E. Ojeda, Ph.D., Associate Professor *(Linguistics)*
Ana Peluffo, Ph.D., Assistant Professor

Emeriti Faculty

Zunilda Gertel, Ph.D., Professor Emerita
Mario González, Ph.D., Lecturer Emeritus
Didier T. Jaén, Ph.D., Professor Emeritus
Daniel S. Keller, Ph.D., Professor Emeritus
Fabián A. Samaniego, M.A., Senior Lecturer Emeritus
Robert M. Scari, Ph.D., Professor Emeritus
Hugo J. Verani, Ph.D., Professor Emeritus

Affiliated Faculty

Francisco Alarcón, M.A., Lecturer
Norma López-Burton, M.A., Lecturer

The Major Program

The Spanish major program assures proficiency in all four language skills—speaking, understanding, reading, and writing—and acquaints students with the intellectual and cultural contributions of the Spanish-speaking world through a study of its language, literature, and traditions.

The Program. The department's lower division program gives students a solid foundation in the Spanish language, either through the traditional elementary and intermediate language series or through an accelerated three-course sequence of Spanish for native speakers. Linguistics 1 introduces students to a systematic study of language in general and serves as an introduction to upper division courses in Spanish linguistics. At the upper division level, students receive a broad introduction to basic concepts and the practice of literary criticism and to the four areas of study represented in the department's curriculum: Spanish linguistics, Spanish literature, Spanish-American literature, and Hispanic literatures and cultures in the United States. Students are encouraged to work closely with the department's academic advisers in designing a program of studies tailored to their individual needs and interests. Many students combine the Spanish major with another major in the humanities or social sciences.

Career Alternatives. The program, alone or in combination with other major programs, may lead to advanced study of the language or literature of Spain and Spanish America, and to careers not only in teaching, but also in other professions such as library science, law, medicine, and in government, social service, or business.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 4-37
Spanish 1, 2, 3, 21, 22, 23, and 24 0-33
or Spanish 31, 32, 33 0-15
Linguistics 1 4
In consultation with a departmental adviser and with the consent of the department chairperson, Linguistics 1 may be taken concurrently with upper division courses.

Depth Subject Matter..... 45-48
One course in each of the following five areas 19-20
Spanish 100 4
Spanish 111N, 115, or 116..... 3-4
Spanish 130, 131N, or 134N..... 4
Spanish 150N, 151N, or 157..... 4
Spanish 117, 174, or 176 4
Students planning to take Spanish 110 should do so at the beginning of the upper division sequence or concurrently with Spanish 100.
Seven elective courses to be chosen in consultation with the student's major adviser 26-28
No more than seven electives may be taken with EAP, preferably concentrated in two of the following areas. Other combinations are possible with the approval of the major adviser:
(a) Spanish literature,
(b) Spanish-American literature,
(c) Chicano/Latino literature,
(d) Spanish linguistics

Students may, with the approval of their adviser, take up to three elective courses outside the Spanish department in such programs as Anthropology (Anthropology 144, 146), Chicana/o Studies (Chicana/o Studies 154, 155, 156, 160, 171), Comparative Literature 152, Education (Education 151,152), History (History 161A, 161B, 164, 165, 166A, 166B, 167, 168, 169A, 169B), and Linguistics (Linguistics 166) .

A maximum of six units of course 199 may be counted toward the major. Course 199 cannot be used to replace regular departmental courses.

Total Units for the Major 49-85

Major Advisers. Consult department.

Advising. Given the great flexibility in the Spanish major, it is important that students design their programs in close consultation with their major adviser. This is especially important for students who intend to use their major as preparation for graduate study, for those who are planning a teaching career, and for those who wish to take advantage of our EAP options.

Minor Program Requirements:

UNITS

Spanish..... 23-24

One course in each of the following five areas:

Spanish 100 4

Spanish 111N, 115, or 116..... 3-4

Spanish 130, 131N, or 134N..... 4

Spanish 150N, 151N, or 157..... 4

Spanish 117, 174, or 176..... 4

One upper division elective in Spanish 4

Consult a departmental adviser if any of these courses are to be taken abroad.

Honors Program. Candidates for high or highest honors in Spanish must write a senior thesis under the direction of a faculty member. For this purpose, honors candidates must enroll in at least six units of Spanish 194H distributed over two quarters. Normally, a student will undertake the honors project during the first two quarters of the senior year; other arrangements must be authorized by the department chair. Only students who, at the end of their junior year (135 units), have attained a cumulative GPA of 3.5 in courses required for the major will be eligible for the honors program. The requirements for earning high and highest honors in Spanish are in addition to the regular requirements for the major in Spanish.

Education Abroad Program options. The department encourages its majors to consider study in a Spanish-speaking country with our Education Abroad Program (EAP). It is now possible for our students to complete significant portions of the Spanish major in the EAP centers at both the lower (Preparatory Subject Matter) and upper division levels through newly introduced options.

Short Term Language and Culture Programs. A Short Term Program Abroad is offered in Mendoza, Argentina and in Santender, Spain. These programs aim at providing students with opportunities to increase their knowledge of the Spanish language and the Latin American culture by experiencing the life-learning challenges of living and studying abroad.

Students will earn 15-22 UC Davis units toward the Spanish major, minor, or foreign language requirement. Each program has on upper division course taught by the UC Davis Program Director focusing on history, culture and society. For more information, contact C. Columbi; http://shorttermabroad.ucdavis.edu

Teaching Credential Subject Representative. C. Colombi See also under Teacher Education Program.

Graduate Study. The Department offers courses leading to the M.A. degree in Spanish to students who have completed with distinction the A.B. degree in Spanish, or the equivalent. Candidates will be recommended for admission to graduate studies in Spanish provided they meet the requirements of the Graduate Studies Office and the Department of Spanish. The Department also offers programs of study and research leading to the Ph.D. degree. Detailed information may be obtained by writing to the Chairperson of the Spanish Department.

Graduate Adviser. Consult department.

Prerequisite credit. Credit normally will not be given for a course if that course is the prerequisite of a course already successfully completed. Exceptions can be made by the Department Chairperson only.

Courses in Spanish (SPA)

Course placement: Students with two years of high school Spanish normally take Spanish 2, those with three years take Spanish 3, and those with four years take Spanish 21. It is recommended that transfer students who have successfully completed a two-year sequence at the junior college level continue their study by taking Spanish 24 or 100. Consult a departmental adviser.

Lower Division Courses

1. Elementary Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Introduction to Spanish grammar and development of all language skills in a cultural context with special emphasis on communication. Not open for credit to students who have completed course 1S. Students who have successful completed Spanish 2 or 3 in the 10th or higher grade of high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.—I, II, III. (I, II, III.)

1S. Elementary Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Introduction to Spanish grammar and development of all language skills in a cultural context with special emphasis on communication. Offered in a Spanish speaking country under the supervision of a UC Davis faculty/lecturer. Not open for credit to students who have completed course 1.—III.

2. Elementary Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 1 or 1S. Continuation of courses 1 and 1S in the areas of grammar and basic language skills. Not open for credit to students who have completed course 2S.—I, II, III. (I, II, III.)

2S. Elementary Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 1 or 1S. Continuation of Spanish 1 in the areas of grammar and basic language skills. Offered in a Spanish speaking country under the supervision of UC Davis faculty/lecturer. Not open for credit to students who have completed course 2.—III.

3. Elementary Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 2 or 2S. Completion of grammar sequence and continuing practice of all language skills using cultural texts. Not open for credit to students who have completed course 3S.—I, II, III. (I, II, III.)

3S. Elementary Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 2 or 2S. Completion of grammar sequence and continuing practice of all language skills using cultural texts. Offered in a Spanish speaking country under the supervision of UC Davis faculty. Not open for credit to students who have completed course 3.—III. (III.)

8. Elementary Spanish Conversation (2)
Discussion—3 hours. Prerequisite: course 3; course 21 (concurrently) recommended. Designed to develop oral communication skills. Emphasis on increasing vocabulary, improving listening comprehension, pronunciation, accuracy and grammar control. Practice of everyday situations. Not open to native speakers or to upper division students.—I, II, III. (I, II, III.)

21. Intermediate Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 3 or 3S. Review and develop the grammar, vocabulary and composition acquired in the first year through exercises and reading of modern texts. Students transferring from other institutions are recommended to start the second year program at this point. Not open for credit to students who have completed course 21S.—I, II, III. (I, II, III.)

21S. Intermediate Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 3 or 3S. Review and develop the grammar, vocabulary and composition acquired in the first year through exercises and reading of modern texts. Students transferring from other institutions are recommended to start the second year program at this point. Not open for credit to students who have completed course 21.—III. (III.)

22. Intermediate Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 21 or 21S. Continuation of course 21 and 21S. Focus on more difficult grammar concepts and further practice on composition. Development of all language skills through exercises and reading of modern texts. Not open for credit to students who have completed course 22S.—I, II, III. (I, II, III.)

22S. Intermediate Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 21 or 21S. Continuation of course 21 and 21S. Focus on more difficult grammar concepts and further practice on composition. Development of all language skills through exercises and reading of modern texts. Offered in a Spanish speaking country under the supervision of UC Davis faculty. Not open for credit to students who have completed course 22.—III. (III.)

23. Spanish Composition I (4)
Lecture—3 hours; extensive writing. Prerequisite: course 22 or 22S. Development of writing skills by way of reading, discussion, and analysis of authentic materials, literary texts, and videos. Selective review of grammar. Composition, journals, individual and group projects. Not open for credit to students who have completed 23S.—I, II, III. (I, II, III.)

23S. Spanish Composition I (4)
Lecture—3 hours; extensive writing. Prerequisite: course 22. Development of writing skills by way of reading, discussion, and analysis of authentic materials, literary texts, and videos. Selective review of grammar. Composition, journals, individual and group projects. Course is taught in a Spanish speaking country. Not open for credit to students who have completed course 23.—III.

24. Spanish Composition II (4)
Lecture—3 hours; extensive writing. Prerequisite: course 23 or 23S. Development of advanced level writing skills, with emphasis on how to write argumentative prose, essays, and research papers. Introduction to the analysis of literary genres. Compositions, journals, individual and group projects. Not open for credit to students who have completed course 24S.—I, II, III. (I, II, III.)

24S. Spanish Composition II (4)
Lecture—3 hours; extensive writing. Prerequisite: course 23. Development of advanced level writing skills, with particular emphasis on how to write argumentative prose, essays, and research papers. Introduction to the analysis of literary genres. Compositions, journals, individual and group projects. Course is taught in a Spanish speaking country. Not open for credit to students who have completed course 24.—III.

28. Intermediate Spanish Conversation (2)
Discussion—3 hours. Prerequisite: course 8 or 22. Continuation of course 8. Designed to develop oral communication skills at a more advanced level.

Practice in more complex situations. (Former course 9.)—I, II, III. (I, II, III.)

31. Intermediate Spanish for Native Speakers I (5)
Lecture/discussion—3 hours; tutorial—1 hour; frequent writing assignments. Prerequisite: course 3 or the equivalent, or consent of instructor. First course of a three-quarter series designed to provide bilingual students whose native language is Spanish with the linguistic and learning skills required for successfully completing upper division courses in Spanish. Intensive review of grammar and composition.—I. (I.)

32. Intermediate Spanish for Native Speakers II (5)
Lecture/discussion—3 hours; tutorial—1 hour; frequent writing assignments. Prerequisite: course 31 or consent of instructor. Continuation of intensive review of grammar and composition. Development of all language skills through reading of modern texts, presentation/discussion of major ideas, vocabulary expansion, and writing essays on topics discussed. Designed for students whose native language is Spanish. (Former course 7B.)—II. (II.)

33. Intermediate Spanish for Native Speakers III (5)
Lecture/discussion—3 hours; tutorial—1 hour; frequent writing assignments. Prerequisite: course 32 or consent of instructor. Development of writing skills, with emphasis on experimenting with various writing styles: analytical, argumentative, and creative. Analytical review of literary genres. Written essays will be assigned. Students will develop a research paper. Designed for students whose native language is Spanish. (Former course 7C.)—III. (III.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor and Department Chairperson. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

Course 100 is prerequisite to all upper division literature courses.

100. Principles of Hispanic Literature and Criticism (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 24S or 33. Principles of literary criticism applied to the study of fiction, drama, poetry, and essay of major literary writers of the Hispanic world. Not open for credit to students who have completed course 100S.—I, II, III. (I, II, III.)

100S. Principles of Hispanic Literature and Criticism (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 33. Principles of literary criticism applied to the study of fiction, drama, poetry and essay of major literary writers of the Hispanic world. Offered in a Spanish speaking country under the supervision of a UC Davis faculty/lecturer. Not open for credit to students who have completed course 100.—III.

110. Advanced Spanish Composition (4)
Lecture—3 hours; frequent writing assignments. Prerequisite: course 24 or 33. Practice in expository writing with emphasis on clarity and idiomatic expression. Practical application and review of selected grammar topics. (Part of former courses 110A and 110B.)—I, II, III. (I, II, III.)

111N. The Structure of Spanish: Sounds and Words (3)
Lecture—3 hours. Prerequisite: Linguistics 1 and course 24 or 33, or consent of instructor. A linguistic description of the sound patterns of Spanish and how those sounds can be used to form larger units, such as morphemes and words. Theoretical and practical comparisons with English and with other Romance languages. (Former course 132.)—I, II, III. (I, II, III.)

112N. The Structure of Spanish: Words and Phrases (3)
Lecture—3 hours. Prerequisite: course 111N. A study of Spanish word and phrase structure, with special emphasis on the constituent structure of noun and verb phrases. Theoretical and practical comparisons with English and with other Romance languages. (Former course 131.)—II, III. (II, III.) Blake, Ojeda

113. Spanish Pronunciation (4)
Lecture—3 hours; term paper. Prerequisite: Linguistics 1 and course 24 or 33. The sound structure of modern Spanish; theoretical analysis of selected problems in pronunciation. Strongly recommended for prospective teachers of Spanish.—I, II, III. Bradley

114N. Contrastive Analysis of English and Spanish (4)
Lecture—3 hours; extensive writing. Prerequisite: Linguistics 1 and course 24 or 33, or consent of instructor; courses 111N and 112N recommended. Contrastive analysis of English and Spanish, error analysis, introduction to structuralist and transformational linguistics. Individual and group conferences. (Former course 137.)—III. (III.) Colombi, Ojeda

115. History of the Spanish Language (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 24S or 33 and Linguistics 1 or consent of instructor. The Spanish language from its roots in spoken Latin to modernity. Emphasis on the close relationship between historical events and language change, and the role that literature plays in language standardization. Not open for credit to students who have completed course 115S.—I, II, (I, II.) Blake

115S. History of the Spanish Language (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 33 and Linguistics 1 or consent of instructor. The Spanish language from its roots in spoken Latin to modernity. Emphasis on the close relationship between historical events and language change, and the role that literature plays in language standardization. Offered in a Spanish-speaking country under the supervision of a UC Davis faculty/lecturer. Not open for credit to students who have completed course 115.—III.

116. Applied Spanish Linguistics (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: Linguistics 1 and course 24 or 33, or consent of instructor. Exploration of the major theoretical and practical issues concerning learning Spanish as a second language. For students interested in teaching Spanish as a career.—I, II. (I, II.) Blake, Colombi

117. Teaching Spanish as a Native Tongue in the U.S.: Praxis and Theory (4)
Lecture—3 hours; extensive writing. Prerequisite: Linguistics 1 and course 24 or 33, or consent of instructor; course 116 and Linguistics 116 recommended. Designed for students interested in teaching Spanish to native speakers. Focus on cultural diversity of the main Spanish-speaking populations in the U.S.; applied language teaching methodologies in the context of teaching Spanish to native speakers at different levels. Conducted primarily in Spanish.—I. (I.) Colombi, Alarcón

118. Topics in Spanish Linguistics (4)
Lecture—3 hours; term paper. Prerequisite: courses 111 and 112. A study of specialized topics in Spanish linguistics, for example: language and use; text and context; language and society; bilingualism; Spanish dialectology; syntax and semantics. May be repeated once for credit when topic differs.—III. (III.)

123. Creative Writing in Spanish (4)
Discussion—4 hours. Prerequisite: course 24 or 33, or consent of instructor. Intensive writing of poetry or fiction in Spanish or in a bilingual (Spanish/English) format. Students will write both in prescribed forms and in experimental forms of their own choosing. Offered in alternate years.—(III.) Alarcón

130. Survey of Spanish Literature to 1700 (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Survey of Spanish literature (narrative, poetry and drama) to 1700, Emphasis on the multicultural birth of the Spanish culture, the formation and growth of the Spanish language and letters through its written records and the literature of the early period. (Part of former courses 103A and 103B.)—I. (I.) Armistead, Martín

131N. Survey of Spanish Literature: 1700 to Present (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100. Survey of modern Spanish literature, providing an overview of main literary movements (romanticism, realism, naturalism, modernism, avant-garde). Emphasis on the philosophical and historical background and on the European context for modern Spanish literature. (Part of former courses 104A and 104B.)—II. (II.) Altisent

132N. Medieval and Renaissance Spanish Literature (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Introduction to the study of the principal works and authors of Medieval and early 16th-century Spanish literature. (Part of former courses 112 and 103A.)—I. (I.) Armistead

133N. Golden Age Literature of Spain (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Introduction to the study of the principal authors and literary movements of 16th- and 17th-century Spain and Spanish American colonial literature. (Part of former courses 103B , 109 and 115.)—I. (I.) Martín

134N. Don Quijote (4)
Lecture—3 hours; term paper. Prerequisite: course 100. A critical reading of Don Quijote by Cervantes. Focused interpretations of important passages and characters in the context of the socio-cultural background of the period. Don Quijote as prototype for the modern novel. Offered in alternate years. (Former course 111.)—(II.) Martín

135N. Spanish Romanticism (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Romanticism as a philosophical concept, and as a literary movement in Spain, with emphasis on its distinctive, specific "Romantic" qualities and its literary expression in five leading authors of the early nineteenth century. (Former course 114.)—III. (III.)

136N. The Spanish Novel of the 19th Century (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Literary realism in Spain, focusing on Leopoldo Alas (Clarín), Emilia Pardo Bazán and Benito Pérez Galdós. The unique characteristics of Spanish realism and its historical roots in Cervantes and the picaresque. (Former course 119.)—II. (II.)

137N. Twentieth-Century Spanish Fiction (4)
Lecture—3 hours; term paper. Prerequisite: course 100 or 131. Study of the main literary trends and authors of the modern Spanish novel and short story. Selected works by Unamuno, Valle-Inclán, Sender, Cela, Matute, Ayala and others. (Former course 120A.)—III. (III.) Altisent

138N. Modern and Contemporary Spanish Poetry (4)
Lecture—3 hours; term paper. Prerequisite: course 100 or 131. Study of the main literary trends and authors of modern and contemporary Spanish poetry. Selected works by Machado, Juan Ramón Jiménez, García Lorca, Guillén, Aleixandre, Hernández Hierro and others. Offered in alternate years. (Former course 120C.)—(III.) Altisent

139. Modern Spanish Theater (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Study of the main dramatic trends and playwrights of modern Spanish theater. Selected works by Valle Inclán, García-Lorca, Mihura, Buero-Vallejo, Arrabal and others. Offered in alternate years. (Former course 120B.) GE credit: ArtHum, Div.—(I.) Altisent

140N. Modern Spanish Essay (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Ortega, Unamuno and the modern Spanish essay. Their concept of Spain and their relations with other movements and thinkers.—II. (II.)

141. Spanish Culture (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 24 or 24S or 33. The development of Spanish culture(s) from the Romans to the present, focusing on important historical periods. Topics include art, history of ideas, and everyday cultural manifestations. Not open for credit to students who have completed course 141S. GE credit: ArtHum, Div.—II. (II.)

141S. Spanish Culture (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1S, 2S, 3S, or consent of instructor. The development of Spanish culture(s) from the Romans to the present, focusing on important historical periods. Topics include art, history of ideas, and everyday cultural manifestations. Offered in a Spanish speaking country under the supervision of UC Davis faculty. Not open for credit to students who have completed course 141. GE credit: ArtHum, Div.—III. (III.)

142. Special Topics in Spanish Cultural and Literary Studies (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Special topics in the study of Spanish literature and culture. May be repeated twice for credit when topic differs. (Part of former course 151.)—I, II, III. (I, II, III.) Armistead, Martín

143. Spanish Art (4)
Lecture—3 hours; term paper or discussion—1 hour. Spanish art and the different historical, sociological and political manifestations that frame it. History of art, including Paleolithic, Roman, Visigothic, Romanesque, Goth, Renaissance, Baroque, Neoclassic and Contemporary art. GE credit: ArtHum—summer. (summer.) Martínez-Carazo

148. Cinema in the Spanish-Speaking World in Translation (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 24 or 24S or 33. Analysis of the culture of the Spanish-speaking world through film in translation. Emphasis on the cultural information illustrated by the films; no prior knowledge of cinematography required. Films with subtitles. Not open for credit to students who have completed Spanish 148S. GE credit: ArtHum, Div.—II. (II.) Martinez-Carazo

148S. Cinema in the Spanish-Speaking World in Translation (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 24 or 33. Analysis of the culture of the Spanish-speaking world through film in translation. Emphasis on the cultural information illustrated by the films; no prior knowledge of cinematography required. Films with subtitles. Offered in a Spanish speaking country, in Spanish, under the supervision of UC Davis faculty. Not open for credit to students who have completed course 148. GE credit: ArtHum, Div.—III. (III.) Martínez-Carazo

149. Latin-American Literature in Translation (4)
Lecture/discussion—3 hours; term paper. Prerequisite: English 3 or the equivalent. Reading, lectures and discussions in English of works by Borges, Cortázar, Fuentes, García Márquez, Paz and others. May not be counted toward the major in Spanish. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(III.) Egan

150N. Survey of Spanish-American Literature to 1900 (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Spanish American literature from prehispanic texts and the Chronicles of the Conquest to Romanticism and Modernism. Reading selections include fiction, poetry, drama and essays. (Former course 105A.)—I. (I.) Egan

151N. Survey of Spanish-American Literature 1900 to Present (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100. Spanish-American literature from Modernism to the present. Reading selections include fiction, poetry, drama, and essays. (Former course 105B.)—II. (II.) Egan, Bejel

153. Spanish-American Short Story (4)
Lecture—3 hours; term paper. Prerequisite: course 100. The evolution of the Spanish-American short story during the 19th and 20th centuries. Emphasis on the contemporary period. Offered in alternate years. (Former course 128.)—(I.) Egan

154. Spanish-American Novel (4)
Lecture—3 hours; term paper. Prerequisite: course 100. The evolution of the Spanish-American novel during the 19th and 20th centuries. Emphasis on significant contemporary works. Offered in alternate years. (Part of former courses 108A and 108B.)—(II.) Egan

155. Mexican Novel (4)
Lecture—3 hours; term paper. Prerequisite: course 100. The evolution of the Mexican novel during the 19th and 20th centuries. Emphasis on the narrative of the Revolution and significant contemporary works. (Former course 129.)—II. (II.) Egan

156. Darío, Modernism and Its Legacy (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Modernism as an authentic expression of Latin American literature and its influence on 20th-century poetry and prose. In depth analysis of the works of Darío and other major Modernist writers. Offered in alternate years. (Former course 125.)—(II.) Egan

157. 20th Century Masters in Spanish-American Literature (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Study of major 20th-century Spanish-American writers and their cultural and literary milieus. Offered in alternate years. (Part of former courses 127 and 138.)—(III.) Egan, Bejel

158. Spanish-American Poetry: From Vanguardism to Surrealism and Beyond (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Study of vanguardism, surrealism, and more recent movements of 20th-century poetry. An in-depth analysis of the works of such major poets as Neruda, Vallejo, and Octavio Paz. Offered in alternate years.—(II.)

159. Special Topics in Spanish-American Literature and Culture (4)
Lecture—3 hours; term paper. Prerequisite: course 100 or 100S. Special topics in the study of Spanish-American literature and culture. Course 159 and 159S combined may be repeated twice for credit when topic differs.—I, II, III. (I, II, III.) Egan

159S. Special Topics in Spanish American Literature and Culture
Lecture—3 hours; term paper. Prerequisite: course 100 or 100S. Special topics in the study of Spanish-American literature and culture. Offered in a Spanish speaking country under the supervision of UC Davis faculty. Course 159S and 159 may be repeated twice for credit when topic differs.—III. (III.)

170. Spanish American Culture (4)
Lecture—3 hours; term paper. Prerequisite: course 24, 24S or 33. Major developments in the arts and social institutions of Spanish America and areas other than Mexico. Reading, lectures, and discussions in Spanish. Not open for credit to students who have completed course 170S. GE credit: ArtHum, Div.—III. (III.)

170S. Spanish American Culture (4)
Lecture—3 hours; term paper. Prerequisite: course 24 or 24S or 33. Major developments in the arts and social institutions of Spanish America and areas other than Mexico. Reading, lectures, and discussions in Spanish. Offered in a Spanish speaking country under the supervision of UC Davis faculty/lecturer. Not open for credit to students who have completed course 170.—III. (III.)

171. Music from Latin America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Spanish 24 or 33. Examination of music from Latin America. Characteristic music (i.e., tango, bossa nova, salsa, musica nortena, musica andina) as well as its implications in other musical genres. Taught in Spanish. For non-majors. Offered in alternate years. (Same course as Music 127.)—(I.) Ortiz

171S. Music from Latin America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 24 or 33. Examination of music from Latin America. Characteristic music (i.e. tango, bossa nova, salsa, musica motena, musica andina) as well as its implications in other musical genres. Taught in Spanish and in a Spanish speaking country under the supervision of UC Davis faculty. Not open for credit to students who have completed course 171 or Music 127.—II. (II.)

172. Mexican Culture (4)
Lecture—3 hours; discussion—1 hour or term paper. Prerequisite: course 24 or 33. The development of Mexican culture from the Aztec-Mayan era to the present. Study includes important periods such as the Conquest and Colonialism, the Independence movement, and changes from the Revolution to contemporary Mexico. Reading, lectures and discussions in Spanish. (Former course 135.) GE credit: ArtHum, Div.—III. (III.) Egan

174. Chicano Culture (4)
Lecture—3 hours; term paper/discussion—1 hour. Prerequisite: course 24 or 33. An interdisciplinary survey of Chicano culture. Topics include literature, art, folklore, oral tradition, music, politics, as well as everyday cultural manifestations. Conducted in Spanish. (Former course 124.) GE credit: ArtHum, Div.—II. (II.) Alarcón

176. Literature in Spanish Written in the United States (4)
Lecture—3 hours; term paper. Prerequisite: course 24 or 33. Survey of the literary and cultural contributions of the main Spanish-speaking populations present in the U.S.: Chicanos, Puerto Ricans, Cuban-Americans, Central Americans, and other Latinos. GE credit: ArtHum, Div.—III. (III.) Alarcón

192I. Internship in Spanish (1-12)
Independent study—3-36 hours. Prerequisite: course 23; junior standing; major in Spanish, Chicano Studies, or a related field. Internships in fields where Spanish language skills can be used and perfected (teaching, counseling, translating-interpreting). May be repeated for credit for a total of 8 units. Units will not count toward the Spanish major. (P/NP grading only.)

194H. Special Study for Honors Students (1-5)
Independent Study—3-15 hours. Prerequisite: Senior standing and qualification for the Spanish honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Spanish literature, civilization, or language studies. May be repeated for up to 8 units of credit. (P/NP grading only.)

197T. Tutoring in Spanish (1-4)
Tutorial—1-4 hours. Prerequisite: upper division standing and permission of the chair. Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with departmental courses. May be repeated for credit for a total of 6 units. (P/NP grading only.)

197TC. Tutoring in the Community (2-4)
Tutorial—2-4 hours. Prerequisite: upper division standing and permission of the chair. Tutoring in public schools under the guidance of a regular teacher and supervision by a departmental faculty member. May be repeated for credit for a total of 6 units. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor and Department Chairperson. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
May be repeated for up to 6 units of credit (P/NP grading only.)

Graduate Courses

201. Literary Theory I (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Basic theories and practical approaches to modern and contemporary Hispanic literature. Emphasis on formalism, poststructuralism, socio-cultural discourses, and ideologies.—II. (II.) Bejel

202. Literary Theory II (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Major contemporary critical theories including recent, innovative approaches to Hispanic literature and culture. Readings from Semiotics and Deconstructionism to Psycho--logical and Socio-ideological approaches. Emphasis on Postmodern and Neo-colonial discourse.—III. (III.) Bejel

205. Spanish Phonology (4)
Seminar—3 hours; term paper. Prerequisite: some knowledge of phonetics is required and consent of instructor; Linguistics 109 and 139 highly recommended. Analyzes the sound patterns of Spanish from both linear and non-linear perspectives. Students will develop a clear understanding of what phonology is and the nature of Spanish phonology, as defined by modern linguistic analysis.—II. (II.)

206. Spanish Syntax (4)
Seminar—3 hours; term paper. Prerequisite: Linguistics 140 and 165. An examination of Spanish word order within the framework of general linguistic theory. The student will investigate how to write a grammar of Spanish with particular attention to the structure of noun and verb clauses.—I. (I.) Blake, Ojeda

207. History of the Spanish Language (4)
Seminar—3 hours; term paper. Prerequisite: Latin 1. (Former course 220A.)—I, III. (I, III.) Blake

208. Old Spanish Texts (4)
Seminar—3 hours; term paper. Prerequisite: course 207. An in-depth linguistic examination of Old Spanish texts from the 12th to the 15th centuries, with particular attention to the significance of orthographic changes.—II. (II.) Blake

211. Hispanic Dialectology (4)
Seminar—3 hours; term paper. Prerequisite: course 220 or consent of instructor. Descriptive and historical study of the distinctive features of Peninsular and American Spanish dialects. (Former course 221.)—III. (III.)

212. Applied Linguistics (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing and courses 215 and 216 recommended. Focuses on the relevant linguistic aspects of teaching Spanish. De-signed for graduate students who have an interest in second-language learning and teaching.—II. (II.) Colombi, Blake

215. Special Topics in Hispanic Linguistics (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor; courses 205, 206 recommended. Specialized topics in Hispanic linguistics (e.g., pragmatics, sociolinguistics, topics in syntax, semantics, or diachronic studies). May be repeated for credit when topic differs.—III. (III.)

222. Critical Approaches to Spanish Literature I: Prose and Essay (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Critical approaches to Spanish narrative and essay. May be repeated twice for credit when topic differs. Offered in alternate years.—II. Altisent, Armistead, Martín

223. Critical Approaches to Spanish Literature II: Poetry and Drama (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Critical approaches to Spanish poetry and drama. May be repeated twice for credit when topic differs. Offered in alternate years.—II. Altisent, Armistead, Martín

224. Studies of a Major Writer, Period, or Genre in Spanish Literature (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Artistic development of a major Spanish writer and his/her intellectual and literary milieu or study of a special topic, period, or genre. May be repeated for credit with consent of instructor.—III. (III.)

252. Medieval Spanish Literature: Prose (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. An exploration of the major genres of Medieval Spanish prose from its origins to 1450.—I. (I.) Armistead

253. Medieval Spanish Literature: Epic (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Medieval Spanish epic narratives. Major theoretical perspectives on the genesis, diffusion, and character of the Medieval epic. Relationship of epic to ballad literature.—II. (II.) Armistead

254. Medieval Hispanic Lyric (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Analysis of the most representative lyric poetry in the various Peninsular languages and in provencal, troubadour poetry, kharjas, villancicos, cantigas de amigo, and courtly lyric.—II. (II.) Armistead

255. Spanish Literature of the Early Renaissance (4)
Seminar—3 hours; term paper. Spanish Literature, 1450-1550, with emphasis on La Celestina. (Former course 229.)—I. (I.) Armistead, Martín

256. Spanish Literature of the Renaissance and Golden Age: Poetry (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Extensive critical study of the main currents of Renaissance and Baroque Spanish poetry through its language structures, styles ("Culteranismo-Conceptismo"), rhetorical devices, myths, and themes (love, death, time).—I. (I.) Martín

257. Spanish Literature of the Renaissance and Golden Age: Drama (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. An exploration of major 16th and17th century literary and cultural developments through the study of selected dramas.—I. (I.) Martín

258. Spanish Literature of the Renaissance and Golden Age: Prose (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. The origins and development of the Spanish novel during the Renaissance and the Spanish Golden Age.—I. (I.) Martín

259. Cervantes and the Novel (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. The narrative works of Miguel de Cervantes with special emphasis on Don Quijote.—I. (I.) Martín, Armistead

260. Modern Spanish Literature (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics of Spanish literature, from 1700-1920.—I. (I.)

261. Contemporary Spanish Literature: Poetry (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Critical analysis of modern Spanish poetry from a wide spectrum of poetic currents.—I. (I.) Altisent

262. Contemporary Spanish Literature: Narrative (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the 20th-century novel and short story with emphasis on the avant-garde, existentialism, social realism, and postmodern trends. May be repeated twice for credit when topic differs and with consent of instructor.—III. Altisent

263. Contemporary Spanish Literature: Drama (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. The Spanish theatrical production of the last 70 years.—I. (I.) Altisent

264. Contemporary Spanish Literature: Essay (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Major thinkers from Ganivet to Unamuno and Ortega y Gassett. Emphasis will be placed on the relationships between Spanish thought and European philosophical currents. Offered in alternate years.—(III.)

265. Women Writers of Spain (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Introduction to the development of a feminine consciousness in the Spanish contemporary literary scene. Selected texts represent particularly innovative typologies of feminine discourse in the realm of the historical, psychoanalytical, and metafictional, erotic, and allegorical fiction.—I. (I.) Altisent

272. Critical Approaches to Spanish American Literature: Narrative (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Development of Spanish-American literary periods and currents in narrative (novel, short story, and essay), from early Colonial times to the present. May be repeated twice for credit when topic differs. Offered in alternate years.—Egan, Bejel, Larsen

273. Critical Approaches to Spanish American Literature: Poetry and Drama (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Development of Spanish-American literary periods and currents in poetry and drama, from early Colonial times to the present. May be repeated twice for credit when topic differs. Offered in alternate years.—Egan

274. Studies of a Major Writer, Period, or Genre in Spanish-American Literature (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Artistic development of a major Spanish-American writer and his/her intellectual and literary milieu or study of a special topic, period, or genre. May be repeated for credit with consent of instructor.—I. (I.)

275. Colonial Literature (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing and consent of instructor. An examination of pre-Hispanic and Colonial narrative, poetry and theatre. Emphasis on historical, anthropological, and ethnographic approaches to Colonial discourse.—I. (I.) Egan

276. Twentieth-Century Spanish-American Drama (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Major Spanish-American dramatists from Florencio Sánchez to the present. Offered in alternate years. (Former course 240.)—(III.)

277. Spanish-American Novel, 1900-1950 (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of main trends and key authors in Spanish America in the first half of the 20th century. Offered in alternate years. (Former course 241A.)—(I.) Egan

278. New Trends in Spanish-American Fiction (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Recent developments in Spanish-American narrative. Emphasis on innovative language and structure. Offered in alternate years. (Former course 241B.)—(II.) Egan

279. Mexican Narrative (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the evolution of Mexican narrative. Emphasis on the narrative of the Revolution and significant contemporary works. Offered in alternate years.—(III.) Egan

280. Spanish-American Short Story (4)
Seminar—3 hours; term paper. Works by major writers with emphasis on 20th-century authors such as Quiroga, Borges, García Márquez, Cortázar, and Rulfo. (Former course 243.)—III. (III.) Egan

281. Spanish-American Women Writers (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of feminist critical theories, gender construction, and self-representation within the history of socio-cultural changes in Latin America.—I. (I.) Egan

282. Darío and Modernism (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of poetry and prose of Spanish-American Modernism (1880-1916). Offered in alternate years. (Former course 245.)—(I.) Egan

283. New Directions in Spanish-American Poetry (4)
Seminar—3 hours; term paper. Offered in alternate years. (Former course 247.)—(III.) Egan

284. The Spanish-American Essay (4)
Seminar—3 hours; term paper. Major Spanish-American essayists from Sarmiento to Octavio Paz. Offered in alternate years. (Former course 248.)—(II.) Egan

285. Multicultural Approaches to Cuban Literature and Culture (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of main trends in Cuban literature. Emphasis on historical, geographic, social and cultural context (including music and film). Course taught in English with some readings in Spanish.—III. (III.) Bejel

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor. May be repeated for credit. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Courses

390. The Teaching of Spanish in College (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: graduate standing. Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of graduate teaching assistants.—I. (I.) López-Burton

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Statistics

(College of Letters and Science)

Rudolph Beran, Ph.D., Chairperson of the Department

Department Office, 380 Kerr Hall (530-752-2361)

http://www-stat.ucdavis.edu

Faculty

Rudolph Beran, Ph.D., Professor
Prabir Burman, Ph.D., Professor
Nello Cristianini, Ph.D., Assistant Professor
Christiana Drake, Ph.D., Associate Professor
Fushing Hsieh, Ph.D., Professor
Jiming Jiang, Ph.D., Associate Professor
Wesley O. Johnson, Ph.D., Professor
Yue-Pok (Ed) Mack, Ph.D., Professor
Hans-Georg Müller, Ph.D., Professor
Wolfgang Polonik, Ph.D., Associate Professor
George G. Roussas, Ph.D., Professor
Francisco J. Samaniego, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Robert H. Shumway, Ph.D., Professor
Duncan Temple Lan, Ph.D., Associate Professor
Jessica M. Utts, Ph.D., Professor, *Academic Senate Distinguished Teaching Award*
Jane-Ling Wang, Ph.D., Professor

Emeriti Faculty

P.K. Bhattacharya, Ph.D., Professor Emeritus
Alan P. Fenech, Ph.D., Professor Emeritus
Alvin D. Wiggins, Ph.D., Professor Emeritus

Affiliated Faculty

Rahman Azari, Ph.D., Lecturer

The Major Program

Statistics enables us to make inferences about entire populations, based on samples extracted from those populations. Statistical methods can be applied to problems from almost every discipline and they are vitally important to researchers in agricultural, biological, environmental, social, engineering, and medical sciences.

The Program. Statistics majors may receive either a Bachelor of Arts or a Bachelor of Science degree. The A.B. degree is very flexible, facilitating a double major or extensive elective course work in a field in which statistics is applied. The B.S. degree program has two options: one emphasizes mathematics and is especially recommended as preparation for graduate study in statistics; the other emphasizes computer science. All three programs require theoretical and applied course work and underscore the strong interdependence of statistical theory and the applications of statistics.

Preparatory Requirements. Before applying for either the A.B. or B.S. major in Statistics, students must ordinarily complete the following courses with at least *C* grades:

Mathematics 21A, 21B, 21C
Mathematics 22A, 22B
Computer Science Engineering 30 or 40
Statistics 32

In addition, due to space limitations in the B.S. major, students admitted to this major will normally be chosen from those having at least a 3.0 grade point average in the above courses. For further information, please contact a Statistics adviser.

Career Alternatives. Probability models and statistical methods are used in a great many fields, including the biological and social sciences, business and engineering. The wide applicability of statistics has created in both the public and private sectors a strong demand for graduates with statistical training. Current employment opportunities include state and federal government positions with a statistician designation, industrial positions (e.g., in the actuarial series within an insurance company, in the data management unit in a health science facility, or in the research units in pharmaceutical and biotechnology industries), and teaching positions.

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 25
Mathematics 21A, 21B, 21C..... 12
Mathematics 22A, 22B 6
Computer Science Engineering 30 or Computer Science Engineering 40 (or the equivalent)..... 4
Statistics 32 3

Depth Subject Matter..... 41-44
Statistics 106, 108 or the equivalent 8
Statistics 131A, 131B, 131C..... 12
Three courses from Statistics 104, 135, 137, 138, 141, 142, 144, 145 12
Related elective courses..... 9-12
Three upper division courses approved by major adviser; they should be in mathematics, computer science or in quantitative aspects of a substantive discipline.

Total Units for the Major 66-69

B.S. Major Requirements:

UNITS

Preparatory Subject Matter 25-29
Mathematics 21A, 21B, 21C..... 12
Mathematics 22A, 22B 6
Computer science:
General option: Computer Science Engineering 30 or Computer Science Engineering 40 (or the equivalent)..... 4
Computer Science option: Computer Science Engineering 30 and 40..... 8
Statistics 32 3

Depth Subject Matter
Complete one of the two options below.

Statistics—General option..... 51-52
Statistics 106, 108 or the equivalent 8
Statistics 131A, 131B, 131C or the equivalent..... 12
Four courses selected from Statistics 104, 135, 137, 138, 141, 142, 144, 145 16
Three courses selected from Mathematics 108, 127A, 127B, 127C, 128A, 128B, 128C, 167, 168 (Mathematics 127 strongly recommended for students considering graduate work in Mathematics or Statistics.)..... 12
Related elective course..... 3-4
One upper division course approved by major adviser; it should be in mathematics, computer science or in quantitative aspects of a substantive discipline.

Total Units for the Major 76-77

Statistics—Computer Science option 52
Statistics 106, 108 (or the equivalent)..... 8
Statistics 131A, 131B, 131C..... 12
Two courses from Statistics 104, 135, 137, 138, 141, 142, 144, 145 8
Computer Science Engineering 110, 165A 8
Two courses from Mathematics 128A, 128B, 132A, 132B, 167, 168..... 8
Two courses from Computer Science Engineering 122A, 124, 130, 175..... 8

Total Units for the Major 81

Major Adviser. C. Drake.

Students are encouraged to meet with an adviser to plan a program as early as possible. Sometime before or during the first quarter of the junior year, students planning to major in Statistics should consult with a faculty adviser to plan the remainder of their undergraduate programs.

Minor Program Requirements:

The Department offers a minor program in Statistics that consists of a survey at the upper division level of the fundamentals of mathematical statistics and of the most widely used applied statistical methods.

UNITS

Statistics..... 20
Statistics 106, 108, and 130A-130B or 131A-131B..... 16
One course in Statistics having Statistics 130B or 131B as a prerequisite 4
Preparation: Statistics 13 or 32.

Graduate Study. The Graduate Program in Statistics offers study and research leading to the M.S. and Ph.D. degrees in Statistics, including a Ph.D. in Statistics with an emphasis in Biostatistics. Detailed information concerning these degree programs, as well as information on admissions and on financial support, is available from the Department of Statistics.

Graduate Adviser. W. Polonik
Statistical Consulting. The Department provides a consulting service for researchers on campus. For more information, call the Statistical Laboratory Office (530-752-6096).

Courses in Statistics (STA)

Lower Division Courses

10. Statistical Thinking (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: two years of high school algebra. Statistics and probability in daily life. Examines principles of collecting, presenting and interpreting data in order to critically assess results reported in the media; emphasis is on understanding polls, unemployment rates, health studies; understanding probability, risk and odds. GE credit: SciEng or SocSci, Wrt.—III. (III.)

12. Introduction to Discrete Probability (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: two years of high school algebra. Random experiments; countable sample spaces; elementary probability axioms; counting formulas; conditional probability; independence; Bayes theorem; expectation; gambling problems; binomial, hypergeometric, Poisson, geometric, negative binomial and multinomial models; limiting distributions; Markov chains. Applications in the social, biological, and engineer-

ing sciences. Offered in alternate years. GE credit: SciEng.

13. Elementary Statistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: two years of high school algebra or the equivalent in college. Descriptive statistics; basic probability concepts; binomial, normal, Student's t, and chi-square distributions. Hypothesis testing and confidence intervals for one and two means and proportions. Regression. Not open for credit to students who have completed course 13V or higher. GE credit: SciEng.—I, II, III. (I, II, III.)

13V. Elementary Statistics (4)
Lecture—1.5 hours; online lecture—5 hours. Prerequisite: two years of high school algebra or the equivalent in college. Descriptive statistics; basic probability concepts; binomial, normal, Student's t, and chi-square distributions. Hypothesis testing and confidence intervals for one and two means and proportions. Regression. Not open for credit to students who have completed course 13 or higher. GE credit: SciEng.—I. (I.) Utts

32. Basic Statistical Analysis Through Computers (3)
Lecture—3 hours. Prerequisite: Mathematics 16B or 21B; ability to program in a high-level computer language such as Pascal. Overview of probability modeling and statistical inference. Problem solution through mathematical analysis and computer simulation. Recommended as alternative to course 13 for students with some knowledge of calculus and computer programming. GE credit: SciEng.—II, III. (II, III.)

90X. Seminar (1-2)
Seminar—1-2 hours. Prerequisite: high school algebra and consent of instructor. Examination of a special topic in a small group setting.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Applied Statistics for Biological Sciences (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: Mathematics 16B or the equivalent. Probability computation/modeling, estimation, hypothesis testing, contingency tables, ANOVA, regression; implementation of statistical methods using computer package. Only two units credit allowed to students who have taken course 13 or 32. Not open for credit to students who have taken course 102. GE credit SciEng.—I, II, III. (I, II, III.)

102. Introduction to Probability Modeling and Statistical Inference (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: two years of high school algebra, and upper division standing. Introductory probability and statistics at a rigorous yet precalculus level. Rigorous precalculus introduction to probability and parametric/nonparametric statistical inference with computing; binomial, Poisson, geometric, normal, and sampling distributions; exploratory data analysis; regression analysis; ANOVA. Only two units of credit allowed to students who have taken course 32. Not open for credit to students who have taken course 100. GE credit: SciEng.—I, III. (I, III.)

103. Applied Statistics for Business and Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 13, 32, or 102; and Mathematics 16A, 16B. Descriptive statistics; probability; random variables; expectation; binomial, normal, Poisson, other univariate distributions; joint distributions; sampling distributions, central limit theorem; properties of estimators; linear combinations of random variables; testing and estimation; Minitab computing package. GE credit: SciEng.—I, II, III. (I, II, III.)

104. Applied Statistical Methods: Nonparametric Statistics (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 13, 32, or 102. Sign and Wilcoxon tests, Walsh averages. Two-sample procedures. Inferences concerning scale. Kruskal-Wallis test. Measures of association. Chi square and Kolmogorov-Smirnov tests. Offered in alternate years. GE credit: SciEng.—(II.)

106. Applied Statistical Methods: Analysis of Variance (4)
Lecture—4 hours. Prerequisite: course 13, 32, or 102. One-way and two-way fixed effects analysis of variance models. Randomized complete and incomplete block design, Latin squares. Multiple comparisons procedures. One-way random effects model. GE credit: SciEng.—I, II. (I, II.)

108. Applied Statistical Methods: Regression Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 13, 32 or 102. Simple linear regression, variable selection techniques, stepwise regression, analysis of covariance, influence measures, computing packages. GE credit: SciEng.—I, II, III. (I, II, III.)

120. Probability and Random Variables for Engineers (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21A, 21B, 21C, and 22A. Basic concepts of probability theory with applications to electrical engineering, discrete and continuous random variables, conditional probability, combinatorics, bivariate distributions, transformation of random variables, law of large numbers, central limit theorem, and approximations. No credit for students who have taken course 131A or Civil and Environmental Engineering 114. GE credit: SciEng.—I, III. (I, III.)

130A. Mathematical Statistics: Brief Course (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics16B. Basic probability, densities and distributions, mean, variance, covariance, Chebyshev's inequality, some special distributions, sampling distributions, central limit theorem and law of large numbers, point estimation, some methods of estimation, interval estimation, confidence intervals for certain quantities, computing sample sizes. Only 2 units of credit allowed to students who have taken course 131A.—I. (I.)

130B. Mathematical Statistics: Brief Course (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 130A. Transformed random variables, large sample properties of estimates. Basic ideas of hypotheses testing, likelihood ratio tests, goodness-of-fit tests. General linear model, least squares estimates, Gauss-Markov theorem. Analysis of variance, F-test. Regression and correlation, multiple regression. Selected topics.—II. (II.)

131A. Introduction to Probability Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21A, 21B, 21C, and 22A. Fundamental concepts of probability theory, discrete and continuous random variables, standard distributions, moments and moment-generating functions, laws of large numbers and the central limit theorem. Not open for credit to students who have taken Mathematics 131.—I, II, III. (I, II, III.)

131B-131C. Introduction to Mathematical Statistics (4-4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 131A, or Mathematics 22A and 131. Sampling, methods of estimation, sampling distributions, confidence intervals, testing hypotheses, linear regression, analysis of variance, elements of large sample theory, and nonparametric inference.—II-III. (II-III.)

133. Mathematical Statistics for Economists (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 103 and Mathematics 16B, or the equivalents; no credit will be given to students majoring in Statistics. Probability, basic properties; discrete and continuous random variables (binomial, normal, t, chi-square); expectation and variance of a random variable; bivariate random variables (bivariate normal); sampling distributions; central limit theorem; estimation, maximum likelihood principle; basics of hypotheses testing (one-sample).—I. (I.)

135. Multivariate Data Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 130B, and preferably course 131B. Multivariate normal distribution; Mahalanobis distance; sampling distributions of the mean vector and covariance matrix; Hotelling's T^2; simultaneous inference; one-way MANOVA; discriminant analysis; principal components; canonical correlation; factor analysis. Intensive use of computer analyses and real data sets.—III. (III.)

137. Applied Time Series Analysis (4)
Lecture—3 hours; term paper. Prerequisite: course 108 or the equivalent. Time series relationships, cyclical behavior, periodicity, spectral analysis, coherence, filtering, regression, ARIMA and state-space models; Applications to data from economics, engineering, medicine environment using time series software.—III. (III.)

138. Analysis of Categorical Data (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 130B or 131B, or courses 106 and 108. Varieties of categorical data, cross-classifications, contingency tables, tests for independence. Multidimensional tables and log-linear models, maximum likelihood estimation; tests of goodness-of-fit. Logit models, linear logistic models. Analysis of incomplete tables. Packaged computer programs, analysis of real data. GE credit: SciEng.—I. (I.)

141. Statistical Computing (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 130A or 131A, and one of courses 13, 32, 100, 102, or the equivalent, and experience in computer programming; course 130B or 131B recommended. Use of computers in statistics. Numerical foundations of statistical procedures. Computation of probabilities and quantiles. Random numbers. Monte Carlo method and bootstrap. Methods for parametric statistical models. Graphical methods and exploratory data analysis.—II. (II.)

142. Reliability (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 130B or 131B or consent of instructor. Stochastic modeling and inference for reliability systems. Topics include coherent systems, statistical failure models, notions of aging, maintenance policies and their optimization. Offered in alternate years.

144. Sampling Theory of Surveys (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 130B or 131B. Simple random, stratified random, cluster, and systematic sampling plans; mean, proportion, total, ratio, and regression estimators for these plans; sample survey design, absolute and relative error, sample size selection, strata construction; sampling and nonsampling sources of error. Offered in alternate years. GE credit: SciEng.—(I.)

145. Bayesian Statistical Inference (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: courses 130A and 130B, or 131A and 131B, or the equivalent. Subjective probability, Bayes Theorem, conjugate priors, non-informative priors, estimation, testing, prediction, empirical Bayes methods, properties of Bayesian procedures, comparisons with classical procedures, approximation techniques, Gibbs sampling, hierarchical Bayesian analysis, applications, computer implemented data analysis. Offered in alternate years.—(II.)

190X. Seminar (1-2)
Seminar—1-2 hours. Prerequisite: one of courses 13, 32, 100, 102, or 103. In-depth examination of a special topic in a small group setting.

192. Internship in Statistics (1-12)
Internship—3-36 hours; term paper. Prerequisite: upper division standing and consent of instructor. Work experience in statistics. (P/NP grading only.)

194HA-194HB. Special Studies for Honors Students (4-4)
Independent study—12 hours. Prerequisite: senior qualifying for honors. Directed reading, research and writing, culminating in the completion of a senior

honors thesis or project under direction of a faculty adviser. (Deferred grading only, pending completion of sequence.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

205. Statistical Methods for Research (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 106 or the equivalent. Topics in design of experiments include factorial designs, balanced and unbalanced experiments, random and mixed effects models, response surface methodology, nested design, repeated measures, cross-over design, analysis of covariance. Applications in engineering, biological sciences, medicine and environmental research. Offered in alternate years.—(III.)

222. Biostatistics: Survival Analysis (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 131C. Incomplete data; life tables; nonparametric methods; parametric methods; accelerated failure time models; proportional hazards models; partial likelihood; advanced topics. (Same course as Biostatistics 222.)—I. (I)

223. Biostatistics: Generalized Linear Models (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 131C. Likelihood and linear regression; generalized linear model; Binomial regression; case-control studies; dose-response and bioassay; Poisson regression; Gamma regression; quasi-likelihood models; estimating equations; multivariate GLMs. (Same course as Biostatistics 223.)—II. (II)

224. Analysis of Longitudinal Data (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course/Biostatistics 222, 223 and course 232B or consent of instructor. Standard and advanced methodology, theory, algorithms, and applications relevant for analysis of repeated measurements and longitudinal data in biostatistical and statistical settings. (Same course as Biostatistics 224.)—III. (III.)

225. Clinical Trials (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course/Biosatistics 223 or consent of instructor. Basic statistical principles of clinical designs, including bias, randomization, blocking, and masking. Practical applications of widely-used designs, including dose-finding, comparative and cluster randomization designs. Advanced statistical procedures for analysis of data collected in clinical trials. (Same course as Biostatistics 225.) Offered in alternate years.—III.

226. Statistical Methods for Bioinformatics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 131C or consent of instructor; data analysis experience recommended. Standard and advanced statistical methodology, theory, algorithms, and applications relevant to the analysis of –omics data. (Same course as Biostatistics 226.) Offered in alternate years.—II.

231A. Mathematical Statistics I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 131A, 131B, 131C, Mathematics 127A, 127B or the equivalent. First part of 3-quarter sequence on mathematical statistics. Emphasizes foundations. Topics include basic concepts in asymptotic theory, decision theory (e.g. risk function, Bayes and minimax optimality, Bayes estimation), and an overview of methods of point estimation.—I. (I.)

231B. Mathematical Statistics II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 231A. Second part of a 3-quarter sequence on mathematical statistics. Emphasizes large sample theory, e.g. asymptotics of MLE, likelihood-ratio-test and Chi-square-test, CLT with applications in (generalized) linear models. Classical hypothesis testing, e.g. Neyman-Pearson theory, UMP (unbiased)-tests.—II. (II.)

231C. Mathematical Statistics III (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 231A, 231B. Third part of 3-quarter sequence on mathematical statistics. Emphasizes large sample theory and their applications. Topics include statistical functionals (applications to L- and M-estimation); resampling methods (jackknife, bootstrap); curve estimation (density, regression, failure rate); rank tests, and one instructor-selected topic.—III. (III.)

232A. Applied Statistics I (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 106, 108, 131A, 131B, 131C, Mathematics 167. Estimation and testing for the general linear model, ANOVA design, model validation, variable selection, and analyzing data with the linear model.—I. (I.)

232B. Applied Statistics II (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 232A. Estimation and testing for the general linear mixed model, Bayesian hierarchical modeling, nonparametric modeling, analyzing data and designing experiments with respect to these models.—II. (II.)

232C. Applied Statistics III (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 232B. Multivariate analysis: multivariate distributions, multivariate linear models, data analytic methods including principal component, factor, discriminant, cluster, and canonical correlation analyses, nonparametric methods, regression trees, and Bayesian methods.—III. (III.)

233. Design of Experiments (3)
Lecture—3 hours. Prerequisite: course 131C. Topics from balanced and partially balanced incomplete block designs, fractional factorials, and response surfaces. Offered in alternate years.—(III.)

235A-235B-235C. Probability Theory (4-4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: Mathematics 127C and 131 or course 131A or consent of instructor. Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariance principle. Conditional expectation. Topics selected from martingales, Markov chains, ergodic theory. (Same course as Mathematics 235A-235B-235C.)—I-II-III. (I-II-III.)

237A-237B. Time Series Analysis (4-4)
Lecture—3 hours; term paper. Prerequisite: course 131B or the equivalent; course 237A is a prerequisite for course 237B. Advanced topics in time series analysis and applications. Models for experimental data, measures of dependence, large-sample theory, statistical estimation and inference. Univariate and multivariate spectral analysis, regression, ARIMA models, state-space models, Kalman filtering. Offered in alternate years.—(I-II.)

238. Theory of Multivariate Analysis (4)
Lecture—3 hours; term paper. Prerequisite: courses 131B and 135. Multivariate normal and Wishart distributions, Hotelling's T-Squared, simultaneous inference, likelihood ratio and union intersection tests, Bayesian methods, discriminant analysis, principal component and factor analysis, multivariate clustering, multivariate regression and analysis of variance, application to data. Offered in alternate years.—II.

240A-240B. Nonparametric Inference (4-4)
Lecture—3 hours; term paper. Prerequisite: course 231C; courses 235A-235B-235C recommended. Comprehensive treatment of nonparametric statistical inference, including the most basic materials from classical nonparametrics, robustness, nonparametric estimation of a distribution function from incomplete data, curve estimation, and theory of resampling methodology. Offered in alternate years. (II-III.)

241. Asymptotic Theory of Statistics (4)
Lecture—3 hours; term paper. Prerequisite: course 231C; courses 235A-235B-235C desirable. Topics in asymptotic theory of statistics chosen from weak convergence, contiguity, empirical processes, Edgeworth expansion, and semiparametric inference. Offered in alternate years. (III.)

250. Topics in Applied and Computational Statistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 131A; course 232A recommended. Topics may include resampling methods, nonparametric and semiparametric methods, incomplete data analysis, diagnostics, multivariate and time series analysis, applied Bayesian methods, sequential analysis and quality control, categorical data analysis, spatial and image analysis, computational biology, functional data analysis, models for correlated data, learning theory. May be repeated for credit with consent of instructor. Not offered every year.—I, II, III.

251. Topics in Statistical Methods and Models (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 231B or the equivalent. Topics may include Bayesian analysis, nonparametric and semiparametric regression, sequential analysis, bootstrap, statistical methods in high dimensions, reliability, spatial processes, inference for stochastic process, stochastic methods in finance, empirical processes, change-point problems, asymptotics for parametric, nonparametric and semiparametric models, nonlinear time series, robustness. May be repeated for credit with consent of instructor. Not offered every year.—II. (II.)

252. Advanced Topics in Biostatistics (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 222, 223. Biostatistical methods and models selected from the following: genetics, bioinformatics and genomics; longitudinal or functional data; clinical trials and experimental design; analysis of environmental data; dose-response, nutrition and toxicology; survival analysis; observational studies and epidemiology; computer-intensive or Bayesian methods in biostatistics. May be repeated for credit with consent of adviser when topic differs. (Same course as Biostatistics 252.) Offered in alternate years.—III.

280. Orientation to Statistical Research (2)
Seminar—2 hours. Prerequisite: consent of instructor. Guided orientation to original statistical research papers, and oral presentations in class of such papers by students under the supervision of a faculty member. May be repeated once for credit. (S/U grading only.)—III. (III.)

290. Seminar in Statistics (1-6)
Prerequisite: consent of instructor. Seminar on advanced topics in probability and statistics. (S/U grading only.)—I, II, III. (I, II, III.)

292. Graduate Group in Statistics Seminar (1-2)
Seminar—1-2 hours. Prerequisite: graduate standing. Advanced study in various fields of statistics with emphasis in applied topics, presented by members of the Graduate Group in Statistics and other guest speakers. (S/U grading only.)—III. (III.)

298. Directed Group Study (1-5)
Prerequisite: graduate standing, consent of instructor.

299. Individual Study (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

299D. Dissertation Research (1-12)
Prerequisite: advancement to candidacy for Ph.D., consent of instructor. (S/U grading only.)

Professional Course

390. Methods of Teaching Statistics (2)
Lecture/discussion—1 hour; laboratory—1 hour. Prerequisite: graduate standing. Practical experience in methods/problems of teaching statistics at university undergraduate level. Lecturing techniques, analysis of tests and supporting material, preparation and grading of examinations, and use of statistical software. Emphasis on practical training. May be repeated for credit. (S/U grading only.)—I. (I.)

Professional Course

401. Methods in Statistical Consulting (3)
Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: graduate standing in Statistics. Introduction to consulting; in-class consulting as a group; individual or team consulting under supervision. May be repeated for credit. (S/U grading only.)—II, III. (II, III.)

Statistics (A Graduate Group)

Jane-Ling Wang, Ph.D., Chairperson of the Group
Group Office, 380 Kerr Hall (530-752-2362)
http://www-stat.ucdavis.edu

Faculty

Carolyn Aldwin, Ph.D., Professor *(Human and Community Development)*
Rudolph Beran, Ph.D, Professor *(Statistics)*
David S. Bunch, Ph.D., Associate Professor *(Graduate School of Management)*
Prabir Burman, Ph.D., Associate Professor *(Statistics)*
Colin Cameron, Ph.D., Associate Professor *(Economics)*
Andrew J. Clifford, Ph.D., Professor *(Nutrition)*
Christiana Drake, Ph.D., Associate Professor *(Statistics)*
Juanjuan Fan, Ph.D., Assistant Professor *(Statistics)*
Thomas B. Farver, Ph.D., Professor *(Population Health and Reproduction)*
Alan P. Fenech, Ph.D., Associate Professor *(Statistics)*
William Gardner, Ph.D., Professor *(Electrical and Computer Engineering)*
Shu Geng, Ph.D., Professor *(Agronomy and Range Science)*
Arthur Havenner, Ph.D., Professor *(Agricultural and Resource Economics)*
Jiming Jiang, Ph.D., Associate Professor *(Statistics)*
Wesley O. Johnson, Ph.D., Professor *(Statistics)*
Oscar Jorda, Ph.D., Assistant Professor *(Economics)*
Philip Kass, Ph.D., Associate Professor *(Population Health and Reproduction)*
M. Levent Kavvas, Ph.D., Professor *(Civil and Environmental Engineering)*
Arthur J. Krener, Ph.D., Professor *(Mathematics)*
Richard A. Levine, Ph.D., Assistant Professor *(Statistics)*
Hongzhe Li, Ph.D., Assistant Professor *(Internal Medicine)*
Yue-Pok (Ed) Mack, Ph.D., Professor *(Statistics)*
Norman Matloff, Ph.D., Professor *(Computer Science)*
Patricia Mokhtarian, Ph.D., Associate Professor *(Civil and Environmental Engineering)*
Hans-Georg Mueller, M.D., Ph.D., Professor *(Statistics)*
Debbie Niemeier, Ph.D., Associate Professor *(Civil and Environmental Engineering)*
Richard E. Plant, Ph.D., Professor *(Agronomy and Range Science)*
Wolfgang Polonik, Ph.D., Assistant Professor *(Statistics)*
Carlos E. Puente, Ph.D., Associate Professor *(Land, Air and Water Resources)*
David Rocke, Ph.D., Professor *(Graduate School of Management)*
George G. Roussas, Ph.D., Professor *(Statistics)*
Naoki Saito, Ph.D., Associate Professor *(Mathematics)*
Francisco J. Samaniego, Ph.D., Professor *(Statistics)*
Steven J. Samuels, Ph.D., Associate Adjunct Professor *(Epidemiology and Preventive Medicine)*
Douglas V. Shaw, Ph.D., Professor *(Pomology)*
Robert H. Shumway, Ph.D., Professor *(Statistics)*
Chih-Ling Tsai, Ph.D., Professor *(Graduate School of Management)*
Jessica M. Utts, Ph.D., Professor *(Statistics)*
Jane-Ling Wang, Ph.D, Professor *(Statistics)*
Roger J.B. Wets, Ph.D., Professor *(Mathematics)*

Emeriti Faculty

P.K. Bhattacharya, Ph.D., Professor Emeritus
Gerald L. DeNardo, M.D., Professor Emeritus
Charles E. Franti, Ph.D., Professor Emeritus
Alvin D. Wiggins, Ph.D., Professor Emeritus

Affiliated Faculty

Rahman Azari, Ph.D., Lecturer *(Statistics)*

Graduate Study. The Graduate Group in Statistics offers programs of study and research leading to the M.S. and Ph.D. degrees. The M.S. gives students a strong foundation in the theory of statistics as well as substantial familiarity with the most widely used statistical methods. Facility in computer programming is essential for some of the course work. The supervised statistical consulting required of all M.S. students has proven to be a valuable educational experience. The Ph.D. program combines advanced course work in statistics and probability with the opportunity for in-depth concurrent study in an applied field. A Ph.D. program with an emphasis in biostatistics is also offered and overseen by the Biostatistics Affinity Group, a subgroup of the Graduate Group in Statistics. For detailed information contact the Chairperson of the Group or the Graduate Adviser.

Preparation. For admission to the Ph.D. program, course work requirements for the master's degree, and at least one semester/two quarters of advanced calculus must be completed.

Graduate Adviser. W. Polonik

Subject A

See University Requirements (Undergraduate Education chapter)

Surgery

See Surgery (Medicine, School of); and Surgical and Radiological Sciences (Veterinary Medicine, School of)

Surgical and Radiological Sciences

See Veterinary Medicine, School of

TechnoCultural Studies

(College of Letters and Science)
Douglas Kahn, Ph.D., Program Director
Program Office, Room 316, Art Building (530-752-0105)
http://technoculture.ucdavis.edu

Committee in Charge

Carolyn de la Peña, Ph.D. *(American Studies)*
Jesse Drew, Ph.D. *(Technocultural Studies)*
Frances Dyson, Ph.D. *(Art Studio)*
Bernd Hamann, Ph.D *(Computer Science)*
Lynn Hershman, M.A. *(Art Studio)*
Douglas Kahn, Ph.D *(Technocultural Studies)*
Pablo Ortiz, D.M.A. *(Music)*
Kathryn Sylva, M.F.A. *(Design)*
Barbara Sellers-Young, Ph.D. *(Theatre and Dance)*
Simon Sadler, Ph. D *(Art History)*

The Program of Study

The Program in Technocultural Studies is an interdisciplinary initiative bridging the arts, humanities, technology and the sciences. The program integrates new research in cultural history and theory with innovative production in digital media and wherever performance, music, visual arts, writing and media engage science and technology.

Courses in Technocultural Studies (TCS)

Lower Division Courses

1. Introduction to Technocultural Studies (4)
Lecture—3 hours; extensive writing. Contemporary developments in the fine and performing arts, media arts, digital arts, and literature as they relate to technological and scientific practices. GE credit: ArtHum.—I. Kahn

2. Critiques of Media (4)
Lecture—3 hours; term paper. Introduction to different forms of critical analysis of media, with focus on creative responses to the media within visual arts, media arts, and net culture. Response of artists to the power of mass media, from early forms of photomontage through contemporary "culture-jamming" and alternative media networks. GE credit: ArtHum.—II. Dyson

4. Parallels in Art and Science (4)
Lecture—3 hours; term paper. Issues arising from historical and contemporary encounters between the arts and sciences, with emphasis on comparative notions of research, experimentation, and progress. GE credit: ArtHum.—II, III.

5. Media Archaeology (4)
Lecture/discussion—3 hours; term paper. Evolution of media technologies and practices beginning in the 19th Century as they relate to contemporary digital arts practices. Special focus on the reconstruction of the social and artistic possibilities of lost and obsolete media technologies. GE credit: ArtHum.—III.

6. Technoculture and the Popular Imagination (4)
Lecture—3 hours; extensive writing. Issues of technological and scientific developments as conveyed through mass media and popular culture with special attention to public spectacle, exhibitions, broadcasts, performances, demonstrations and literary fictions and journalistic accounts. GE credit: ArtHum.—III.

7A-E. Technocultural Workshop (1)
Seminar—1 hour. Workshops in technocultural digital skills: **(A)** Digital Imaging; **(B)** Digital Video; **(C)** Digital Sound; **(D)** Web Design; **(E)** Topics in Digital Production.—I. (I.)

Upper Division Courses

100. Experimental Digital Cinema I (4)
Lecture/discussion—3 hours; laboratory—3 hours. Experimental approaches to the making of film and video in the age of digital technologies. Opportunities for independent producers arising from new media. Instruction in technical, conceptual and creative skills for taking a project from idea to fruition.—II. Hershman

101. Experimental Digital Cinema II (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 100. Continuation of course 100 with further exploration of digital cinema creation. Additional topics include new modes of distribution, streaming, installation and exhibition.—III. Hershman

103. Interactivity and Animation (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 7A, 7D or the equivalent. Funda-

mentals of creating interactive screen-based work. Theories of interactivity, linear versus non-linear structures and audience involvement and participation. Use of digital production tools to produce class projects.—III. (III.)

104. Documentary Production (4)
Lecture/discussion—3 hours; project. Prerequisite: course 7B or the equivalent, course 155. Traditional and new forms of documentary, with focus on technocultural issues. Skills and strategies for producing work in various media. Progression through all stages of production, from conception through post-production to critique.—II. (II.)

110. Object-Oriented Programming for Artists (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 1. Introduction to object-oriented programming for artists. Focus on understanding the metaphors and potential of object-oriented programming for sound, video, performance, and interactive installations.—III.

111. Community Media Production (4)
Lecture/discussion—3 hours; laboratory—3 hours. Use of video and new media tools to address social issues among neighborhood and community groups. Students will use basic video, sound, and lighting techniques as they work with local groups in a group video project.—III. (III.)

112. New Radio Features and Documentary (4)
Lecture/discussion—3 hours; laboratory—3 hours. New feature and documentary production for radio and other audiophonic media, including audio streaming Web sites and installation. Emphasis on new and experimental approaches to audio production for broadcast on community radio and in international arts programming. Offered in alternate years.—III. Dyson

113. Community Networks (4)
Lecture/discussion—3 hours; laboratory—3 hours. Impact and implications of computer-based networks in community, civic, and social life. Subjects may include community-access computer sites, neighborhood wireless networks, the digital divide, open-source software, and citizen action.—II. (II.)

120. History of Sound in the Arts (4)
Lecture—3 hours; term paper. Prerequisite: course 1. A survey of the use of sound, voice, noise, and modes of listening in the modernist, avant-garde, and experimental arts, from the late 19th Century to the present. Focus on audiophonic and audiovisual technologies.—II. Kahn

121. Introduction to Sonic Arts (4)
Lecture/discussion—3 hours; lecture/laboratory—3 hours. Prerequisite: course 7C. Introduction to the use of sound within the arts. Techniques and aesthetics of experimental contemporary practices. Creation of original sound works.—I. (I.)

122. Intermediate Sonic Arts (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 121, 170C. Techniques of recording, editing, mixing, and synthesis to combine voice, field recordings, and electronic signals. Incorporating live, recorded, and found sounds to create multidimensional stories. Presentation of live performances, audio recordings, and sound installations.—II. (II.)

123. Sight and Soundtrack (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: courses 7C, 170C. The use of sound to articulate, lend mood or subconsciously underscore visual, environmental or performative situations, combining music, voice, sound effects and other noises to create sound designs that enhance, alter or support action and movement.—III. (III.)

150. Introduction to Theories of the Technoculture (4)
Lecture/discussion—3 hours; extensive writing. Major cultural theories of technology with emphasis on media, communications, and the arts. Changing relationships between technologies, humans, and culture. Focus on the evolution of modern technologies and their reception within popular and applied contexts. GE credit: ArtHum—I. (I.)

151. Topics in Virtuality (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1. Social, political, economic, and aesthetic factors in virtual reality. Artificial environments, telepresence, and simulated experience. Focus on contemporary artists' work and writing.—III. Dyson

152. New Trends in Technocultural Arts (4)
Lecture/discussion—3 hours; term paper. Current work at the intersection of the arts, culture, science, and technology including biological and medical sciences, computer science and communications, and artificial intelligence and digital media.—I. (I.) Hershman

153. Concepts of Innovative Soundtracks (4)
Lecture/discussion—3 hours; term paper. Innovative and unconventional soundtracks in cinema, media arts, and fine arts. Introduction to basic analytical skills for understanding sound-image relationships. Offered in alternate years.—II. Kahn

154. Outsider Machines (4)
Lecture/discussion—3 hours; term paper. Invention, adaptation and use of technologies outside the mainstream, commonsense, and the possible. Topics include machines as metaphor and embodied thought, eccentric customizing and fictional technologies. Offered in alternate years.—II. Kahn

155. Introduction to Documentary Studies (4)
Lecture/discussion—3 hours; term paper. Recent evolution of the documentary. The personal essay film; found-footage/appropriation work; non-linear, multi-media forms; spoken word; storytelling; oral history recordings; and other examples of documentary expression.—I. (I.)

158. Technology and the Modern American Body (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 and either American Studies 1 or 5. The history and analysis of the relationships between human bodies and technologies in modern society. Dominant and eccentric examples of how human bodies and technologies influence one another and reveal underlying cultural assumptions. (Same course as American Studies 158.) GE credit: ArtHum.—I, III. de la Pena

159. Media Subcultures (4)
Lecture/discussion—3 hours; term paper. Relationships between subcultural groups and media technologies. Media as the cohesive and persuasive force of subcultural activities. List-servs, Web sites, free radio, fan 'zines, and hip-hop culture. GE credit: Div.—II. (II.)

170A-E. Advanced Technocultural Workshop (1)
Seminar—1 hour. Prerequisite: course 7A or the equivalent. Workshops in advanced technocultural digital skills: **(A)** Digital Imaging; **(B)** Digital Video; **(C)** Digital Sound; **(D)** Web Design; **(E)** Topics in Digital Production. Not offered every year.

190. Research Methods in Technocultural Studies (4)
Lecture/discussion—3 hours; project. Introduction to basic research methods for Technocultural Studies: electronic and archived images, sounds and data, satellite downlinking, radiowave scanning, and oral histories.—II. (II.)

191. Writing Across Media (4)
Lecture/discussion—3 hours; extensive writing. Introduction to experimental approaches to writing for different media and artistic practices. How written texts relate to the images, sounds, and performances in digital and media production.—I. (I.) Kahn

192. Internship (1-4)
Internship—3-12 hours. Supervised internship on or off campus in area relevant to Technocultural Studies. May be repeated twice for credit. Not offered every year. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Textile Arts and Costume Design

See Design

Textile Science

See Fiber and Polymer Science

Textiles (A Graduate Group)

Gang Sun, Ph.D., Chairperson of the Group
Group Office, 129 Everson Hall (530-752-6650)
http://wdsroot.ucdavis.edu/caes/textiles/default.html

Faculty

Colin A. Carter, Ph.D., Professor *(Agricultural and Resource Economics)*
You-Lo Hsieh, Ph.D., Professor *(Textiles and Clothing)*
Susan B. Kaiser, Ph.D., Professor *(Textiles and Clothing, Women and Gender Studies)*
Gyongy Laky, M.A., Professor *(Design)*
Dean MacCannell, Ph.D., Professor *(Landscape Architecture)*
Zuhair A. Munir, Ph.D., Professor *(Chemical Engineering and Materials Science)*
Ning Pan, Ph.D., Professor *(Textiles and Clothing, Biological and Agricultural Engineering)*
Victoria Z. Rivers, M.A., Professor *(Design)*
Margaret H. Rucker, Ph.D., Professor *(Textiles and Clothing)*
James F. Schackelford, Ph.D., Professor *(Chemical Engineering and Materials Science)*
Barbara Shawcroft, M.F.A., Professor *(Design)*
Charles F. Shoemaker, Ph.D., Professor *(Food Science and Technology)*
Gang Sun, Ph.D., Associate Professor *(Textiles and Clothing)*
Patricia A. Turner, Ph.D., Professor *(African American and African Studies)*

Emeriti Faculty

Howard Needles, Ph.D., Professor Emeritus *(Textiles and Clothing)*
Howard G. Schutz, Ph.D., Professor Emeritus *(Consumer Science)*
Jo Ann C. Stabb, M.A., Senior Lecturer Emeritus *(Design)*
S. Haig Zeronian, Ph.D., Professor Emeritus *(Textiles and Clothing)*

Graduate Study. The Graduate Group in Textiles offers a program of study and research leading to the M.S. degree. Students in the program can emphasize either the physical or behavioral science aspects of textiles. Research areas include chemical, physical, biochemical, and mechanical properties of fibers and polymers as well as fibrous assemblies, including composites, paper, and nonwovens; and psychological and sociological factors relating to perception and consumption of textiles and apparel. Extensive specialized fiber, polymer, and textiles research facilities and a behavioral research laboratory are available. For detailed information regarding the program, address the Chairperson of the Group.

Graduate Adviser. G. Sun *(Textiles and Clothing).*

Textiles and Clothing

(College of Agricultural and Environmental Sciences)
Susan B. Kaiser, Ph.D., Chairperson of the Division
Division Office, 129 Everson Hall (530-752-6650)
http://trc.ucdavis.edu/textiles

Faculty

You-Lo Hsieh, Ph.D., Professor
Susan B. Kaiser, Ph.D., Professor
Ning Pan, Ph.D., Professor
Margaret H. Rucker, Ph.D., Professor
Gang Sun, Ph.D., Associate Professor

Emeriti Faculty

Stephen C. Jett, Ph.D., Professor Emeritus
Mary Ann Morris, Ph.D., Professor Emeritus
Howard L. Needles, Ph.D., Professor Emeritus
S. Haig Zeronian, Ph.D., D.Sc., Professor Emeritus

Affiliated Faculty

Joan Chandler, M.S., Lecturer

The Major Program

The textiles and clothing major emphasizes the connections among (a) the physical characteristics of textile products, (b) human perceptions of and behavior toward these products, and (c) global economic trends affecting the textile/apparel marketplace. An integrative knowledge base links textile products with people and processes, to focus on the production, distribution, and consumer use of textiles and apparel. (See also Fiber and Polymer Science.)

The Program. The textiles and clothing major offers two options: textile science and marketing/economics. The Textile Science option provides students with a broad knowledge base in both the social and physical sciences. This base includes production, end-use applications and care of textiles and apparel, physical and chemical properties of textiles, and social-psychological and economic aspects of textiles and clothing. The Marketing/Economics option emphasizes social science and business course work, while also providing students with an awareness of the physical nature of textile products.

Internships and Career Alternatives. Textiles and clothing majors can pursue internships and careers in apparel production and merchandising, retail management, international marketing, textile testing and conservation, and textiles journalism. The majority of textiles and clothing graduates accept entry-level management and technical positions within the textile and apparel industry or in related fields, (e.g., merchandising and marketing, production, research and development, technical service and design). Students may also pursue graduate studies in textiles, business, and other areas depending on their specific selections of restricted elective course work.

B.S. Major Requirements:

UNITS

English Composition Requirement 4-12
See College Requirement 0-8
Communication 1 4

Preparatory Subject Matter 43-45
Agricultural Management and Rangeland Resources 21 or Computer Science Engineering 15 or 30 3-4
Economics 1A-1B 10
Anthropology 2, Science and Society 1, Art History 1A, 1B, 1C, or 1D 4
Physics 1A or 10 3-4
Psychology 1 4
Sociology 2 4
Statistics 13 4
Textiles and Clothing 6, 7, 8 12

Breadth/General Education 6-24
Satisfaction of General Education requirement

Select one of the following two options:

Marketing/Economics Option

Additional Preparatory Subject Matter for the option 18-19
Management 11A-11B 8
Chemistry 10 or 2A 4-5
Mathematics 16A-16B 6

Depth Subject Matter 57-58
Agricultural and Resource Economics 100A-100B, 106, 136 16
Statistics 103 4
Psychology 151 or 156, or Consumer Science 100 3-4
Fiber and Polymer Science 110, Textiles and Clothing 107, 162, 162L, 163, 163L, 164, 165, 171, 173, 174 31

Restricted Electives 12
Courses selected from the following: Agricultural and Resource Economics 18, 112, 141M, 142, 155, 157, 171A, 171B, Anthropology 122, 126, Consumer Science 100, Design 77A, 77B, 143, Economics 101, 121A, 121B, 134, 162, and other relevant course work, Foreign language units may be used to satisfy any or all of the required 12 units, Mathematics 16C, Psychology 151, 156, Sociology 123, 126, 140, 141, 145, Textiles and Clothing 180A, 180B, 230, 293, with consent of instructor, and a maximum of 5 units in either Textiles and Clothing 192 or 199.

Unrestricted Electives 15-44

Textile Science Option

Additional Preparatory Subject Matter for the option 19
Chemistry 2A, 2B, 8A, 8B 16
Mathematics 16A 3

Depth Subject Matter 52-53
Agricultural and Resource Economics 112, 113 8
Design 143 4
Psychology 151 or 156, or Consumer Science 100 3-4
Fiber and Polymer Science 100, 161, 161L, Textiles and Clothing 107, 162, 162L, 163, 163L, 164, 165, 171, 173, 174 ... 34

Restricted Electives 16
Courses selected from the following: Agricultural and Resource Economics 18, 141, 141M, 142, 155, 171A, 171B, Agricultural Management and Rangeland Resources 120, Chemistry 2C, 128A, 128B, 128C, Communication 42, 130, 136, 140, Community and Regional Development 162, Consumer Science 100, Design 77A, 77B, 142A, 142B, 160A, 160B, 160C, 170A, 170B, 170C, Economics 11A, 11B, 100, 101, 121A, 121B, 134, Fiber and Polymer Science 110, Foreign Language units may be used to satisfy any or all of the required 16 units, Mathematics 16B, 16C, Psychology 151, 156, Sociology 25, 123, 126, 140, 148, 159, 175, Statistics 106, 108; Textiles and Clothing 180A, 180B, 230, 293, with consent of instructor, and a maximum of 5 units in either Textiles and Clothing 192 or 199.

Unrestricted Electives 17-46

Total Units for the Degree 180

Major Adviser. G. Sun.

Advising Center for the major is located in 133B Everson Hall (530-752-4417).

Minor Program Requirements:

The Division of Textiles and Clothing offers a minor program for non-majors interested in satisfying secondary career objectives. For acceptance into the program see the staff adviser in 133B Everson Hall.

UNITS

Textiles and Clothing 18
Textiles and Clothing 6, 7, or 8 4
Courses selected from Fiber and Polymer Science 100, 110, 161, 161L, Textiles and Clothing 107, 162-162L, 163-163L, 164, 165, 171, 173, 174 14

Minor Adviser. G. Sun.

Courses in Textiles and Clothing (TXC)

Questions pertaining to the following courses should be directed to the instructor or to the Division of Textiles and Clothing. See also courses in Fiber and Polymer Science.

Lower Division Courses

6. Introduction to Textiles (4)
Lecture—3 hours; laboratory—3 hours. Introduction to the structure and properties of textiles. Consumer use and fabric characteristics are emphasized. GE credit: SciEng.—I. (I.) Sun

7. Style and Cultural Studies (4)
Lecture/discussion—3 hours; discussion/laboratory—1 hour. The multiple and overlapping influences of gender, sexuality, ethnicity, and class on constructions of identity and community are explored through the study of style in popular culture and everyday life. Continuity and change in clothing and appearance styles are interpreted. GE credit: SocSci, Div, Wrt.—III. (III.) Kaiser

8. The Textile and Apparel Industries (4)
Lecture—4 hours. Study of the textile and apparel industries including fashion theory, production, distribution, and consumption of textile goods. GE credit: SocSci, Div.—I. (I.) Rucker

92. Internship in Textiles and Clothing (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience off campus in a textiles or clothing-related area. Supervision by a member of the Textiles and Clothing faculty. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)
(P/NP grading only.)

Upper Division Courses

107. Social and Psychological Aspects of Clothing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Sociology 2. Social and cognitive factors influencing management and perception of personal appearance in everyday life. Concepts and methods appropriate to the study of meaning of clothes in social and cultural contexts. GE credit: SocSci, Div, Wrt.—I. (I.) Kaiser, Chandler

162. Textile Fabrics (3)
Lecture—3 hours. Prerequisite: course 6. Properties of fabrics as related to serviceability, comfort, and appearance. GE credit: SciEng.—III. (III.) Pan

162L. Textile Fabrics Laboratory (1)
Laboratory—3 hours. Prerequisite: course 162 (may be taken concurrently). Laboratory methods and procedures employed in studying properties of textile fabrics as related to serviceability, comfort, and appearance.—III. (III.) Pan

163. Textile Coloration and Finishing (3)
Lecture—3 hours. Prerequisite: course 6, Fiber and Polymer Science 110, or Chemistry 8B. Basic principles of textile dyeing, printing, and finishing; color theory; structure, properties, and application of dyes and finishes; factors affecting application and fast-

ness; maintenance of dyed and finished textiles.—III. (III.) Sun

163L. Textile Coloration and Finishing Laboratory (1)
Laboratory—3 hours. Prerequisite: course 163 (may be taken concurrently). Demonstrates various aspects of dyeing, printing, and finishing of textile substrates including the effect of fiber and finish type, and physical and chemical variables on dyeing and finishing processes and on the properties of the resultant textile.—III. (III.) Sun

164. Principles of Apparel Production (3)
Lecture—3 hours. Prerequisite: course 6 or 8. Overview of characteristics, technology, processes, and research in apparel manufacturing industries including study of government statistics, material utilization and fabrication, mechanization, management, and production engineering.—II. (II.) Chandler

165. Textile Processes (3)
Lecture/discussion—3 hours. Prerequisite: course 6. Physical processes involved in the production of textiles from the individual fiber to the finished fabric. Includes spinning, texturing, yarn formation, weaving preparation, weaving and knitting, tufting and fabric finishing.

171. Clothing Materials Science (4)
Lecture—3 hours; laboratory/discussion—3 hours. Prerequisite: course 6, 8, and senior standing. The properties, characterization, and performance evaluation of clothing materials and structures for specific functional applications. Principles and methods related to wetting and transport properties, fabric hand and aesthetic properties, clothing comfort, and material and assembly technology.—II. (II.)

173. Principles of Fashion Marketing (3)
Lecture—3 hours. Prerequisite: course 8, Economics 1A, Agricultural and Resource Economics 113 or 136. Study of basic elements of fashion marketing including philosophy and objectives, organization, merchandising, pricing, promotion and personnel. Offered in alternate years.—III. Rucker

174. Introduction to World Trade in Textiles and Clothing (3)
Lecture—3 hours. Prerequisite: course 8. Structure of the global fiber/textile/apparel complex and its distribution patterns with an overview of political, economic, and technological factors that are changing these industries and their markets. Issues of race, ethnicity, and gender are highlighted throughout. GE Credit: SocSci, Div.—II. (II.) Rucker

180A-180B. Introduction to Research in Textiles (2-2)
Laboratory—6 hours. Prerequisite: senior standing with textile-related major, and consent of instructor. Senior thesis on independent problems. Research begun in course 180A will be continued and completed in course 180B. (Deferred grading only, pending completion of sequence.)—I, II, III. (I, II, III.)

192. Internship in Textiles and Clothing (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience off campus in a textiles or clothing-related area. Supervision by a member of the Textiles and Clothing faculty. (P/NP grading only.)

197T. Tutoring in Textiles and Clothing (1-5)
Discussion/laboratory—3-15 hours. Prerequisite: upper division textiles-related major and consent of instructor. Tutoring of students in Textiles and Clothing courses. Assistance with discussion groups and laboratory sections under supervision of instructor. May be repeated for credit if tutoring another textiles course. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

230. Behavioral Science Concepts in Textiles (3)
Lecture—3 hours. Prerequisite: course 107, upper division or graduate course in statistics (e.g., Agricultural Management and Rangeland Resources 120) and one in a behavioral science (e.g., Psychology 145). Examination of theories and research concerning relationships between clothing and human behavior with emphasis on research techniques, including methods of measuring clothing variables. Offered in alternate years.—I. Kaiser

290. Seminar (1)
Seminar—1 hour. Critical review of selected topics of current interest in textiles. (S/U grading only.)—I, II. (I, II.)

290C. Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing; consent of instructor. Individual faculty members meet with their graduate students. Critical presentations of original research are made by graduate students. Research activities are planned. Discussions are led by major professors for their research groups. (S/U grading only.)—I, II, III. (I, II, III.)

293. Recent Advances in Textiles (3)
Lecture—3 hours. Prerequisite: two upper division courses in Textiles and Clothing or consent of instructor. Critical reading and evaluation on selected topics of current interest in textiles. Multidisciplinary aspects of the topics selected will be stressed. May be repeated for credit.—(III.)

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Theatre and Dance

(College of Letters and Science)

Barbara Sellers-Young, Ph.D., Chairperson of the Department

Department Office, 222 Wright Hall (530-752-0888); FAX (530) 752-8818

http://theatredance.ucdavis.edu

Faculty

Sarah Pia Anderson, Professor
Della Davidson, M.A., Associate Professor
Sheldon Deckelbaum, M.F.A., Assistant Professor
John Iacovelli, M.F.A., Professor
David Grenke, Assistant Professor
Peter Lichtenfels, Professor
Jade McCutcheon, Ph.D., Assistant Professor
Maggie Morgan, M.F.A., Assistant Professor
Thomas Munn, Assistant Professor
Jon Rossini, Ph.D., Assistant Professor
Barbara Sellers-Young, Ph.D., Professor
Peggy Shannon, Professor
Darrell F. Winn, M.A., Lecturer

Emeriti Faculty

Bobbie J. Bolden, M.A., Senior Lecturer Emerita
Ruby Cohn, Ph.D., Professor Emerita
Harry C. Johnson, M.A., Professor Emeritus
William E. Kleb, D.F.A., Professor Emeritus
Robert K. Sarlós, Ph.D., Professor Emeritus
Daniel E. Snyder, Professor Emeritus
Alan A. Stambusky, Ph.D., Professor Emeritus

The Dramatic Art Major Program

The A.B. degree in Dramatic Art provides students with an appreciation for and understanding of performance and its role in culture and society. The program offers a strong foundation in all aspects of drama, theater, dance performance, and production. Students build significant skills in specific areas as well as achieving a broad knowledge of theatre, dance and film.

Productions and Facilities. Each year's schedule includes undergraduate festivals in theatre, dance, and film; opportunities to work with professional directors and choreographers in three main stage productions; and performance projects and established scripts developed by M.F.A students. These productions take place on our proscenium (Main), thrust (Wyatt), arena (University Club) stages as well as in the Mondavi Center's Studio Theatre and Jackson Hall. These productions are part of the academic program of the department and serve an important purpose in the study of theatre and dance. Participation is open to all students.

A.B. Major Requirements:

Theatre Emphasis

	UNITS
Preparatory Subject Matter	**33**
Dramatic Art 20, 24, 25, 26	14
Dramatic Art 21A or 14	4
Choose 4 units from Dramatic Art 21B, 40A, 40B, 41A, 41B, 98, 99, African American and African Studies 51 or courses in other departments with departmental approval	4
Dramatic Art 30	11
Participation in at least two of the following areas: acting/dance; directing/choreography/playwriting; stage management/dramaturgy; design/studio/technical production; and crew assignments for a minimum of two productions which may include stage management, fly crew, stage running crew, props, running crew, lighting board operator, follow spot operator, sound board operator, costume running crew, dresser, make-up	
Depth Subject Matter	**45-47**
Dramatic Art 156A, 156B, 156C	12
One course from Dramatic Art 124A, 124B, 124C, 124D	4
One course from Dramatic Art 150, 154, 155, 155A, 159	4
One course from Dramatic Art 121A, 121B, 122A, 122B, 141, 143	3-4
One course from Dramatic Art 126, 127A, 127B, 140A, 160A	3-4
A minimum of 10 units chosen from the following: Dramatic Art 121A, 121B, 122A, 122B, 124A, 124B, 124C, 124D, 125, 126, 127A, 127B, 130, 140A, 141, 143, 150, 154, 155A, 159, 160A, 160B, 170	10
Dramatic Art 180	9
Participation in University Theatre in at least two of the following areas: acting/dance; directing/choreography/playwriting/stage management/dramaturgy; design/studio/technical production; and crew assignments for a minimum of two productions which may include stage management, fly crew, stage running crew, props, running crew, lighting board operator, follow spot operator, sound board operator, costume running crew, dresser, make-up	
Total Units for the Major	**78**

Dance Emphasis

	UNITS
Preparatory Subject Matter	**28**
Dramatic Art 14, 24, 26	11
Choose 10 units from Dramatic Art 21A, 40A, 40B, 41A, 41B, 42A, 42B, 44A, 44B, African American and African Studies 51	12
Dramatic Art 30 (crew)	4
Dramatic Art 30 (performance)	3

Depth Subject Matter..... 45
Dramatic Art 140A, 140B, 140C, 141, 145 19
Choose 19 units from African American and African Studies 155, Dramatic Art 142, 143, 154, 155, 156C, 159, Music 107A, Native American Studies 125..... 19
Dramatic Art 124C, 126..... 7

Total Units for the Major 73

Major Adviser. _____.

Minor Program Requirements:

UNITS

Dramatic Art..... 22
One course from Dramatic Art 20, 21A, 24, 25, 26 3-4
Two courses chosen from Dramatic Art 156A, 156B, 156C..... 8
Two courses chosen from Dramatic Art 121A, 121B, 122A, 122B, 124A, 124B, 124C, 124D, 125, 126, 127A, 127B, 130, 140A, 141, 142, 143, 150, 154, 155, 155A, 159, 160A, 160B, 170 6
Dramatic Art 180 5
Participation in University Theatre in at least two of the following areas: acting/dance; directing/choreography/playwriting/stage management/dramaturgy; design/studio/technical production; and crew assignments for a minimum of one production which may include stage management, fly crew, stage running crew, props, running crew, lighting board operator, follow spot operator, sound board operator, costume running crew, dresser, make-up

Transfer Students. As described above, all students completing a major in Dramatic Art must participate in dramatic productions, including work in at least three of the following four areas: acting/dance, design, studio (scenic, costume, lighting, painting, props, sound), directing/playwriting/stage management. Such experience gained prior to transfer to UC Davis may count toward partial satisfaction of this requirement; transfer students should see the major adviser for an evaluation of your previous experience. While in residence at UC Davis, transfer students are required to participate in a minimum of five dramatic productions and that participation must include work in at least three of the four areas specified above, as well as running crew.

Guest Artists. The Granada Visiting Artists Program brings distinguished professional artists to the campus each year, to be in residence for a quarter. These working professional artists interact closely with students in the classroom and rehearsal halls and provide them excellent pre-professional experiences of theater practice.

Graduate Study. The Department of Dramatic Art offers programs of study and research leading to the M.F.A. (acting, directing, design, choreography) and Ph.D. (performance and culture) degrees. Detailed information may be obtained by contacting the Graduate Adviser.

Graduate Advisers. Ph.D. Program: L. Hunter; M.F.A. Program: P. Lichtenfels.

Courses in Dramatic Art (DRA)

Lower Division Courses

1. Theatre, Performance and Culture (4)
Lecture—3 hours; discussion—1 hour. Introductory investigation of the nature of all performance, moving from performance theory to consideration of various manifestations of performance including theater, film and media, dance, sports, political rallies and demonstrations, religious celebrations, civic pageants and "occasions." Investigation of the border between ritual and performance. GE credit: ArtHum.—I, II. (I, II, III.)

10. Introduction to Acting (3)
Laboratory/discussion—4 hours; term paper. Fundamentals of movement, speech, theatre games, and improvisation. Selected reading and viewing of theatre productions. Intended for students not specializing in Dramatic Art.—I, II, III. (I, II, III.)

14. Introduction to Contemporary Dance (4)
Lecture—3 hours; laboratory—3 hours. Introduction to basic issues and methods in contemporary dance. Focus on preparing the student for dancing and dance-making through basic techniques of improvisation and composition. Consideration of dance as a cultural practice.—I, II, III. (I, II, III.)

20. Introduction to Dramatic Art (4)
Lecture—3 hours; discussion—1 hour. Understanding and appreciation of both the distinctive and collaborative contributions of playwright, actor, director, and designer to the total work of dramatic art. Study of plays from the major periods of dramatic art in their cultural contexts. GE credit: ArtHum.—I, II. (I, II, III.)

21A. Fundamentals of Acting (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 20. Physical and psychological resources of the actor. Experience in individual and group contact and communication, theatre games, advanced improvisation, sound and movement dynamics. Viewing of theatre productions. Limited to those planning to major in Dramatic Art.—, II. (II.)

21B. Fundamentals of Acting (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 21A and consent of instructor. Theory and practice of acting with emphasis on character analysis, interpretation, and development. Acting in a student-directed project. Viewing of theatre productions. Limited to those planning to major in Dramatic Art.—III. (III.)

24. Visual Aspects of Dramatic Art (4)
Lecture—3 hours; laboratory—2 hours. Understanding and appreciation of the visual aspects of dramatic art: theatre architecture, scenery, lighting, costume, and makeup.—I. (I.)

25. Technical Aspects of Dramatic Production (3)
Lecture—3 hours. Technical principles of dramatic production emphasizing the three areas of scenic, costume and lighting studios. Subjects covered include basic tools, materials and equipment, production practices; and the interdisciplinary and collaborative nature of dramatic production.—II. (II.)

26. Performing Arts Production Management (3)
Lecture—3 hours. Theoretical study of performing arts administration and backstage operations from audition through performance. Techniques of scheduling, production management, stage management, technical direction, audience control, box office, promotion, safety, accommodations for persons with disabilities and emergency procedures.—I. (I.) Winn

30. Theatre Laboratory (1-5)
Prerequisite: course 25 or consent of instructor. Projects in acting, production, scene design, costuming, lighting, directing, and playwriting. Participation in departmental productions. May be repeated for credit up to a total of 8 units.—I, II, III. (I, II, III.)

40A. Beginning Modern Dance (2)
Laboratory/discussion—4 hours. Prerequisite: course 14 or consent of instructor. Fundamentals of modern dance focusing primarily on the development of techniques and creative problem solving. Basic anatomy, dance terminology, and a general overview of modern dance history. May be repeated once for credit with consent of instructor.

40B. Intermediate Modern Dance (2)
Laboratory/discussion—4 hours. Prerequisite: course 40A. Modern dance techniques. Basic anatomy, dance terminology and a general overview of modern dance history. May be repeated once for credit with consent of instructor.

41A. Beginning Jazz Dance (2)
Laboratory/discussion—4 hours. Prerequisite: course 14 or consent of instructor. Fundamentals of jazz dance; includes warm-ups, dance techniques and combinations. Basic anatomy, dance terminology and general overview of jazz dance history. May be repeated once for credit with consent of instructor.

41B. Intermediate Jazz Dance (2)
Laboratory/discussion—4 hours. Prerequisite: course 41A. Warm-ups, dance techniques and combinations at the intermediate level. Basic anatomy, dance terminology and a general overview of jazz styles of historically significant jazz choreographers and leading contemporary jazz choreographers. May be repeated once for credit with consent of instructor.

42A. Beginning Ballet (2)
Laboratory/discussion—4 hours. Prerequisite: course 14 or consent of instructor. Fundamentals of ballet, focusing on the development of technique through proper alignment, quality, and rhythm. Basic anatomy, ballet terminology, and dance history. May be repeated once for credit with consent of instructor.

42B. Intermediate Ballet (2)
Laboratory/discussion—4 hours. Prerequisite: course 42A or consent of instructor. Barre and center work at the intermediate level. Development and refinement of technique through proper alignment, rhythmic, and qualitative understanding. Anatomy, ballet terminology, and dance history. May be repeated once for credit with consent of instructor.

44A. Beginning Hip Hop Dance (2)
Laboratory/discussion—4 hours. Fundamentals of Hip Hop dance focusing on developing a fluid movement vocabulary, facility in body isolations, intricate rhythmic patterning, quick shifts of weight and mastering dance combinations. Discussions on Hip Hop dance history, styles and terminology. May be repeated once for credit.

44B. Intermediate Hip Hop Dance (2)
Laboratory/discussion—4 hours. Prerequisite: course 44A or consent of instructor. Expansion of Hip Hop dance vocabulary by focusing on mastering body isolations and intricate rhythmic techniques, complex dance combinations, advanced across the floor sequences. May be repeated once for credit

98. Directed Group Study (1-5)
Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

115. Advanced Study of Major Film Makers (4)
Lecture/discussion—3 hours; film viewing—2 hours. Prerequisite: course 15. Analysis of the contribution of some outstanding film creators. Study of diverse aesthetic theories of the cinema and their application to selected films. May be repeated for credit when different film creator studied.

121A. Advanced Acting: Mask, Myth, and Tragedy (4)
Lecture/laboratory—6 hours. Prerequisite: course 21B and consent of instructor. Theory and practice of acting focused on the performance skills necessary to enact verse plays. Specific concentration on language as vocal and physical metaphor. Offered in alternate years.—(II.)

121B. Advanced Acting: Comedy from Farce to Manners (4)
Lecture/laboratory—6 hours. Prerequisite: courses 21B, 121A and consent of instructor. Theory and practice of acting in comic plays. Specific issues addressed will be comic characterization, physical mask, and timing. Offered in alternate years.—(III.)

122A. Advanced Acting: Realism (4)
Lecture/laboratory—6 hours. Prerequisite: course 21B and consent of instructor. The issues of Stanislavski realism are explored through selected plays. Script analysis using improvisation and emotional scoring. Offered in alternate years.—II.

122B. Advanced Acting: Non-Realism (4)
Lecture/laboratory—6 hours. Prerequisite: courses 21B, 122A and consent of instructor. Exploration of the acting techniques needed to perform a non-realistic script. Different avant-garde movements will

be examined through performance of the scripts. Offered in alternate years.—III.

124A. Principles of Theatrical Design: Scenery (4)
Lecture-seminar—4 hours. Prerequisite: course 24 or consent of instructor. Scene design processes, working drawings, sketching techniques, scale models, methods and materials of scenery construction.—II. (II.)

124B. Principles of Theatrical Design: Scenery (4)
Lecture-seminar—4 hours. Prerequisite: course 24 or consent of instructor. Analysis of plays in terms of scene design, elements of design, execution of designs for modern and period plays.—(III.)

124C. Principles of Theatrical Design: Lighting (4)
Lecture-seminar—4 hours. Prerequisite: course 24 or consent of instructor. Theories of lighting the stage, equipment and control systems, execution of lighting plots.—II. (II.) Munn

124D. Principles of Theatrical Design: Costume (4)
Lecture-seminar—4 hours. Prerequisite: course 24 or consent of instructor. Source materials for theatrical costuming, selecting fabrics, elements of design, analysis of plays in terms of costume design, execution of designs for modern and period plays.—I. (I.) Morgan

125. Scenic Painting: Studio (4)
Lecture—2 hours; studio—3 hours; laboratory—3 hours. Prerequisite: upper division standing in Dramatic Art, Art Studio, or Design; or course 24 or 25, or consent of instructor. Scene painting techniques, practices and materials. Course satisfies production requirement in studio category. May be repeated once with consent of instructor. Offered in alternate years.

126. Principles of Performing Arts Stage Management (3)
Lecture/discussion—2 hours; laboratory—3 hours. Prerequisite: course 20, 24, 25, 26 or the equivalent or consent of instructor. Stage management principles for theatre, dance, musical theatre, music, and concerts. The dynamical role of the stage manager in the performing arts, upper-management team.—II. (II.) Winn

127A. Principles of Directing (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: courses 21A, 26; two of 156A, 156B, 156C; or consent of instructor. The director's creative approach to the play and to its staging.—I. (I.) Shannon

127B. Principles of Directing (4)
Lecture—2 hours; laboratory—4 hours; rehearsal. Prerequisite: course 127A and consent of instructor for non-majors. The director's creative approach to the actor.—III. (III.) Anderson

128. Principles of Theatre Sound (3)
Lecture/discussion—2 hours; laboratory—3 hours. Fundamentals of sound, sound equipment, and sound design as used in modern theatre and other performance venues. Assembly, set-up, and operation of basic theatre sound reinforcement system, recording system, and theatrical playback system.—I. (I.) Jacobson

130. Approaches to Theatrical Design: Practice and Theory (4)
Seminar—2 hours; studio—4 hours. Prerequisite: upper division standing in Dramatic Art, Art Studio or Design. Advanced scenic design study in specific areas including but not limited to: research, design styles and concepts, new materials and techniques, photography, projections, computer technology, spectacle and special effects, and alternative theatre forms and genres. Course satisfies Dramatic Art production requirement in Design. Offered in alternate years.

140A. Dance Composition (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 40A, 41A, and 42A, or consent of instructor. Introduction to the craft of choreography. Students will compose phrases and present movement studies based on the elements of choreography: motivation, space, time, force/energy.—II. (II.) Davidson

140B. Dance Composition (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 140A. Continuation of the study of choreography, focusing on the development of group choreography: duets, trios, quartets and group work, form, and accompaniment.—III. (III.) Grenke

140C. Dance Composition (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 140A, 140B. Continuation of study of choreography focusing on sequencing movements for groups. The relation between dance and allied mediums of music, sets, costumes and lighting. Students conceptualize a choreographic issue and explore it through creation of short dance studies.—I. (I.) Davidson

141. Introduction to the Fundamentals of Movement (3)
Lecture/discussion—3 hours. Introduction to fundamentals of movement that combines intellectual and kinesthetic understanding of the body's skeletal and muscular systems. Explorations based on theories of body mind specialists Feldenkrais, Bartenieff and Sweigard as well as the eastern discipline of Yoga.—I. (I.) Sellers-Young

142. History of Modern Dance (5)
Lecture—3 hours; laboratory—3 hours; extensive writing. The Modern Dance tradition in the U.S., focusing on its theorizations of individual and social identity. Students will write and choreograph analyses of principle dances in this tradition. Offered in alternate years.

143. Dance and Movement Studio (1-4)
Laboratory/discussion—2-8 hours. Prerequisite: course 14 or consent of instructor. Special studies in dance and movement such as African, Balinese, Baroque, Chinese, European, and stage combat. Offered as needed for stage productions. May be repeated for credit for a total of 8 units.

145. Directed Choreography Projects (4)
Lecture/laboratory—6 hours. Prerequisite: courses 140A, 140B, 140C or consent of instructor. Conceptualization, creation, casting, rehearsing, and concert presentation of complete dances, with students integrating elements of stagecraft and directing the on-stage rehearsals.—II. (II.) Grenke

150. American Theatre and Drama (4)
Lecture—4 hours. The history of the theatre from Colonial times to the present. Readings of selected plays. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II.

154. Asian Theatre and Drama: Contexts and Forms (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing. Selected Asian plays and performance forms in their cultural and artistic contexts; myth, ritual and the theatre; performance training, visual presentation of the text; political theatre; intercultural performance—the fusion of Asian and Western traditions. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. Sellers-Young

155. Representing Race in Performance (4)
Lecture—4 hours. Examination of how "race" is represented and performed in American culture. Course will feature different sub-headings such as "African American Theatre" or "Asian-Americans on Stage." May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—III. Rossini

155A. African American Dance and Culture in the United States, Brazil and the Caribbean (4)
Lecture/discussion—4 hours. A comparative study of the African American dance forms in the U.S.A., Brazil, Haiti, Cuba, Jamaica, Barbados, and Trinidad. Examination of ritual, folk, and popular dance forms and the socio/historical factors that have influenced these forms. (Same course as African American and African Studies 155A.) Offered in alternate years

156A. History of Theatre and Dance: Ancient to 1650 (4)
Lecture—4 hours. Overview of theatre and dance as it has come to be recognized in ancient societies through to 1650. Performance traditions studied include Greek, Indian, Aztec, Roman, Japanese (Noh), through the Renaissance. GE credit: ArtHum, Div, Wrt.—I. (I.)

156B. History of Theatre and Dance: 1650-1900 (4)
Lecture—4 hours. Overview of theatre and dance between 1650 and 1900. Dance and theatre are related to the specific social and political organizations of court society in 17th and 18th century France, Germany and England, and to Japanese society. GE credit: ArtHum, Div, Wrt—II. (II.)

156C. History of Theatre and Dance: The Twentieth Century (4)
Lecture—4 hours. Overview of theatre and dance in the twentieth century. Although largely focused on Western theatrical practices, the relationship between East and West performance practices will be studied and contemporary Japanese theatre will be included. GE credit: ArtHum, Div, Wrt.—III. (III.)

159. Contemporary Experimental Theatre and Drama (4)
Lecture—4 hours. Examination and evaluation of the "New Theatre." Course includes attending theatre events. May be repeated once with consent of instructor.—III.

160A-160B. Principles of Playwriting (4-4)
Lecture/seminar—4 hours. Prerequisite: two courses in Dramatic Art or related courses in other departments; course 160A prerequisite for 160B or consent of instructor. Analysis of dramatic structure; preparation of scenarios; the composition of plays.—I, II. (I, II.)

170. Media Theatre (3)
Lecture—1 hour; rehearsal—2 hours; performance—1 hour. Prerequisite: upper division standing in Dramatic Art, Music, Art Studio, Design, Computer Science, or Engineering: Computer Science, or consent of instructor. New media and application of theatre design and performance. Emphasis on collaborative process in relationship to integration of emerging technologies and formation of new theatrical works. Development of collaborative performance through lecture, demonstration, improvisation and experimentation. May be repeated once for credit.—I, III. (I, III.)

180. Theatre Laboratory (1-5)
Prerequisite: upper division standing and course 25, or consent of instructor. Projects in acting, production, scene design, costuming, lighting, directing, and playwriting. Participation in departmental productions. May be repeated for credit.—I, II, III. (I, II, III.)

192. Internship in Dramatic Art (1-12)
Internship—3-36 hours. Prerequisite: upper division or graduate work in dramatic art; upper division course related to the project; consent of instructor and Department Chairperson. Internship outside the academic department enabling students to practice their skills. May be repeated for credit for a total of 12 units. (P/NP grading only.)

194HA-194HB. Special Study for Honors Students (3-3)
Independent study—9 hours. Prerequisite: qualification for Letters and Science Honors Program and admission to Dramatic Art Senior Honors Program. Preparation and presentation of a culminating project, under the supervision of an instructor, in one of the creative or scholarly areas of Dramatic Art. (Deferred grading only, pending completion of sequence).

197T. Tutoring in Dramatic Art (1-5)
Tutoring—1-5 hours. Prerequisite: upper division or graduate standing with major in dramatic art; consent of department chairperson. Leading of small voluntary groups affiliated with one of the department's regular courses. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200. Methods and Materials in Theatre Research (4)
Seminar—3 hours; term paper. Essential research tools in theatre and related fields; bibliographies, primary sources; methods of evaluating and presenting evidence; delineating research areas in the field.—I. Rossini

211. Advanced Voice and Speech (2)
Laboratory—4 hours. Open to advanced undergraduates with consent of instructor. Voice production and speech related to specific acting problems in classical plays, particularly in verse. May be repeated for credit.—I, II, III. (I, II, III.)

212. Advanced Stage Movement (3)
Laboratory—6 hours. Prerequisite: graduate standing in the MFA Program. The application of modes of exploration, breath placement, and the use of imagery as well as Laban's effort/shape system as a method of analysis in classic and modern plays. Open to advanced undergraduates by consent of instructor. May be repeated for credit.—I, II, III. (I, II, III.)

221. Special Problems in Advanced Acting (4)
Seminar—2 hours; laboratory—4 hours. Prerequisite: consent of instructor. Advanced acting problems arising from differences in the type and style of plays selected from Greece to the present. May be repeated for credit.—I, II, III. (I, II, III.)

228. Seminar in Directing Theory: Non-Realism (4)
Seminar—3 hours; term paper. Modern directing theory as it applies to non-realistic theatre; development of directorial concepts for production of selected non-realistic plays—Greek to the present; emphasis on textual analysis. Offered in alternate years.

229. Special Problems in Directing (5)
Seminar—2 hours; laboratory—2 hours; rehearsal—4 hours. Prerequisite: consent of instructor. Projects in directing scenes selected from plays from ancient Greece to the present. May be repeated for credit.—I, III. (I, II, III.)

250. Modern Theatre (4)
Seminar—3 hours; term paper. The theatre of Europe and America, 1860-1940, with emphasis on the relationship of the dramas of the period to the physical circumstances under which they were produced. Offered in alternate years.

251. Scoring and Scripting in Performance (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. The process of weaving together various performance elements brought into play by the artists in their respective disciplines. The "script" is the thread from which the artists' "scores" will layer and transform the "script" into performance for specific time, place, spectators.—II. (II.)

252. Performance: Concepts of Space, Place, and Time (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Innovative theories of creating performance spaces, establishing a sense of place, and communicating the concept of time explored through collaborative interaction. Research includes traditional principles, site-specific spaces and consideration of various tempi from music and movement.—I. (I.)

253. Approaches to Collaboration (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Exploration of different approaches to collaboration among artists in different media and their influence on the creative process.—I.

254. Performing Identities/Personae (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Historical and contemporary theories of constructing stage identities. Discussion and project collaborations based on theories. Questions of identity related to ethnicity, gender or sexual orientation.

255. Composition in the Arts (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Examine manner in which specific elements utilized by actors, dancers, directors, choreographers, and designers are combined or related to form a whole in space and time, as well as methods of sequencing used by each discipline to produce artistic products. May be repeated once for credit.—III. (III.)

259. Topics in Contemporary Theatre and Performance (4)
Seminar—3 hours; term paper. Special topics designed to study in depth aspects of contemporary performance including performance analysis, cultural and historical context, modes of production, theoretical and political entailments, and issues of spectatorship (e.g., "Brecht and After," "British Theater," "Race and Gender in Performance." May be repeated five times for credit.

265A. Theory of Dramatic Art: Modes of Production (4)
Seminar—3 hours; term paper. Introduces students to literature of theatrical practice, cultural and aesthetic theory, as related to practical stage performance.—I. (I.)

265B. Theory of Dramatic Art: Signification and the Body (4)
Seminar—3 hours; term paper. Introduce students to analysis of the body in performance, drawing on theoretical models from various fields.—II. (II.)

265C. Theory of Dramatic Art: Technologies of Difference (4)
Seminar—3 hours; term paper. Introduce students to history, theory, practice of staging social and cultural difference.—III. (III.)

265D. Theory of Dramatic Art (4)
Seminar—3 hours; term paper. Theory and aesthetic principles of dramatic art as a fine art. Offered in alternate years. (Former course 265.)

280. Theatre Laboratory (1-12)
Advanced practice in acting, designing, directing, playwriting, and technical theatre. May be repeated for credit.—I, II, III. (I, II, III.)

298. Group Study (1-5)
Prerequisite: consent of instructor.

299. Individual Study (1-12)
(S/U grading only.)

299D. Dissertation Research (1-12)
(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Professional Course

413. Stage Make-up (1)
Lecture/laboratory—2 hours. Prerequisite: consent of instructor. Approved for graduate degree credit. Lectures, demonstrations, and practical work in aspects of theatrical make-up.—II. (II.)

Transportation Technology and Policy (A Graduate Group)

Patricia L. Mokhtarian, Ph.D., Chairperson of the Group

Group Office, 2028 Academic Surge (530-752-0247)

http://www.its.ucdavis.edu

Faculty

Ralph C. Aldredge, III, Ph.D., Associate Professor *(Mechanical and Aeronautical Engineering)*
Dan Chang, Ph.D., Professor *(Civil and Environmental Engineering)*
Y. Hossein Farzin, Ph.D., Associate Professor *(Agricultural and Resource Economics)*
Robert Feenstra, Ph.D., Professor *(Economics)*
Mark Francis, M.L.A., Professor *(Landscape Architecture)*
Andrew A. Frank, Ph.D., Professor *(Mechanical and Aeronautical Engineering)*
Joanna R. Groza, Ph.D., Professor *(Chemical Engineering and Materials Science)*
Susan Handy, Ph.D., Associate Professor *(Environmental Science and Policy)*
John T. Harvey, Ph.D., Assistant Professor *(Civil and Environmental Engineering)*
Robert A. Johnston, M.S., Professor *(Environmental Science and Policy)*
Ian Kennedy, Ph.D., Professor *(Mechanical and Aeronautical Engineering)*
Michael Kleeman, Ph.D., Assistant Professor *(Civil and Environmental Engineering)*
Emilio Laca, Ph.D., Assistant Professor *(Agronomy and Range Science)*
Patricia L. Mokhtarian, Ph.D., Professor *(Civil and Environmental Engineering)*
Janet Momsen, Ph.D., Professor *(Human and Community Development)*
Debbie A. Niemeier, Ph.D., Associate Professor *(Civil and Environmental Engineering)*
Ahmet Palazoglu, Ph.D., Professor *(Chemical and Materials Science Engineering)*
Bahram Ravani, Ph.D., Professor *(Mechanical and Aeronautical Engineering)*
David M. Rocke, Ph.D., Professor *(Graduate School of Management)*
Paul Sabatier, Ph.D., Professor *(Environmental Science and Policy)*
Seymour Schwartz, Ph.D., Professor *(Environmental Science and Policy)*
Daniel Sperling, Ph.D., Professor *(Civil and Environmental Engineering, Environmental Science and Policy)*
Pieter Stroeve, Sc.D., Professor *(Chemical Engineering and Materials Science)*
Steven Velinsky, Ph.D., Professor *(Mechanical and Aeronautical Engineering)*
Michael Zhang, Ph.D., Assistant Professor *(Civil and Environmental Engineering)*

Emeriti Faculty

Myron "Mike" Hoffman, Professor Emeritus

Affiliated Faculty

Rahman Azari, Ph.D., Lecturer *(Statistics)*
Andrew F. Burke, Ph.D., Research Engineer *(Institute of Transportation Studies)*
Mark A. Delucchi, Ph.D., Research Ecologist *(Institute of Transportation Studies)*
Ryuichi Kitamura, Ph.D., Research Engineer *(Institute of Transportation Studies)*
Kenneth S. Kurani, Ph.D., Research Engineer *(Institute of Transportation Studies)*
Robert Moore, Ph.D., Research Associate *(Institute of Transportation Studies)*
Tom Turrentine, Ph.D., Research Anthropologist *(Institute of Transportation Studies)*

Graduate Study. The Graduate Group in Transportation Technology and Policy offers the M.S. (Plan I—thesis; and Plan II—exam), and Ph.D. degrees in two areas of specialization: Transportation Technology; and Transportation Planning and Policy. The technology track is for students trained in engineering and the physical sciences and interested in systems-level planning, analysis, management and design of advanced technologies (emphasizing vehicle propulsion and "intelligent transportation system" technologies) focusing on energy and environmental issues. The planning and policy track is aimed at students from a wider range of disciplines interested in the broader public policy issues concerning transportation systems. The curriculum for both tracks includes courses in civil, mechanical, and environmental engineering, economics, policy sciences, statistics, travel behavior, management, technology assessment and environmental studies.

Preparation. Applicants will normally be expected to have completed two courses in calculus, one course in linear algebra, and one course each in calculus level statistics and microeconomics. Additionally, students entering the technology track will need either to have an appropriate technical background or make up a relatively large number of prerequisite courses in order to be able to take the approved courses in that track.

Program of Study. Students will have the option of following either a technology or policy/management track. The core courses are required of all students in both degrees and both tracks. M.S. students take between 15 and 20 units from a common set of core courses, and Ph.D. students take 24–32 units from the same core. Master's degrees require a minimum of 36 quarter units and doctoral degrees require a minimum of 54 units (of which, 21 units beyond the core must be in the chosen track, and 9 must be in the other track). M.S. Plan I students may replace up to 6 units of regular course work with research (course 299) units. At least two thirds of all credits must be at the graduate level.

Graduate Adviser: P.L. Mokhtarian.

Curriculum

Core Courses. Students in each track are required to take courses in a common set of core competencies, as well as some courses in the other track.

Research Methods core courses: M.S. students take one of Transportation Technology and Policy 200, Environmental Science and Policy 278, Management 249; Policy Ph.D. students also take one of Civil and Environmental Engineering 254, Agricultural and Resource Economics 252, 256, Agronomy 206; Technology Ph.D. students also take one of Agronomy 205, Statistics 205, Biological Sciences Engineering 265.

Transportation Modeling/Analysis core courses: M.S. students take one of Civil and Environmental Engineering 251, 256; Ph.D. students take both.

Policy Analysis core courses: M.S. students and Technology Ph.D. students take one, and Policy Ph.D. students take two of Civil and Environmental Engineering 252, 262, Environmental Science and Policy 212A, 212B, Political Science 208.

Economics core courses: M.S. and Ph.D. students take one of Agricultural and Resource Economics 204, 275, 276, Civil and Environmental Engineering 268, Economics 145.

Technology core courses: To be announced.

In addition, students are expected to register for Transportation Technology and Policy 298 (or the approved equivalent in another department), a one-unit seminar course, each quarter it is offered. Transportation Technology and Policy 298 or the equivalent units will not count toward the required totals.

Planning and Policy Courses. Approved courses in this area include the following (additional courses may be added upon approval by the Chairperson):

Agricultural and Resource Economics 100A, 100B, 106, 136, 175, 176, 252, 253, 254, 255, 275
Agronomy 205, 206
Civil and Environmental Engineering 153, 165, 254, 262, 268
Civil and Environmental Engineering/Environmental Science and Policy 163
Community and Regional Development 240
Ecology 213
Economics 140, 145, 240A, 240B, 256
Environmental Science and Policy 168A, 168B, 171, 173, 178, 212A, 212B
Geography 155, 156
Landscape Architecture 201
Management 232, 240, 249, 250, 251, 252, 285
Mathematics 108, 227, 258A, 258B
Nutrition 492A
Psychology 207A, 207B
Statistics 106, 108, 110, 130A, 130B, 131A, 131B, 131C, 135, 137, 138, 140, 142, 144, 205, 222, 223
Transportation Technology and Policy 200, 292, 298

Technology Courses. Approved courses in this area include the following (additional courses may be added upon approval by the Chairperson):

Applied Biological Systems Technology 180, 181
Applied Science Engineering—Davis 115, 116, 132
Applied Science Engineering—Livermore 220A, 220B
Atmospheric Science 116, 270
Biological Systems Engineering 265
Civil and Environmental Engineering 149, 161, 162, 189, 242, 257
Computer Science Engineering 168,
Environmental and Resource Sciences 131, 186
Electrical and Computer Engineering 207
Mechanical Engineering 161, 163, 188, 217, 226, 234, 236

Courses in Transportation Technology and Policy (TTP)

Graduate Courses

200. Transportation Survey Methods (4)
Lecture—4 hours. Prerequisite: Statistics 13; Civil and Environmental Engineering 251 recommended. Description of types of surveys commonly used in transportation demand modeling, including travel and activity diaries, attitudinal, panel, computer, and stated-response surveys. Discussion of sampling, experimental design, and survey design issues. Analysis methods, including factor, discriminant and cluster analysis. Not open for credit to students who have completed Civil and Environmental Engineering 255.—II. (II.) Mokhtarian

289A. Selected Topics in Transportation Technology and Policy (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Directed group study of special topics with instruction carried out through lecture or laboratory, or a combination of both. May be repeated for credit.—I, II, III. (I, II, III.)

289B. Selected Topics in Transportation Technology and Policy (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Directed group study of special topics with instruction carried out lecture or laboratory, or a combination of both. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Graduate Research Group Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress, and techniques in transportation. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

292. Internship in Transportation Technology and Policy (1-5)
Prerequisite: second year standing; approval of project prior to period of internship. Supervised work experience in transportation studies. May be repeated for credit if topic differs. (S/U grading only.)—I, II, III. (I, II, III.)

298. Group Study (1-5)
Discussion—1-5 hours. Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
Discussion—1-12 hours. Prerequisite: consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

UC Davis Short-Term Programs Abroad

_____, STPA Director
207 Third Street, Suite 130 (530-297-4633; Fax: 530-758-8472)
http://shorttermabroad.ucdavis.edu

Programs of Study

UC Davis Short-Term Programs Abroad is a study-abroad program unique to the Davis campus. A UC Davis faculty-led program, STPA offers multiple programs each year in various countries and specializations. Participants remain registered UC Davis students while abroad and receive UC Davis units for their academic work. Financial aid and scholarships fully apply. Students may participate in STPA as early as their freshman year, or as late as their senior year.

Academic Focus. Students of any major can participate in STPA. All programs are approximately one quarter in length, and are led by UC Davis faculty members. Students may take courses in the language applicable to the country or earn units through an internship component for specific programs. All programs allow students to experience the program country's unique culture through co-curricular activities, such as day-trips to surrounding areas, museum tours, and theater visits.

Students can earn 12-22 quarter units through 3-5 courses taken abroad. The UC Davis faculty leader teaches one course in the program while the rest are led by adjunct faculty of the host country. Students may be able to apply earned units towards their major, minor, or language requirements.

STPA courses can apply specifically towards the Global and International Studies minor. The minor is designed for students who intend to focus their interest in global and international studies in either the Arts and Humanities or the Social Sciences.

In preparation for STPA, students are urged to take Education Abroad Program 90X or 190X, which examine issues of study abroad.

UC Davis Washington Center

Emily O. Goldman, Ph.D., Director and Associate Professor

UC Davis Washington Center,
1608 Rhode Island Avenue NW, Third Floor
Washington, D.C. 20036
(202-974-6350)

Information:
UC Davis Washington Center On-Campus Office
Internship and Career Center
South Hall, 2nd Floor, 530-754-5718

http://www.ucdc.edu/ucdavis

The UC Davis Washington Center began operations in the 1990-91 academic year. It provides students and faculty new and expanded opportunities in the nation's capital to enrich their education and research. Its principal activities are an undergraduate academic internship program, fellowships and internships for graduate and professional school students, fellowships and research grants for faculty, and conferences and workshops organized by UC Davis faculty. The University of California Washington Center now resides in a new 11-story, state of the art facility in downtown D.C. The center houses the academic and residential programs for undergraduate, faculty, and graduate students participating in the UC Davis Washington Center, as well as those from other UC campuses.

Undergraduate Academic Internship Program

The UC Davis Washington Center undergraduate program is open to students from all majors at UC Davis who have completed 89.9 units towards graduation. Students earn 15 units of academic credit, continue to be registered as full-time students, and fulfill university residency requirements. A GPA of approximately 3.0 is recommended for admission although not required. Applicants are also evaluated based on overall relevant experience, a written statement, letters of recommendation and personal interviews.

The **Undergraduate Academic Internship Program** runs fall and spring quarters, on a 11 week "extended quarter" basis. The winter quarter is a 10 week program. It has two principal components:

- **Internships/Research Projects** (11 units): Students work three to four days per week as interns in Congress, federal agencies, interest groups, trade associations, research institutions, the media, museums or in other organizations related to policy, politics, science and culture and geared to the interests and objectives of individual students. Drawing on the internship experience, each student develops an independent research project, under the supervision of a member of the faculty.
- **Elective Seminar Course** (4 units): Each student also enrolls in one upper division seminar course taught at the Washington Center. These courses vary each quarter, and are a mix of political science, international relations, history, other social sciences, the arts and humanities, and science policy. In addition to regular instruction, seminars often include guest speakers, observations of congressional committees and federal agencies, and other relevant Washington experiences. UC Davis course equivalencies are established each quarter.

Courses are taught by UC Davis faculty in residence, faculty from the UCLA, UC Santa Barbara, UC Santa Cruz, UC San Diego, UC Berkeley, UC Irvine and UC Riverside programs, or visiting faculty from the Washington area.

Financial aid eligibility is maintained, and the aid package can be adjusted to reflect the additional costs of the program. Some additional financial awards also are offered directly by the Washington Center, including the University of California President's Washington Scholarship and the Joyce and Norman Weil Scholarships.

Students reside at the UC Washington Center facility, convenient to public transportation. Arrangements are made to cover health services and other aspects of student life. The program also includes many educational, cultural and historical activities in the Washington area.

The UC Davis Washington Center also operates a **Summer Program**. The Summer Program has a credit or non-credit option. The credit option allows students to earn 7 units of academic credit, in addition to working at an internship. Students pay the summer sessions rate per credit hour plus an application fee. The non-credit internship has a program fee of $200. Both options allow students to participate in many educational, cultural, historical and social activities. Some financial assistance is provided but is more limited than for the academic year programs.

The Washington Center also has positions during the academic year for graduate students as **Graduate Fellows** (combination of a predoctoral research fellowship and a teaching assistantship) and **Graduate Summer Internships.**

Courses in UC Davis Washington Center (WAS)

175. Health Policy and Health Politics (4)
Seminar—3 hours; extensive writing or discussion—1 hour. Following the model of a Congressional subcommittee, identification of four salient health policy issues for study, research, and development of model policies to address them. (Same course as Epidemiology and Preventive Medicine 175W.) GE credit: SocSci, Wrt.—III. Wintemute

187. Gun Violence (4)
Lecture/discussion—4 hours. Gun violence, viewed from the perspectives of criminology and public health. Topics include personal and societal contributing factors and critical assessment of potential solutions. Offered in alternate years.—III. Wintemute

192. Internship in the UC Davis Washington Center Program (7)
Internship—28 hours. Prerequisite: junior or senior standing, admission in the UC Davis Washington Center undergraduate program, course 193 concurrently. Internship in Washington, DC with associated, supervised research project. (Same course as Political Science 192W.) (P/NP grading only.)—I, II, III. (I, II, III.) Goldman

193. Washington Center Research Seminar (4)
Lecture/discussion—1 hour; independent study—3 hours; tutorial—0.5 hour. Prerequisite: course 192 concurrently. Core academic component of Washington Program. Topics coordinated with internships. Research draws on resources uniquely available in Washington, DC. Supervised preparation of extensive paper. (Same course as Political Science 193W.) GE credit: Wrt.—I, II, III. (I, II, III.) Goldman

Urban Planning

See Environmental Science and Policy

Urology

See Medicine, School of

Vegetable Crops

(College of Agricultural and Environmental Sciences)

John I. Yoder, Ph.D., Chairperson of the Department

Department Office, 148 Asmundson Hall
(530-752-0516)

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Kent J. Bradford, Ph.D., Professor
Albert J. Fischer, Ph.D., Associate Professor
Marie A. Jasieniuk, Ph.D., Assistant Professor
Daniel J. Kliebenstein, Ph.D., Assistant Professor
Richard W. Michelmore, Ph.D., Professor
Donald J. Nevins, Ph.D., Professor
Carlos F. Quiros, Ph.D., Professor
Dina St. Clair, Ph.D., Associate Professor
Mikal E. Saltveit, Ph.D., Professor
John I. Yoder, Ph.D., Professor

Emeriti Faculty

David E. Bayer, Ph.D., Professor Emeritus
Clyde L. Elmore, Ph.D., Lecturer Emeritus
James M. Lyons, Ph.D., Professor Emeritus
Robert F. Norris, Ph.D., Professor Emeritus
Harlan K. Pratt, Ph.D., Professor Emeritus
Lawrence Rappaport, Ph.D., Professor Emeritus
Vincent Rubatzky, Ph.D., Lecturer Emeritus
William L. Sims, Ph.D., Lecturer Emeritus
Paul G. Smith, Ph.D., Professor Emeritus
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Masatoshi Yamaguchi, Ph.D., Professor Emeritus
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Ronald E. Voss, Ph.D., Lecturer

Graduate Study. A program of study is offered leading to the M.S. degree in Horticulture and Agronomy. Information can be obtained from the Advising Office at 140 Environmental Horticulture. Also see the Graduate Studies chapter of this catalog.

Graduate Adviser. C. Quiros

Related Courses. Vegetable Crops faculty also teach the following courses that contribute to majors and graduate programs in Agricultural Management and Rangeland Resources, Biological Sciences, Genetics, and Plant Biology:

Agricultural Management and Rangeland Resources 2, 110C, 118, 195, Biological Sciences 101, Biotechnology 171, Genetics 201D, 207L, 296, Plant Biology 1, 12, 154, 172, 172L, 176, 177, 188, 196, Plant Biology Graduate Group 201, 212, 214, 218A, 223, 293.

Courses in Vegetable Crops (VCR)

Questions pertaining to the following courses should be directed to the instructor or to the Vegetable Crops Office, 148 Asmundson Hall.

Lower Division Course

92. Internship in Vegetable Crops (1-6)
Internship—3-36 hours. Work experience off or on campus in all subject areas pertaining to vegetable crops. Internships supervised by a member of the

faculty. Maximum of 12 units permitted in the Vegetable Crops 92–192 series. (P/NP grading only.)

Upper Division Courses

192. Internship in Vegetable Crops (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience off or on campus in all subject areas pertaining to vegetable crops. Internships supervised by a member of the faculty. Maximum of 12 units permitted in the Vegetable Crops 92-192 series. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

212. Postharvest Physiology of Vegetables (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Plant Biology 112 or 172. Comparative physiology of harvest vegetables; emphasis on maturation, senescence, compositional changes, physiological disorders and effects of environmental factors. Concepts and research procedures. Offered in alternate years.—(III.) Saltveit

216. Ecology and Agriculture (3)
Lecture/discussion—3 hours. Prerequisite: Plant Biology 142 or consent of instructor. Ecological principles and relationships as applied to agriculture. Integration of ecological approaches into agricultural research to develop environmentally sound management practices. Topics include crop autecology, biotic interactions among crops and pests, and crops systems ecology. (Same course as Ecology 216.)—I. (I.) Jackson

220. Genomics and Biotechnology of Plant Improvement (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101 or the equivalent. Integration of modern biotechnology and classical plant breeding including the impact of structural, comparative and functional genomics on gene discovery, characterization and exploitation. Also covers molecular markers, plant transformation, hybrid production, disease resistance, and novel output traits. (Same course as Genetics 220.)—Michelmore

221. Genomics and Breeding of Vegetable Crops (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101 or equivalent. Preview of genome structure, mapping, gene tagging and development of other genetic resources applied to improvement of major vegetables. For graduate students contemplating a career in modern vegetable breeding and biotechnology.—III. (III.) Quiros

290. Seminar (1)
Discussion—1 hour. (S/U grading only.)—I, II. (I, II.)

298. Group Study (1-5)
Prerequisite: consent of instructor.

299. Research (1-12)
(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

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Susan V. Hildebrand, D.V.M., Associate Dean—Student Programs

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Courses in Veterinary Medicine (VMD)

Lower Division Course

92. Internship in Veterinary Science (1-12)
Discussion/laboratory—1-4 hours; clinical experience—3-36 hours. Prerequisite: approval of project by faculty sponsor prior to period of internship. Students in this program will be under the supervision of faculty in the School of Veterinary Medicine whose expertise is appropriate for the proposed project. (P/NP grading only.)—I, II, III, IV. Pascoe

Upper Division Courses

170. Ethics of Animal Use (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: any basic course in composition or speech. Ethical issues relating to animal use in contemporary society. Integration of philosophical theories with scientific evidence relating to animal behavior, mentality, and welfare. Uses of animals in agriculture, research, and as companions. Ethical responsibilities regarding wildlife and the environment. (Same course as Animal Science 170.) GE credit: SocSci, Wrt.—III. (III.) Tannenbaum, Mench

192. Internship in Veterinary Science (1-12)
Discussion/laboratory and clinic—3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in veterinary medicine. (P/NP grading only.) Pascoe

Graduate Courses

298. Group Study (1-5)
(S/U grading only.)

299. Directed Independent Study (1-12)
(S/U grading only.)

Professional Courses

401A. Normal Anatomy of the Canine Locomotor System (2.8)
Lecture—10 sessions; laboratory—18 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Normal canine anatomy with comparison to other species of bones, joints, muscles, ligaments, tendons, nerves, and vessels of the vertebral column and limbs.—I. Meyers

401B. The Normal Anatomy of the Canine Head (1.6)
Lecture—6 sessions; laboratory—8 sessions; discussion—2 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Normal canine anatomy with comparison to other species of bones, joints, muscles, ligaments, tendons, nerves and vessels of the head including the eye and ear.—II. Plopper

402. Structure and Function of the Cardiovascular and Respiratory Systems (4.2)
Lecture—29 sessions; laboratory—13 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine of consent of instructor. Integrated view of cardiovascular and respiratory anatomy and physiology.—I, II. Jones

402D. Structure and Function of the Urinary System and Body Fluids (2.2)
Lecture—15 sessions; laboratory—7 sessions. Prerequisite: first-year standing in veterinary curriculum or consent of instructor. Basic understanding of the structure and function of the urinary system plus physiology of body fluids and acid-base balance. Structure and function are correlated.—III. Schelegle

403. Physiological Chemistry (5.9)
Lecture—52 sessions; discussion—7 sessions. Prerequisite: first-year standing in School of Veterinary Medicine. Biochemical principles used to analyze problems and to evaluate metabolic relationships important in animal health and pathophysiology. Integrative approach, emphasizing controls of major metabolic pathways, molecular basis of gene expression, tumorigenesis and signal transduction.—I. Cortopassi

405. Veterinary Parasitology (3.6)
Lecture—26 sessions; laboratory—10 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Biological and clinical aspects of parasites and the diseases they cause in animals.—III. Conrad, Boyce

406. Principles of Behavior (0.7)
Lecture—7 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Approved for graduate degree credit. Overview of animal behavior with relevance to veterinary medicine.—I. B. Hart

407. Principles and Techniques of Operative Surgery and Anesthesia (2.4)
Lecture—24 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine; course 426. Introduction to operative and anesthetic skills and foundation in the importance of regional anatomy in the planning and conduct of surgical practice.—I. Gregory

407L. Principles and Techniques of Surgery and Anesthesia Laboratory (1.4)
Laboratory—14 sessions. Prerequisite: course 426, third-year standing in School of Veterinary Medicine. Introduction to surgical anatomy, operative and anesthetic skills. (Deferred grading only, pending completion of sequence. S/U grading only.)—I, II, III. Gregory, Ilkiw

408. Nutrition and Nutritional Diseases in Animals (2.9)
Lecture—27 sessions; laboratory—2 three-hour sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Approved for graduate degree credit. Principles of nutrition and their application to the solution of nutritional disorders of animals.—II. Ramsey

409. Epidemiology (1.7)
Lecture—11 sessions; discussion—6 session. Prerequisite: first-year standing in School of Veterinary Medicine. Approved for graduate degree credit. Introduction to epidemiology and its applications in veterinary medicine.—I. Kass

412. Fundamentals of Zoonoses (1.1)
Lecture—11 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine or consent of instructor. Major zoonotic infections transmitted mainly by farm animals and pets. For each animal species and each infection, a short review of symptoms, diagnostic tests, epidemiology and control are presented. Specific lectures on regulatory medicine of major zoonoses: e.g., rabies, tuberculosis.—III. Chomel

413. Veterinary Food Safety (1.3)
Lecture—10 sessions; discussion—3 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. The food system and diseases transmitted by food. Topics include sources of contaminants, the function of processing in food safety, and the role of veterinarians in pre-harvest food safety and in food protection in general.—III. Cliver

414A. Principles of Veterinary Pharmacology and Toxicology (2.4)
Lecture—19 sessions; discussion—4 sessions; laboratory—1 session. Prerequisite: second-year standing in the School of Veterinary Medicine. Introduction to the principles of pharmacology and toxicology. Pharmaco-/toxicokinetics, pharmaco-toxicodynamics and chemotherapy of bacterial, neoplastic, fungal and viral diseases.—I. Buckpitt

414B. Veterinary Pharmacology (2.5)
Lecture—23 sessions; discussion—2 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Basic principles for the use of drugs affecting the autonomic and central nervous systems as well as compounds affecting the cardiovascular system.—II. Stanley

414C. Veterinary Toxicology (1.9)
Lecture—17 sessions; discussion—2 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. The toxicants of major importance in veterinary medicine. Basic principles and mechanism of action of toxicants.—III. Segall

419. Virology (2.7)
Lecture—19 sessions; laboratory—8 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine or consent of instructor. Introduction to the classification, morphology, and the strategy of replication of animal viruses, covering the molecular pathogenesis of animal viruses at the cellular level with emphasis on agents of infectious diseases of domestic animals.—I. Yilma

420. Immunology (3.0)
Lecture—21 sessions; laboratory—9 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Approved for graduate degree credit. Concepts of immunology. Emphasis is on the principles of vaccination, responses to pathogenic agents, and the development of hypersensitivity and autoimmune reactions.—III. Gershwin

421. Principles of Neurosciences (2.7)
Lecture—22 sessions; laboratory—5 three-hour sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Approved for graduate degree credit. An integrated study of normal neurobiology, neuroanatomy, and neurophysiology, to enable students to engage in studies of neurologic disorders and clinical neurology.—II. Gietzen

422. Veterinary Ophthalmology (1.9)
Lecture—17 sessions; laboratory—2 sessions. Prerequisite: third-year standing in School of Veterinary Medicine. The eye and related structures. Basic anatomy and physiology with clinically relevant aspects emphasized. Presentation of clinical appearance of common pathological changes. Specific diseases frequently encountered in general practice, including signs, causes, diagnostic approach, and treatment philosophy.—II. Hollingsworth

425. Veterinary Genetics (1.8)
Lecture—16 sessions; discussion—2 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine or consent of instructor. Introduction to veterinary genetics as preparation to recognize breeds; assess a pedigree; explain coat color inheritance; distinguish Mendelian from non-Mendelian patterns; interpret results of "various laboratory tests." Explain to a layperson how diseases or traits are attributed to a gene or gene defect; "appreciate breaking genetics/biotechnology news."—III. Murray

426. Principles of Veterinary Anesthesiology and Critical Patient Care (1.7)
Lecture—15 sessions; laboratory—2 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Basic principles of veterinary anesthesiology including techniques of monitoring and management of animals under anesthesia.—III. Steffey

427. Cell and Tissue Structure and Function (3.3)
Lecture—24 sessions; laboratory—9 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Relationship between structure and function of animal tissues, emphasizing the molecular and cellular processes which integrate normal physiological activity. Mechanisms of cell division, differentiation and locomotion. Microscopic anatomy and organization of cells and extracellular molecules to form specialized differentiated tissues.—I. Tablin

430. Principles of Radiography and Radiologic Interpretation (3.5)
Lecture—24 sessions; laboratory—1 session; discussion—10 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Physical principles of x-ray production and x-ray matter interactions as they pertain to diagnostic medical imaging and radiation safety. Principles of radiologic interpretation. Principles of ultrasound physics and interpretation. (Deferred grading only, pending completion of sequence.)—I, II, III. Wisner

431. Endocrinology (1.8)
Lecture—17 sessions; laboratory—1 session. Prerequisite: first-year standing in the School of Veterinary Medicine. The structure and function of endocrine glands and how hormones and cytokines influence physiological processes.—III. Benton

432. Structure and Function of the Gastrointestinal and Mammary Systems (3)
Lecture—20 sessions; laboratory—10 sessions. Prerequisite: first-year standing in School of Veterinary Medicine or consent of instructor. Basic understanding and correlation of the structure and function of the gastrointestinal and mammary systems. Multiple species' differences examined.—II. Bruss

433. Veterinary Oncology (1.2)
Lecture—12 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Relationships between pathology, hematology, cytology, immunology, and the clinical manifestations of neoplastic diseases in animals.—I. Madewell

434. Basic Veterinary Hematology (2)
Lecture—14 sessions; laboratory—6 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. The regulation of production of blood cells, the morphology of bone marrow and hematopoietic cells, the morphology and function of blood cells and the activities of hemostasis.—III. Zinkl

435. Veterinary Clinical Pathology (3.3)
Lecture—22 sessions; laboratory/discussion—11 sessions. Prerequisite: second-year standing in School of Veterinary Medicine. The principles, selection, use, interpretation, and limitations of laboratory tests used for the diagnosis and monitoring of disease in animals.—II. Christopher

437A. Veterinary Ethics and Law (1.3)
Discussion—10 sessions; project. Prerequisite: first-year standing in the School of Veterinary Medicine. Ethical and legal issues critical to successful and ethical veterinary practice. Processes through which ethical and legal questions are approached and resolved. Background reading materials and discussions are supplemented with problem-based learning.—I. Tannenbaum

437C. Veterinary Ethics and Law (1.6)
Lecture—16 sessions. Prerequisite: third-year standing in School of Veterinary Medicine or consent of instructor. Introduction to ethical and legal issues critical to successful and ethical veterinary practice. Processes through which ethical and legal questions are approached and resolved. Readings and discussions supplemented with problem based learning.—III. Tannenbaum

438. Animal Handling (1)
Laboratory—9 three-hour sessions; discussion—1 two-hour session. Prerequisite: first-year standing in School of Veterinary Medicine. Introduction and practice of methods of animal handling and restraint and selected techniques of diagnostic examination and therapy, as well as recognition of animal breeds, breed characteristics and purpose in animal species of veterinary importance. (S/U grading only.)—III. Watson

440. Veterinary Neurology (2.7)
Lecture—21 sessions; laboratory—6 three-hour sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Approved for graduate degree credit. Integrated study of the relationship between neuroanatomy, neurophysiology, neuropathology, and the clinical manifestations of the diagnosis of neurological diseases and the use of the various neurodiagnostic aids.—I. LeCouteur

444. Clinical Endocrinology (1.5)
Lecture—12 sessions; discussion—3 sessions. Prerequisite: third-year standing in School of Veterinary Medicine or consent of instructor. A correlated review of common endocrinology disorders affecting the dog and cat.—II. Feldman

446. Veterinary Reproduction (4)
Lecture—30 sessions; laboratory—10 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Structural, functional, pathological, and clinical aspects of reproduction in animals.—II. Conley

451. Veterinary Bacteriology and Mycology (4.9)
Lecture—34 sessions; laboratory—15 three-hour sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Approved for graduate degree credit. Introduction to the bacterial and fungal agents of animal diseases. Specifically, each microorganism will be discussed with respect to overall significance to animal disease; structural and functional aspects including morphology, cellular com-position, and products of medical interest.—I. LeFebvre

452. General Pathology (3.1)
Lecture—18 sessions; laboratory—13 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Approved for graduate degree credit. Basic principles of disease and in particular the fundamental mechanisms responsible for creating a disease situation. Illustrations of how the application of general pathological principles is used to determine disease pathogenesis and prognosis.—I. Mohr

459. Systemic Pathology (5.8)
Lecture—44 sessions; laboratory—14 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine or consent of instructor. Basic understanding of the pathobiology of major organ systems relevant to a variety of animal species. Emphasis on mechanisms of injury, patterns of response to injury and on balance between damage and repair.—II. Moore

460. Fundamentals of Clinical Orthopedics (1)
Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Fundamental concepts of veterinary orthopedics, including mechanisms of bone healing, types of fractures, and principles of stabilization.—I. Schulz

470A-470B-470C. VMTH Techniques (3.4)
Clinical activity—34 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Clinical training in veterinary medicine with assignments in the medical and surgical services and clinical diagnostic facilities of the Veterinary Medical Teaching Hospital, discussions regarding client relations and experience with advanced techniques to prepare students for the senior clinical year. (Deferred grading only, pending completion of sequence. S/U grading only.)—I-II-III. Smith

480. Senior Clinic (60)
Clinical activity—60 hours. Prerequisite: fourth-year standing in the School of Veterinary Medicine and consent of instructor. Integration of knowledge and development of clinical judgment and skills in the diagnosis, treatment, and prevention of animal disease. (Deferred grading only depending on completion of sequence. S/U grading only.)—I, II, III, IV. (I, II, III, IV.) Smith

490A. Freshman Hospital Practices (2)
Laboratory—2 hours. Prerequisite: first-year standing in the School of Veterinary Medicine. Introduction to procedures and knowledge integral to working in a veterinary clinical practice and the VMTH. (Deferred grading only, pending completion of sequence. S/U grading only.)—I, II, III. Smith

490B. Sophomore Hospital Practices (2)
Laboratory—2 hours. Prerequisite: second-year standing in the School of Veterinary Medicine. Introduction to procedures and knowledge integral to working in a veterinary clinical practice and the VMTH. (Deferred grading only, pending completion of sequence. S/U grading only.)—I, II, III. Smith

490C. Junior Hospital Practices (2)
Laboratory—2 hours. Prerequisite: third-year standing in the School of Veterinary Medicine. Introduction to procedures and knowledge integral to working in a veterinary clinical practice and the VMTH. (Deferred grading only, pending completion of sequence. S/U grading only.)—I, II, III. Smith

Departmental Courses

Courses in Anatomy, Physiology, and Cell Biology (APC)

Upper Division Courses

100. Comparative Vertebrate Organology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A and 1B. Functional anatomy of major organ systems in vertebrates. Each system examined from cellular to gross level in fish, birds, and mammals. Emphasis on how differentiated cell types are integrated into tissues and organs to perform diverse physiological functions. (Same course as Neurobiology, Physiology, and Behavior 123.)—II. Guinan

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

284. Ruminant Nutrition and Physiology (3)
Lecture—2.7 hours, laboratory—0.9 hours. Prerequisite: graduate or veterinary student standing. Upper division nutrition courses (e.g., Nutrition 110), upper division systemic physiology (e.g., Neurobiology, Physiology and Behavior 110), Biochemistry (e.g., Biological Sciences 102 and 103) or the equivalent. Basic and applied aspects of ruminant nutrition and physiology, nutritional and metabolic disorders of ruminants. (Same as course 484.)—III. Bruss

285. Morphometry of Cells, Tissues and Organs (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 100 or the equivalent, and Statistics 13. At the end of the course, students will be able to define what critical data need to be collected to estimate volumes, surfaces and lengths of organs and their components (e.g., vessels, ducts and airways). Students will also learn how to estimate the number of cells in an organ or tissue, their volumes, products and gene expression using morphometry. Offered in alternate years.—III. Hyde

286. Basics of Microscopy and Cellular Imaging (2)
Lecture—10 sessions; laboratory—10 sessions. Prerequisite: graduate standing. Practical applications of basic microscope techniques used to image cells and tissues with the goal of using these techniques to generate publication quality images. Principles of light, epifluorescent, confocal and electron microscopy, their applications and limitations. Offered in alternate years.—III. Van Winkle

290. Seminar (1)
Seminar—1 hour. Discussion and critical evaluation of advanced topics and current trends in research. (S/U grading only.)—I, II, III.

291. Topics in Biology of Respiratory System (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Topics concerning structure and function of respiratory system. Possible topics include: lung growth, pulmonary reaction to toxicants, pulmonary inflammation, lung metabolism, biology of lung cells, tracheobronchial epithelium, nasal cavity structure and function. May be repeated for credit. (S/U grading only.)—I, II, III. Hyde, Plopper, Wu, Pinkerton

292. Topics in Neuroscience Research (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Students will examine current topics in neuroscience research literature, as well as evaluate rationale, methods, results, interpretation of data, and relevance of studies. Possible topics include pain, autonomic nervous system, neuroendocrinology, neurotransmitter regulation of gene expression, neuroendocrine-immune interactions, stress. (S/U grading only.)

298. Group Study (1-5)
Laboratory—6-15 hours. Prerequisite: consent of instructor.

299. Research (1-12)
Laboratory—6-36 hours. Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

410. Equine Locomotor Anatomy (1.8)
Lecture—9 sessions; laboratory—9 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Normal anatomy of the equine fore and hind limb bones, joints, muscles, ligaments, tendons, nerves and vessels with emphasis on clinically applicable structures.—III. Stover

458. Behavior Theory in Companion Animals (2)
Lecture—20 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Clinical application of behavior modification procedures, management and drug therapy to resolve common behavioral problems of companion animals including dogs, cats, horses and birds.—III. B. Hart

484. Ruminant Nutrition and Physiology (3)
Lecture—2.7 hours, laboratory—0.9 hours. Prerequisite: graduate or veterinary student standing. Upper division nutrition courses (e.g., Nutrition 110), upper division systemic physiology (e.g., Neurobiology, Physiology and Behavior 110), biochemistry (e.g., Biological Sciences 102 and 103) or the equivalent. Basic and applied aspects of ruminant nutrition and physiology, nutritional and metabolic disorders of ruminants. (Same as course 284.)—III. Bruss

Courses in Medicine and Epidemiology (VME)

Upper Division Course

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

217. Evaluation of Diagnostic Tests (2)
Lecture/discussion—1.7 hours; laboratory—1 hour. Prerequisite: consent of instructor. Topics include sensitivity, specificity, predictive values, Bayes' Theorem, RDC curves, measuring agreement between tests, series and parallel testing strategies. Emphasis on rational interpretation and presentation of test results for individuals and aggregates. Offered in alternate years.—III. Gardner

219. Clinical Experimental Design (3)
Lecture—15 sessions. Prerequisite: biostatistics, ecology, epidemiology, experience in clinical medicine or microbiology recommended. Design and construction of experiments, hypothesis testing, exploratory data analysis, controls, inferring causation, and the performance of scientific research. Offered in alternate years.—(II.) Foley

294B. Conservation Biology and Veterinary Medicine (1)
Seminar—1 hour. Discussion of current topics in conservation biology as they relate to veterinary medicine; the emphasis is on wildlife. May be repeated for credit. (S/U grading only.)—II. Mazet

298. Group Study (1-5)
Prerequisite: student in School of Veterinary Medicine or consent of instructor. Group study in selected areas of the clinical sciences. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Courses

410. Husbandry, Feeding and Management of Captive Animals (2)
Lecture—20 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine or consent of instructor. Introduction of management and husbandry dynamics as a prerequisite for preventive health programs in zoos, aquaria, vivaria, and other environments for exotic pets and wild animals.—III. Tell

412. Laboratory Animal Medicine (2)
Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. The role of an institutional laboratory animal veterinarian. Emphasis on the role of the attending veterinarian, mouse genetics, vivarium management, health monitoring programs, experimental design and animal models.—II. Kendall

413. Medical Primatology (2)
Lecture—20 sessions. Prerequisite: third-year standing in School of Veterinary Medicine or consent of instructor. Major diseases, medical management and husbandry of captive non-human primates. (S/U grading only.)—III. Roberts

415. Management and Diseases of Captive Wildlife (2)
Lecture—20 sessions. Prerequisite: second- or third year standing in the School of Veterinary Medicine or consent of instructor. Introduction to the roles of a zoological veterinarian and the most common topics encountered. Emphasis on taxonomy, husbandry, preventive medicine and the most common diseases seen in common captive wildlife species.—I. Wack

416. Diseases of Fish (2.1)
Lecture—18 sessions; laboratory—3 sessions. Prerequisite: second- or third-year standing in the School of Veterinary Medicine or consent of instructor. Etiology, pathology, diagnosis, treatment and prevention of diseases of fish. Preventive management of diseases in aquaculture and aquaria.—III. Hedrick

417. Companion Avian Medicine (2)
Lecture—20 sessions. Prerequisite: third-year standing in School of Veterinary Medicine. Diseases, diagnostics, medical management and surgery of psittacine species. Avian nutrition, husbandry, and management.—II. Tell

419. Companion Exotic Small Animal Medicine and Surgery (3.4)
Lecture—34 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. The etiology, clinical presentation, diagnostic evaluation, treatment, prevention, and control of medical diseases of companion small exotic mammals, reptiles and aquarium fish.—I. Hawkins

426. Foreign Animal Diseases of Livestock, Poultry, and Horses (2)
Lecture—20 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Information and concepts related to diagnosis, prevention, control, and eradication of major foreign animal diseases. Federal requirements necessary to become an accredited veterinarian.—II. Thurmond

427. Introduction to Food Animal Herd Health Medicine (1.9)
Lecture—17 sessions; laboratory—2 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, course 463A and 463B (concurrently) or consent of instructor. Introduction to current problem solving concepts, approaches, and issues addressed in subsequent food animal medicine courses; contexts for developing problem solving skills through on-site, field investigation of herd and flock health problems.—I. Hoar

428. Food Animal Surgery (1.6)
Lecture—16 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Selected topics in surgical diseases of food animals.—III. Smith

428L. Food Animal Surgery Laboratory (0.8)
Laboratory—8 three-hour sessions. Prerequisite: third-year standing in School of Veterinary Medicine;

course 428 (concurrently). Representative surgeries of food animals performed by groups of students. Limited enrollment. (S/U grading only.)—III. Smith

429A. Sheep Herd Health (1)
Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, course 463A, 463B, 427, course 463C concurrently, or consent of instructor. The application of problem-solving and epidemiologic methods to sheep diseases and their control.—II. Lane

429B. Beef Heard Health (1)
Lecture—10 sessions. Prerequisites: Third-year standing in the School of Veterinary Medicine, course 463A, 463B, 427, 463C concurrently or consent of instructor. The application of problem-solving methods to diseases of grazing beef cattle and their control.—II. (II.) Hoar

429C. Swine Herd Health (1)
Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, course 463A, 463B, 427, course 463C concurrently, or consent of instructor. The application of problem-solving and epidemiologic methods to swine diseases and their control.—II. Gardner

430. Raptor Medicine and Rehabilitation (2)
Lecture—20 sessions. Biology, behavior, parasites, diseases, toxins, iatropenic conditions, diagnostics, treatments, nursing, housing, nutrition, rehabilitation and release techniques for eggs, orphans and adult native California raptors.—III. Tell

432. Medical and Husbandry Procedures for Raptors (1)
Laboratory—1 hour. Prerequisite: first-, second-, or third-year standing in the School of Veterinary Medicine or consent of instructor. Serves as student treatment crew for the Raptor Center providing hands-on experience with handling, restraint and treatment for ill and injured birds of prey with the goal of rehabilitation and release back into their native habitat. May be repeated once for credit with consent of instructor.—I, II, III. Tell

446. Small Animal Reproduction (1)
Lecture—7sessions; discussion—1 session; laboratory—2 three-hour sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Approved for graduate degree credit. Provides a complete description (history, physical examination, laboratory abnormalities, etc.) of the common abnormalities associated with the genital tract of male and female dogs and cats.—III. Feldman

450. Small Animal Clinical Immunology (2.2)
Lecture—16 sessions; discussion—6 sessions. Prerequisite: second- or third-year standing in the School of Veterinary Medicine or consent of instructor. Comprehensive discussion of the basic mechanisms of immunologic diseases in small companion animals and a description of common immunologic diseases, including clinical presentation, diagnosis and treatment. (S/U grading only.)—III. Pedersen

454. International Veterinary Medicine Baja California Fieldwork (2)
Fieldwork—40 hours. Students in the School of Veterinary Medicine or consent of instructor. Livestock diseases responsible for limiting trade across the U.S./Mexico border, how knowledge is extended to ranchers, and how veterinarians are educated in Mexico. Offered during Spring break. (S/U grading only.)—III. Hird

455. Beginning Veterinary Spanish (2)
Lecture/discussion—3 hours. Prerequisite: student in the School of Veterinary Medicine. Preparation to converse with clients (e.g., companion animal owners) and livestock managers in Spanish in clinical settings. (S/U grading only.)—II. Hird

456. Intermediate Veterinary Spanish (1)
Discussion—10 sessions. Prerequisite: student in the School of Veterinary Medicine. Presentations on veterinary-related topics in Spanish by native speakers and others followed by discussion to prepare students to converse with clients (e.g., companion animal owners and livestock managers) in Spanish. May be repeated for up to 2 units of credit. (S/U grading only.)—III. Hird

461A. Small Animal Medicine—Level I (3.6)
Lecture—32 sessions; laboratory—4 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine or consent of instructor. Fundamental principles, clinical manifestations, diagnostic methods and therapeutic approaches to the medical diseases of dogs and cats. Course is a core option for the professional veterinary curriculum and preparatory for advanced courses in small medical diagnoses and therapeutics.—III. Kittleson

461B. Small Animal Medicine—Level I (3.3)
Lecture—33 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, course 461A (Small Animal Medicine core only), or consent of instructor. Continuation of fundamental principles, clinical manifestations, diagnostic methods, and therapeutic approaches to the medical diseases of dogs and cats.—I. Marks

461C. Small Animal Medicine—Level I (3.7)
Lecture—37 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, course 461A, 461B (Small Animal Medicine core only), or consent of instructor. Continuation of fundamental principles, clinical manifestations, diagnostic methods and therapeutic approaches to the medical diseases of dogs and cats.—II. White

462. Small Animal Medicine, Level II (2)
Discussion—20 sessions. Prerequisite: course 461A, 461B, 461C, third-year standing in the School of Veterinary Medicine, or consent of instructor. Emphasis on differential diagnosis covering diseases of the skin, cardiovascular, respiratory, gastrointestinal and urinary systems, plus infectious diseases affecting various organ systems. The course is a bridge between didactic teaching and the use of that knowledge in a clinical setting.—III. Ihrke

463A. Food Animal Medicine, Level I (3.4)
Lecture—34 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Fundamentals of food animal medicine presented in a lecture format with integrated case discussion to illustrate the context and application of material presented and to promote development of problem-solving skills.—III. Smith

463B. Food Animal Medicine, Level I (3.4)
Lecture—34 sessions. Prerequisite: course 463A or consent of instructor, third-year standing in the School of Veterinary Medicine. Fundamentals of food animal medicine with integrated case discussions to illustrate the context and application of material presented and to promote development of problem-solving skills.—I. George

463C. Food Animal Medicine Level I (3.5)
Lecture—32 sessions; laboratory—2 sessions; discussion—1 session. Prerequisite: third-year standing in the School of Veterinary Medicine or consent of instructor, course 463A, 463B if food animal medicine is your core requirement. Continuation of the fundamentals of food animal medicine with integrated case discussions to illustrate the context and application of material presented and to promote development of problem-solving skills.—II. George

464A. Equine Medicine, Level I (3.2)
Lecture—28 sessions; laboratory—4 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine or consent of instructor. The etiology, pathophysiology, epidemiology, clinical presentation, diagnostic evaluation, treatment, presentation, and control of important infectious and non-infectious diseases of horses. Emphasis on problem-based approach to differential diagnosis.—III. Wilson

464B. Equine Medicine, Level I (3.9)
Lecture—36 sessions; discussion—3 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, course 464A (Equine Medicine core only), or consent of instructor. Continuation in instruction in the etiology, pathophysiology, epidemiology, clinical presentation, diagnostic evaluation, treatment, prevention, and control of important infectious and non-infectious diseases of horses. A problem-based approach to differential diagnosis.—I. Spier

464C. Equine Medicine, Level I (3.4)
Lecture—32 sessions; discussion—2 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, course 464A, 464B (Equine Medicine core only), or consent of instructor. Continuation in instruction in the etiology, pathophysiology, epidemiology, clinical presentation, diagnostic evaluation, treatment, prevention and control of important infectious and non-infectious diseases of horses. A problem-based approach to differential diagnosis emphasized.—II. Madigan

465. Advanced Equine Medicine, Level II (3.6)
Lecture—36 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, course 464A, 464B, 464C or consent of instructor. An approach to commonly encountered problems of horses held as individuals and farm settings. Development of problem solving skills related to the medical management of horses and their problems.—III. Madigan

465L. Advanced Equine Medicine Level II Laboratory (0.8)
Laboratory—8 sessions. Prerequisite: course 464A, 464B, 464C, 465 (may be taken concurrently), third-year standing in School of Veterinary Medicine. Clinical presentation and instruction in treatment of the medical aspects of equine practice. (S/U grading only.)—III. Madigan

466. Equine Critical Care (2)
Lecture—10 sessions; discussion—10 sessions. Prerequisite: course 464A, 464B, 464C, or consent of instructor, third-year standing in the School of Veterinary Medicine. Focus on common equine emergencies and their initial life-support management strategies. Rational approach to diagnosis and management of emergency and critically ill equine patients in clinical practice. Pathophysiology of Systemic Inflammatory Response Syndrome (SIRS), Multiple Organ Dysfunction Syndrome (MODS), and critical illness.—III. Magdesian

468. Advanced Feline Medicine (2)
Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine or consent of instructor. Fundamental principles, clinical manifestations, diagnostic methods, and therapeutic approaches to medical diseases of cats. Diseases unique to cats and diseases whose clinical presentations and diagnostic evaluations are fundamentally different in cats versus dogs.—III. Westropp

481. Clinical Rounds (1)
Discussion—10 sessions. Prerequisite: first- or second-year standing in the School of Veterinary Medicine or consent of instructor. Discussion of selected small and large animal cases from the Veterinary Medical Teaching Hospital. May be repeated once for credit. (S/U grading only.)—I, II, III. Smith

486. Equine Clinical Neonatology (1)
Discussion—10 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine or consent of instructor. Discussion of methods of equine neonatal intensive care and disease pathophysiology in a case format. (S/U grading only.)—III. (III.) Madigan

487. Comparative Bio-Medical: Form and Function (2)
Lecture—20 sessions. Prerequisite: first-, second-, of third-year standing in the School of Veterinary Medicine or consent of instructor. Comparative biology approach and concepts for non-traditional animal species; alternative pets, zoos, rehabilitation centers, wildlife, aquaculture, laboratory animals, and non-human primates. (S/U grading only.)—II. Roberts

493. Seminar in Veterinary Medicine (1)
Seminar—2 hours. Prerequisite: professional standing; resident in Veterinary Medical Teaching Hospital. Seminars given by the faculty of the School of Veterinary Medicine in topics relating directly to the practice of clinical medicine and surgery. Residents will assist in the presentation of seminar material. May be repeated for credit. (S/U grading only.)—I, II, III.

494. International Programs Seminar (1)
Seminar—10 sessions. Prerequisite: D.V.M, M.P.V.M. or consent of instructor. Discussion, by veterinarians

around the world, of aspects of veterinary medicine in their countries and regions, ranging from livestock to wildlife medicine to companion animal practice. May be repeated twice for credit. (S/U grading only.)—II. Hird

Courses in Molecular Biosciences (VMB)

Lower Division Course

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Molecular Biosciences. Internships supervised by a member of the faculty. (P/NP grading only.)

Upper Division Courses

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Molecular Biosciences. Internships supervised by a member of the faculty. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

247. Natural Toxicants (2)
Lecture—2 hours. Prerequisite: organic chemistry, Biological Sciences 102 and 103, or consent of instructor. Toxicity and metabolism of natural toxicants with emphasis on the toxic plants present in the western United States. General pathways of metabolism plus the relationship between chemical properties and biologic activity of natural toxicants are discussed. Offered in alternate years.—III. Segall

253. Metabolism of Toxicants and Drugs (2)
Lecture—2 hours. Prerequisite: Pharmacology and Toxicology 201, 202, 203, general biochemistry or consent of instructor. Significance/chemical pathways of toxicants and drug metabolism, enzymology and molecular aspects of P450 and flavin monooxygenases, hydrolases and phase 2 transferases and experimental approaches for metabolism studies. Offered in alternate years.—II. Buckpitt

254. Toxicology of the Respiratory System (3)
Lecture—27 sessions; discussion—3 sessions. Prerequisite: Pharmacology and Toxicology 201, 202, 203 or consent of instructor. Survey of structure and function of the respiratory system, the pathophysiology of major lung diseases, the interactions of toxicants with the lung and response of this organ to injury. Offered in alternate years.—II. Buckpitt

260. Toxicologic Pathology (3)
Lecture—3 hours. Prerequisite: Pharmacology and Toxicology 201, 202, and 203. Provide introduction to organ system pathology; provide understanding of pathogenesis and significance of chemically induced tissue injury in the various organs of the body. Offered in alternate years.—II. Woods

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor Topics in nutrition, pharmacology/toxicology, and biochemistry. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Hansen

297T. Tutoring in Graduate Molecular Biosciences (1-5)
Prerequisite: graduate or professional student standing and consent of instructor. Assist in preparation and teaching of courses in Nutrition, Pharmacology and Toxicology, or other courses offered by the department under direct supervision of the instructor. Designed for graduate or professional students who desire teaching experience in graduate courses. May be repeated up to 5 units of credit. (S/U grading only.)

298. Group Study (1-5)
Prerequisite: consent of instructor. Group study in selected areas of Pharmacology and Toxicology. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Course

397T. Tutoring in Molecular Biosciences (1-5)
Discussion—1-5 hours. Prerequisite: graduate or professional standing and consent of instructor. Experience in professional curriculum for graduate or professional students, not teaching assistants, under direct supervision of instructor. May be repeated up to 5 units of credit (S/U grading only.)—I, II, III.

Professional Courses

405. Veterinary Clinical Pharmacology (2)
Lecture—2 hours. Prerequisite: third-year standing in School of Veterinary Medicine or consent of instructor. Approved for graduate degree credit. Pharmacological basis of therapeutic use of drugs in domestic animals. Emphasis on selection of most appropriate drug, its dosage form, route of administration and dose for treatment of certain disease conditions. (S/U grading only.)—I. Vulliet

418. Veterinary Complementary Medicine (1)
Lecture—10 sessions. Prerequisite: first-, second- or third year standing in the School of Veterinary Medicine. Introduction to various methods of complementary (alternative) medicine and how it is applied in the treatment of diseases. Discussion of philosophical differences between Western and Chinese medicine and use of traditional and alternative (acupuncture and bioactive herbs) approaches in patient care.—I. Mount

465. Taxonomy of Poisonous Plants (2.6)
Lecture—16 sessions; laboratory—7 sessions; fieldwork—3 sessions. Prerequisite: first- or second-year professional students, students in the School of Veterinary Medicine, or consent of instructor. Taxonomy, botanical terms, and family characteristics of poisonous plants from 30 plant families. The clinical effects on livestock and pets of toxic substances from each family.—III. Mount

475. Diagnosis and Treatment of Food Animal and Equine Poisoning (2)
Lecture—20 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Clinical systematic approach to poisoning problems in livestock, horses and other ungulate stock emphasizing diagnosis and treatment, including poisonous plants.—III. Mount

480. Diagnosis and Treatment of Small Animal Poisoning (2)
Lecture—20 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Clinical systematic approach to poisoning problems in dogs, cats, and pet birds, emphasizing diagnosis and treatment.—II. Mount

485. Advanced Clinical Nutrition (2)
Lecture—14 sessions; laboratory—1 session; discussion—4 sessions; project. Prerequisite: third-year standing in the School of Veterinary Medicine or consent of instructor. Advanced training in the principles and application of small animal clinical nutrition. (S/U grading only.)—I. Fascetti

Courses in Pathology, Microbiology, and Immunology (PMI)

Lower Division Course

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

101. Comparative Hematology (2)
Lecture—2 hours. Prerequisite: Biological Sciences 1A, 1B, Neurobiology, Physiology, and Behavior 101, Biological Sciences 102; or consent of instructor. An overview of the production, function and morphology of vertebrate blood cells, their alteration in health and disease, and the basic principles of laboratory testing in hematology. For students interested in medical technology or animal health. Offered in alternate years.—(III.) Zinkl

126. Fundamentals of Immunology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 102 or the equivalent or consent of instructor. Overview of immunology including components of the immune system, initiation and regulation of the immune response, infection and immunity, hypersensitivity and immune dysfunction. Clinical immunologic techniques, immunodeficiency and vaccinology.—II. (II.) Stott

126L. Immunology Laboratory (2)
Laboratory—6 hours. Prerequisite: course 126 or Medical Microbiology 107 or equivalent (may be taken concurrently). Laboratory procedures in clinical immunology. Laboratory animal immunization/bleeding. Quantitative and qualitative characterization of the immune response. Cells of the immune system.—II. (II.) Stott

127. Medical Bacteria and Fungi (5)
Lecture—3 hours; laboratory—5 hours. Prerequisite: general microbiology (Microbiology 102 and 102L), basic immunology (course 126 or Medical Microbiology 188). An introduction to the bacterial and mycotic pathogens of man and animals, with emphasis on pathogenic mechanisms and ecologic aspects of infectious disease.—III. LeFebvre

128. Biology of Animal Viruses (3)
Lecture—3 hours. Prerequisite: Biological Sciences 102. Fundamental physical and chemical properties of animal viruses; methods of propagation, purification and assay. Mechanisms of viral replication and pathogenesis of viral infections in man and animals. Immunity to virus diseases and oncogenic properties of animal viruses.—I. (I.) Miller

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

270. Advanced Immunology (3)
Lecture—3 hours. Prerequisite: course 126 or Veterinary Medicine 450 or consent of instructor. Immunoglobulin structure and function, antigenic determinants, complement. Biology of lymphocytes; cell-mediated immune reactions, immunogenetics, hypersensitivity. Pathogenetic mechanisms in immunological diseases, immunological unresponsiveness, cancer immunology. Dynamics of infection and resistance. Methods in immunochemistry and immunobiology. Offered in alternate years.—III. Stott

275. Comparative Pathology of Organ Systems (4)
Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: graduate standing. Correlative alterations in structure and function of organ response to injury presented in context of major disease syndromes. Emphasis on general responses to disease in both humans and animals. Introductory material on the mechanisms of viral, bacterial and parasite pathogenesis.—I. (I.) Wilson

280A. The Mouse as an Experimental Model for Human and Animal Diseases I (3)
Lecture—3 hours. Prerequisite: graduate level standing in the biological sciences, first-, second-, or third-year standing in the School of Veterinary Medicine, or professional standing in the School of Medicine. Mice as models in biomedical research. Basic mouse biology, including reproduction and development, embryology, functional anatomy, ecology and genetics.—III. Baumgarth

280B. The Mouse as an Experimental Model for Human and Animal Diseases II (3)
Lecture—3 hours. Prerequisite: course 280A. Mice as models in biomedical research. Emphasis on mouse genomics, experimental pathology, immu-

nology, physiology and other uses of experimental mouse models. Current technologies for establishment and evaluation of mouse models.—I. Baumgarth

283. Comparative Avian Anatomy and Pathology (1-3)
Lecture—3 hours. Prerequisite: anatomy section—upper division undergraduates, graduates or veterinary students and consent of instructor; pathology section—third-year and fourth-year veterinary students or graduate students and consent of instructor. Ten lectures outline gross/microscopic functional anatomy of a wide range of avian species as appropriate for students interested in avian biology. The remaining 20 lectures encompass comparative aspects of avian pathobiology and disease manifestations for students interested in avian diseases.—I. (I.) Lowenstine

285. Cellular Basis of Disease (3)
Lecture—3 hours. Prerequisite: Biological Sciences 104, and either Veterinary Medicine 452 or Medical Pathology 210. Application of cell biology, biochemistry and molecular biology to the understanding of the basic nature of disease. Cellular injury and mechanisms of adaptation, host-defense and vascular responses, and cellular transformation. Offered in alternate years.—(II.) Mohr, Wu

287. Comparative Pathology of Laboratory Animals (3)
Lecture—3 hours. Prerequisite: general and systemic pathology; third- or fourth-year veterinary student or graduate student, or consent of instructor. Recognition of lesions and understanding of pathogenesis of diseases of animals commonly kept in laboratory settings. Species covered include rodents, lagomorphs, amphibians, nonhuman primates. Genetically manipulated animals and novel animal models. Offered in alternate years.—(III.) Lowenstine

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Topics in pathology, microbiology or immunology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291A. Seminar in Immunology (1)
Seminar—1 hour. Prerequisite: course 126 or the equivalent. Students choose topic for each quarter. Individual or pairs of students choose a paper for all to read and present a seminar based on the subject of the paper. All students participate in discussion. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Gershwin

291B. Histopathology Conference (1)
Discussion—1 hour. Prerequisite: Graduate standing or final year Veterinary student; consent of instructor. Discussion of selected cases based on records and slides. Defense of diagnosis. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Wilson

292A. Seminar in Animal Virology (1)
Seminar—1 hour. A discussion of the current topics in animal virology. May be repeated for credit. (Same course as Microbiology 296.) (S/U grading only.)—I, II, III. (I, II, III.) Marthas, Miller

292B. Surgical Pathology Conference (1)
Discussion—1 hour. Prerequisite: graduate standing or final-year veterinary student; consent of instructor. Diagnosis and discussion of current surgical pathology cases based on clinical records and microscopic study. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

293A. Seminar in Infectious Diseases (1)
Seminar—1 hour. Prerequisite: current enrollment in health sciences professional school or graduate student in Biological Sciences. Discussion of current topics and cases of infectious diseases. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Byrne

293B. Necropsy and Surgical Pathology (2-4)
Laboratory—6-12 hours. Prerequisite: graduate standing; consent of instructor. Responsible diagnostic casework. Performance of necropsies, slide reading, and case reporting. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Munson

296. Microbiological Diagnosis (2-5)
Laboratory—5-14 hours; discussion—1 hour. Prerequisite: laboratory course in veterinary or medical microbiology or the equivalent; consent of Chief of Microbiology, VM Teaching Hospital. Laboratory diagnosis of infectious diseases involving case work at the VM Teaching Hospital. (S/U grading only).—I, II, III. (I, II, III.) Byrne

298. Group Study (1-5)
Group study. (S/U grading only.)

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Courses

418. Health and Disease in Terrestrial Wildlife (2)
Lecture—20 sessions. Prerequisite: first-, second-, or third-year standing in the School of Veterinary Medicine or consent of instructor. Ecology and epidemiology of disease in free-ranging terrestrial wildlife. Offered in alternate years. (S/U grading only.)—II Ziccardi

419. Field Techniques for Assessment of Wildlife and Ecosystem Health (2)
Fieldwork—7 sessions. Prerequisite: Medicine and Epidemiology 294B, first-, second-, third-year or MPVM standing in the School of Veterinary Medicine or consent of instructor. Introduction to the concepts and technical skills necessary to conduct field studies pertaining to wildlife/ecosystem health. Emphasis on Southern California ecosystem. (S/U grading only.)—III. (III.) Ziccardi

475. Diagnostic Medicine of Domestic Animals (2)
Discussion—2 hours. Prerequisite: second-year standing in the School of Veterinary Medicine or consent of instructor. An integrated, problem oriented, approach to diagnosis of animal infectious disease through the disciplines of microbiology, clinical pathology and anatomic pathology. Participants organize assigned cases for presentation to the class in a grand rounds format with presentations by small groups composed of individuals who act as either a moderator, microbiologist, clinical pathologist or pathologist. (S/U grading only.)—III. (III.) Wilson, Zinkl, Hirsh

476. Comparative Pathology of Non-Mammalian Vertebrates (2)
Lecture—20 sessions. Prerequisite: second- or third-year standing in the School of Veterinary Medicine or consent of instructor; Medicine and Epidemiology 410, 487. Mechanisms of disease in non-mammalian vertebrates (fish, amphibians, reptiles, and birds) that differ from mammalian species including tissue response to injury, repair and neoplasia. Gross lesions of common diseases affecting non-mammalian vertebrates.—III.

Courses in Population Health and Reproduction (PHR)

Lower Division Course

92. Internship in Veterinary Science (1-4)
Discussion/laboratory—1-4 hours; clinic—3-36 hours; final report. Prerequisite: approval of project prior to period of internship by faculty sponsor. Supervised work experience in reproduction. (P/NP grading only.)

Upper Division Courses

106. Human–Animal Interactions: Benefits and Issues (2)
Lecture—2 hours. Prerequisite: upper division standing or consent of instructor. The contributions of animals to human society, including historic, anthropologic, developmental, human health, and therapeutic perspectives, as well as effects of humans on animals.—II. L. Hart

111. Animal Hygiene (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A or consent of instructor. Causes, prevention, and control of animal diseases important in economic agriculture and in public health, with emphasis upon animal management factors in disease.—II. West

150. Food-Borne Infections and Intoxications (4)
Lecture—4 hours. Prerequisite: Food Science and Technology 104, Veterinary Microbiology and Immunology 127. Prevalence and characteristics of those diseases of man which are derived from food or food sources; access of disease agents to and distribution in food and food sources; exposure of man to these agents; prevention of food-borne diseases.—III. Cliver

192. Internship in Veterinary Science (1-12)
Discussion/laboratory—1-12 hours; clinic—3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in Reproduction. May be repeated for credit. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

202. Sampling in Health-Related Research (3)
Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 403 or the equivalent; consent of instructor. A very thorough coverage of simple random sampling, stratified sampling, cluster sampling, systematic sampling and other sampling methods applied extensively in epidemiology and other health-related disciplines. Emphasis on application of the sampling methods. Offered in alternate years.—II. Farver

203. Multivariate Biostatistics (3)
Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 403 and 404, or the equivalent; consent of instructor. Multivariate procedures covered are principal component analysis, factor analysis, Two-group and k-group multivariate ANOVA, multivariate regression, Two-group and k-group discriminant analysis and repeated measures analysis, cluster analysis, and canonical analysis. Emphasis is on application of procedures. Offered in alternate years.—II. Farver

210A. Analytic Epidemiology I: Case Control Studies (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Statistics 130B and Preventive Veterinary Medicine 406 or the equivalent or consent of instructor. Theory and practice of epidemiologic data analysis. Topics include confounding, stratification, matching, interaction, and logistic regression. (Same course as Epidemiology 210A.)—II. Kass

210B. Analytic Epidemiology II: Cohort Studies (3)
Lecture/discussion—3 hours. Prerequisite: course 210A. Theory and practice of epidemiologic data analysis. Topics include rates, rate standardization, cohort analysis, Poisson regression, and survival/failure-time methods. (Same course as Epidemiology 210B.)—III. Kass

212. Epidemiology of the Zoonoses (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: graduate standing or third-year standing in School of Veterinary Medicine, or consent of instructor. Epidemiological, biological, and ecological features of some major infections shared by humans and other animals. Wildlife and domestic animals zoonoses of major health and economic significance are presented to illustrate how knowledge of zoonoses epidemiology is essential for implementing control measures.—II. Chomel

213. Food Safety (1)
Lecture—10 sessions. Prerequisite: graduate standing or consent of instructor. Food-borne disease hazards from producer to consumer; types and causes of food-borne illness; measures for prevention of food-borne disease and enhancement of food safety.—III. Cliver

216A. Immunodiagnostic Techniques (2)
Lecture—10 sessions; laboratory—10 sessions. Prerequisite: MPVM student or consent of instructor. Applications of serologic techniques for diagnosis of animal diseases.—II. Lam

216B. Research Methods in Avian Immunology (2)
Discussion—1 hour; laboratory—3 hours. Prerequisite: laboratory immunology background or consent of instructor. Laboratory techniques used in the study of avian immune systems and pathogenesis of avian disease.—III. Lam

220. Advanced Avian Medicine (3)
Lecture—3 hours. Instruction on the methods of prevention of the major diseases of domestic poultry.—III. Wakenell

222. Avian Immunology (3)
Lecture—3 hours. Prerequisite: basic immunology course or consent of instructor. Normal structure of the avian immune system, quick review of basic immunology, comparison between mammalian and avian immune systems and generation of immune responses, immunodiagnostics and vaccination.—III. Wakenell

225. Preventive Avian Medical Practice (3)
Lecture—3 hours. Prerequisite: enrollment in avian medicine option of MPVM program, third- or fourth-year standing in School of Veterinary Medicine, or consent of instructor. Discussion of the economic structure of the broiler, commercial egg and turkey industries, and the delivery of preventive veterinary medical services within these industries. Specific prevention and eradication programs pertaining to diseases of economic importance are covered.—II. West, Wakenell

231. Pathophysiology of Mammalian Reproductive Processes (3)
Lecture—3 hours. Prerequisite: fourth-year standing in School of Veterinary Medicine or consent of instructor. Physiological and pathological aspects of reproductive failure in mammals concerning gonadal function, fertilization, implantation, prenatal mortality, neonatal mortality, environmental factors, anatomical and hereditary defects, intersexuality and behavior. Offered in alternate years.—III. Conley

232. Advanced Reproductive Biology (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: Neurobiology, Physiology and Behavior 121 and 130; graduate standing or consent of instructor. Examination of or challenge to established and emerging concepts at the molecular, cellular and organismal levels. Reproductive development, the male, the non-pregnant female and the pregnant or senescent female.—III. Conley

290A. Seminar (1)
Seminar—1 hour. Discussion of current topics in animal reproduction and medicine, as well as presentation of research findings by graduate students and faculty. May be repeated for credit. (S/U grading only.)—I, II, III. Liu

290B. Current Topics in Avian Medicine (1)
Seminar—1 hour. Prerequisite: consent of instructor. Topics from the current literature in avian medicine will be assigned to students for discussion and interpretation. May be repeated for credit.—I, II, III. Lam, Wakenell

292. Current Topics in Reproduction (1)
Seminar—1 hour. Prerequisite: consent of instructor. Discussion of current scientific literature in reproduction, as well as presentation of research findings by graduate students and faculty. (S/U grading only.)—Lasley

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Professional Courses

406. Human-Animal Interaction in Veterinary Science (1)
Lecture—10 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. From the perspectives of veterinarians and their clients' needs. Human relationships with companion animals, and secondarily, on food, laboratory, and wild animals. Emphasis on the benefits of companion animals for human mental and physical well-being, the role of animals in the human life cycle, societal traditions in keeping animals, and types of specialized and more typical relationships with animals.—II. L. Hart

408. Behavior and Biology of Mice as Domestic Animals (1)
Lecture—10 sessions. Prerequisite: first-, second-, or third-year standing in the School of Veterinary Medicine, or graduate standing in psychology, animal science, animal behavior, or consent of instructor. Laboratory mouse biology and welfare, including the development and purposes of specialized strains of mice, constraints for their care and environmental enrichment, legislation and regulation, and the human benefits of their use.—II. L. Hart

420. Zoonoses of Non-Human Primates (2)
Lecture—20 sessions. Prerequisite: second-, third-, or fourth-year standing in the School of Veterinary Medicine or Medicine or consent of instructor. Epidemiological, clinical, and biological features of zoonoses of non-human primates. Emphasis given to major zoonoses which are threatening to human health and their treatment and prevention. Focus also on management of non-human primates in research, zoological gardens and in the wild. Offered in alternate years.—II. Chomel

429D. Dairy Herd Health Management (4)
Lecture—40 sessions. Prerequisite: Medicine and Epidemiology 427, 463A, 463B, 463C, third-year standing in School of Veterinary Medicine, and consent of instructor. Practical systems for delivering veterinary services to dairy farms with emphasis on disease prevention and improved herd performance.—III. Moore

429DL. Dairy Herd Health Management Laboratory (0.6)
Laboratory—6 sessions. Prerequisite: third-year standing in School of Veterinary Medicine ; course 429D concurrently or consent of instructor. Practical systems for delivering veterinary services to dairy farms with emphasis on disease prevention and improved herd performance. Field trips and computer laboratories to practice skills in animal observations, facilities observations and use of the computer for nutrition services and dairy records analysis. (S/U grading only.)—III. Moore

429E. Dairy Goat Herd Health (1)
Lecture—10 sessions. Prerequisite: Medicine and Epidemiology 427, 463A, 463B, 463C, third-year standing in School of Veterinary Medicine, or consent of instructor. The application of problem-solving and epidemiologic methods to dairy goat diseases and their control.—III. Rowe

430. Issues in Animal Production and Resource Utilization (2)
Lecture—10 sessions; discussion/laboratory—five 3-hour sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Introduction to interfaces of food animal production and environmental protection, wildlife preservation, animal well-being, food safety and human nutrition. Site visits to wildlife preserves, livestock production and processing facilities. (S/U grading only.)—I.

432. Reproductive Technology in Mammals and Birds (0.7)
Lecture—7 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine or consent of instructor. Introductory course in the application of technology to the reproductive process in mammals and birds. Emphasis on domestic animals, but birds and non-domestic mammals discussed to a limited extent. A goal is to expose students to some of the "sexier" aspects of population/reproductive management. (S/U grading only.)—III. BonDurant

432L. Reproductive Technology in Mammals and Birds, Laboratory (0.3)
Laboratory—3 sessions. Prerequisite: course 432 concurrently. Laboratory demonstrations and exercises in gamete freezing, thawing, and handling; artificial insemination of cattle; artificial insemination and other applications of reproductive technology in small ruminants. (S/U grading only.)—III. BonDurant

439. Beef Cattle Nutrition (1)
Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine or consent of instructor. Economically sound methods for meeting nutrient requirements of feedlot and pasture beef cattle (including computer-assisted methods). Strategies for presenting nutritional and ration-associated diseases of beef cattle.—III.

440. Ruminant Clinical Nutrition (1.9)
Lecture—19 sessions. Prerequisite: Veterinary Medicine 408, second- or third-year standing in the School of Veterinary Medicine or consent of instructor. Nutritional related disorders in ruminants with a herd basis approach. Nutritionally related disorders that affect modern cattle production. Emphasis on understanding the problem and preventing it through nutritional management.—III. Santos

442. Equine Theriogenology (2)
Lecture—2 hours. Prerequisite: third-year standing in School of Veterinary Medicine or consent of instructor. Discussions of abnormal conditions and physiologic function in equine reproduction with emphasis on methods of diagnosis and interpretation of clinical and laboratory findings associated with the abnormalities.—I. Ball

442L. Equine Theriogenology Laboratory (1)
Laboratory—10 3-hour sessions. Prerequisite: third-year standing in School of Veterinary Medicine or consent of instructor. Hands-on diagnosis and implementation of techniques related to reproductive examination of horses. Routine and current procedures performed on the farms. Designed to maximize the opportunity for assessment of the normal reproductive anatomy, the diagnosis and interpretations of physiologic conditions and for becoming comfortable in performing the various routine procedures.—I. Ball

445. Food Animal Theriogenology and Reproductive Performance (2)
Lecture—20 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine of consent of instructor. Physiological, pathophysiological, and management factors affecting the reproductive health and performance of food animals, with emphasis on dairy, beef cattle, and sheep. Minor emphasis on swine and goats. Assessment of, and intervention strategies for, herd reproductive performance.—II. BonDurant

445L. Food Animal Theriogenology Laboratory (1)
Laboratory—10 3-hour sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, course 445 concurrently or consent of instructor. Obstetrical and gynecological diagnosis and treatment for food animals; breeding soundness examination of males; analysis and on-farm use of computerized reproductive records; embryo technology. (S/U grading only.)—II. BonDurant

446A. Food Animal Reproduction (1)
Lecture—6 sessions; laboratory—4 three-hour sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Approved for graduate degree credit. Conditions affecting the reproductive system in the cow, sow, ewe, and goat, with emphasis on symptomatology, pathophysiology, treatment, control, prevention, and herd health applications.—III. Rowe

446B. Equine Reproduction (1)
Lecture—6 sessions; laboratory—4 three-hour sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Approved for graduate degree credit. Discussion of special problems of equine reproduction with emphasis on methods of diagnosis and the interpretation of clinical and laboratory findings.—III. Ball

446C. Reproduction of Non-Domestic Animals (1)
Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Follows course 446A and provides information relating to reproduction in non-domestic mammals, birds, and reptile species. Concepts relating to the evaluation of reproductive status, diagnosis of infertility, assisted reproduction and contraception will be presented.—III. Lasley

450. HACCP and Risk Assessment in Pre- and Post-harvest Food Safety (3)
Lecture/discussion—3 hours. Prerequisite: a first year course in microbiology or food science or consent of instructor. Application of the Hazard Analysis-Critical Control Point (HACCP) system in the food industry, for regulatory agencies; and in the pre-harvest area of food production. Development of HACCP plans. (S/U grading only.)—II. Cliver

452. On-Farm Food Safety/Veterinary Public Health (2)
Lecture—20 sessions. Prerequisite: Master's of Preventive Veterinary Medicine students or consent of instructor. The organizations and regulations responsible for ensuring food safety, pathogens that may be on the farm and cause public health concerns, management systems that affect animal health, and key topics regarding environmental health relating to animal agriculture.—III. Cullor, Chomel, West

457. Veterinary Business Management (2)
Lecture—10 sessions. Prerequisite: first-, second-, third-, or fourth-year standing in School of Veterinary Medicine or consent of instructor. Information essential to the successful management of a veterinary practice. Topics include basic accounting, medical recordkeeping, money management, business and personal insurance, client relations and tax law. (S/U grading only.)—III. Klingborg

483. Pet Loss Support Rounds (1-2)
Discussion/laboratory—3-6 hours. Prerequisite: veterinary student status. Training and experience in responding to pet loss hotline callers who are experiencing grief associated with an animal's death. Students gain proficiency in supportive listening and referral to community resources and increase effectiveness in dealing with upset pet owners. (S/U grading only.)—I, II, III, summer. L. Hart

489. Personal, Financial and Professional Development (1)
Lecture—10 sessions. Prerequisite: student in the School of Veterinary Medicine or consent of instructor. Tools necessary to be personally successful as veterinary students, including developing self-insight, team building skills, resume development, interview skills and understanding of personal insurance and wills, budgeting and personal finance (including fundamental investment and debt concepts). (S/U grading only.)—II. Klingborg

Courses in Preventive Veterinary Medicine (MPM)

Professional Courses

402. Medical Statistics I (4)
Lecture—3 hours; laboratory—2 hours. Statistics in clinical, laboratory and population medicine: graphical and tabular presentation of data; probability; binomial, Poisson, normal, t-, F-, and Chi-square distributions; elementary nonparametric methods; simple linear regression and correlation; life tables. Microcomputer applications of statistical procedures in population medicine.—IV. Farver

403. Medical Statistics II (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 402 or the equivalent. Continuation of course 402. Analysis of variance in biomedical sciences; nonparametric methods; multiple regression; biomedical applications of statistical methods. Microcomputer applications to reinforce principles that are taught in lecture.—I. Farver

404. Medical Statistics III (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 403 or the equivalent, consent of instructor. Analysis of time dependent variation and trends, analysis of multiway frequency tables; logistic regression; survival analysis selecting the best regression equation; biomedical applications.—II. Farver

405. Principles of Epidemiology (4)
Lecture—4 hours. Prerequisite: course 402 or consent of instructor. Basic epidemiologic concepts and approaches to epidemiologic research, with examples from veterinary and human medicine, including outbreak investigation, infectious disease epidemiology, properties of tests, and an introduction to epidemiologic study design and surveillance. (Same course as Epidemiology 205A.)—I. Hird

405L. Epidemiology Laboratory (1)
Laboratory—10 hours. Prerequisite: course 405 (may be taken concurrently) with grade of C or better, course 412 with grade B- or better. A practical application of epidemiological methods using the microcomputer as a tool to solve problems. Utilizes spreadsheets and databases as tools to organize and analyze data. Emphasis on epidemiological methods introduced in course 405. Data sets provided.—I. Case

406A. Epidemiologic Study Design (3)
Lecture—1.5 hours; discussion—0.9 hours; laboratory—1.8 hours. Prerequisite: course 405/Epidemiology 205A, Epidemiology 205B. Builds on concepts presented in course 405. Concepts of epidemiologic study design—clinical trials, observational cohort studies, case control studies—introduced in course 405 and covered in more depth, using a problem-based format. Discussion of published epidemiologic studies. (Same course as Epidemiology 206.)—II. Hird

408A. Veterinary Research: Planning and Reporting (2)
Lecture—16 sessions; laboratory—4 sessions. Prerequisite: course 402 or Statistics 102 (with grade B- or better), course 412 and 405 or the equivalent (may be taken concurrently), ability to use commercial software in statistical and graphical applications. Planning, critical analysis, ethics, and written and oral communication of veterinary research—I. Thurmond

408B. Veterinary Research: Planning and Reporting (1)
Lecture—10 sessions. Prerequisite: course 408A. Planning, critical analysis, ethics, and written and oral communication of veterinary research.—II. Thurmond

412. Introduction to Information Management (3)
Lecture—10 sessions; laboratory—20 sessions. Prerequisite: Master's of Preventive Veterinary Medicine students, intermediate computer skills using word processing, spreadsheet, and presentation software. Introduction to information management. Emphasis on data quality and design of data applications. Specific topics include leadership skills and data collection, organization, storage, analysis and communication using software and information resources.—Sischo

426. Applied Epidemiologic Problem Solving (1)
Laboratory—3 hours. Prerequisite: grade of C or better in course 405L. Integration of epidemiologic and statistical methodology in a problem-solving approach to contemporary animal population health issues. Data validation and manipulation; descriptive statistical analysis using spreadsheets, database management, and Epi Info software. Builds on skills learned in courses 405L and 406.—II. Gardner

Courses in Surgical and Radiological Sciences (VSR)

Lower Division Course

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Course

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

290. Clinical Neurology/Neuropathology Conference (1)
Seminar—1.5 hours. Prerequisite: third- or fourth-year standing in the School of Veterinary Medicine, Veterinary Medicine Teaching Hospital, or UCDMC resident or graduate student in appropriate discipline. Discussion and review of neural and muscular pathology of selected cases from the Veterinary Medicine Teaching Hospital. (S/U grading only.)—I, II, III. Higgins, LeCouteur

292. Advanced Veterinary Neurology/ Neurosurgery (2)
Seminar—4 hours; weekly reading assignments; regular examinations. Prerequisite: House Officer in VMTH, UCDMC House Officers, graduate students in the School of Veterinary Medicine or School of Medicine, and 4th-year veterinary students with consent of instructor. Lectures/discussions/literature reviews of diagnosis and medical/surgical treatment of neurological diseases of animals. Relevant neurologic and neurosurgical topics from human medicine will be addressed. (S/U grading only.)—I, II, III, IV. LeCouteur

296. Small Animal Radiology Case Discussions (1)
Seminar—1 hour. Prerequisite: first or second year standing in the School of Veterinary Medicine or consent of instructor. The role of diagnostic radiology in the clinical setting and student interpretation of radiographs. May be repeated once for credit. (S/U grading only.)—I, II, III. Hornof

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Courses

400. Equine Radiographic Anatomy (1)
Autotutorial—1 hour. Prerequisite: first-, second-, or third-year standing in the School of Veterinary Medicine. Self-study of the radiographic anatomy displayed on the standard radiographic projections of the musculoskeletal system of the horse. (S/U grading only.)—I, II, III. Hornof

401. Small Animal Radiology Case Discussions (1)
Discussion—1 hour. Prerequisite: first-, second-, or third-year standing in the School of Veterinary Medicine. Role of diagnostic radiology in the clinical setting and student interpretation of radiographs. May be repeated once for credit. (S/U grading only.)—I, II, III. Hornof

402. Large Animal Radiology Case Discussions (1)
Discussion—1 hour. Prerequisite: first-, second-, or third-year standing in the School of Veterinary Medicine. The role of diagnostic radiology in the clinical setting and student interpretation of radiographs. May be repeated once for credit. (S/U grading only.)—I, II, III. Hornof

404A. Small Animal Radiology (2.9)
Lecture—17 sessions; discussion—12 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Introduction to radiographic interpretation as it relates to muscoskeletal, thoracic, and abdominal disorders of small animals. Assignment of unknown cases as practice in interpreting radiographic patterns described in lecture. (Deferred grading only, pending completion of sequence.)—II, III. Nyland

404B. Large Animal Radiology (1.6)
Lecture—12 sessions; discussion—4 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Orthopedic diseases of the horse and radiographic manifestations of common clinical syndromes known to the lay horseman such as laminitis, navicular disease, bucked shins and spavin. Common radiographic abnormalities in non equine large animal patients. The pharynx and skull of equine patients. Common radiographic patterns seen in both equine and non equine patients seen in large animal practice. Pattern recognition, the most common patterns and their differential diagnosis.—II. Herrgesell

405. Advanced Small Animal Abdominal Ultrasound (2.2)
Lecture—12 sessions; discussion—6 sessions; laboratory—4 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine,

course 406. The use of ultrasound for the diagnosis of common clinical diseases in both the abdomen and thorax. Examination techniques of the thorax and the abdomen covered in the laboratory sessions and examples of the abnormal presented in discussion.—II. Herrgesell

406. Small Animal Diagnostic Ultrasound (1.1)
Lecture—7 sessions; discussion—1 session; laboratory—3 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Ultrasound imaging physics, artifacts, machine controls, techniques of abdominal scanning and basic ultrasonographic anatomy. Lab sessions reinforce topics covered in lecture and provide hands on ultrasound experience.—I. Herrgesell

407R. Comparative Dentistry and Oral Surgery (2)
Discussion—2 hours. Prerequisite: residents in the Veterinary Medical Teaching Hospital; graduate students, veterinarians enrolled in training programs leading to board-certification in veterinary dentistry, AVDC Diplomates and dentists with consent of instructor. Review of current literature pertaining to comparative oral biology, surgery and medicine and related basic sciences; half of sessions based on topics assigned by course leader while other half consist of critical reviews of recent papers chosen by the participants. May be repeated once for credit. (S/U grading only.)—I, II, III. Verstraete

408. Special Procedures Rounds (2)
Discussion—6 hours. Prerequisite: a DVM degree and consent of instructor. Approved for graduate degree credit. Review of selected radiology cases from previous day. Specific radiographic changes and differential diagnosis are discussed, with participants leading the discussions. Special procedures such as angiography; nuclear medicine and ultrasound examinations are reviewed. May be repeated for credit. (S/U grading only.)—I, II, III.

409. Known Case Conference (1.5)
Discussion/demonstration—1.5 hours. Prerequisite: DVM degree and consent of instructor. Approved for graduate degree credit. Film review of current VM Teaching Hospital proven cases. Intended for radiology residents and others with background in diagnostic radiology. May be repeated for credit. (S/U grading only.)—I, II, III.

410. Current Topics in Radiological Sciences (1.5)
Lecture—1.5 hours. Prerequisite: DVM degree or consent of instructor. Fundamentals of radiological sciences for radiology residents. Topics will include series of in-depth lectures covering the broad spectrum of veterinary radiology/radiological sciences and related alternate imaging modalities. Clinically oriented but also including relevant research material. (S/U grading only.)—I, II, III, IV.

411R. Small Animal Orthopedics Conference (0.9)
Discussion—9 sessions. Prerequisite: house officers at the Veterinary Medical Teaching Hospital or completion of D.V.M. or equivalent. Graduate students with permission of instructor. Discussion of current cases and literature pertaining to small animal orthopedics. (S/U grading only.)—I, II, III. Schulz

413. Small Animal Dentistry (2.4)
Lecture—19 sessions; discussion—5 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Introduction to the principles of oral examination, pathophysiology and treatment of periodontitis, exodontics, basic oral soft tissue surgery dental emergencies, orthodontics, developmental and regressive dental conditions, endodontics, prosthodontics, advanced periodontal therapy, oral medicine and advanced oral surgery. (S/U grading only.)—I. Verstraete

415. Lameness in Dogs (1.3)
Prerequisite: third-year standing in the School of Veterinary Medicine. Discussion of lameness examination and detailed descriptions of common congenital and acquired disorders that cause lameness in dogs. Discussion of methods to diagnose and treat.—III. (III.) Watt

416. Equine Ultrasonology (1)
Lecture—8 sessions; discussion—2 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Familiarization with ultrasonographic diagnostic methodology and ultrasonologic features of common diseases of the major equine organ systems.—III. Whitcomb

416L. Equine Ultrasonology Lab (0.4)
Laboratory—4 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine and course 416 (concurrently). Ultrasonographic diagnostic methodology and ultrasonologic features of common diseases of the major equine organ systems.—III. Whitcomb

423. Comparative Ophthalmology (1.5)
Lecture—15 sessions. Prerequisite: Veterinary Medicine 422, third-year standing in School of Veterinary Medicine or consent of instructor. The diagnosis and treatment of commonly encountered eye diseases of common domestic animals.—III. Maggs

424. Case Studies in Veterinary Oncology (1)
Lecture—10 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. The internal medicine subspecialty of oncology. Clinical considerations and basic tenets of tumor biology. (S/U grading only.)—I. Madewell

425R. Veterinary Cancer Biology: Clinical Applications (1)
Seminar—10 sessions. Prerequisite: resident in the Veterinary Medical Teaching Hospital or consent of instructor, course 433. Survey of contemporary literature regarding the clinical management of important tumors in domestic animals and focus on diagnosis and treatment. (S/U grading only.)—I. Madewell

426R. Veterinary Cancer Biology: Mechanisms of Disease (1)
Seminar—10 sessions. Prerequisite: resident in the Veterinary Medical Teaching Hospital or consent of instructor, course 433. Survey of contemporary literature regarding the biology of cancer with particular reference to mechanisms underlying tumorigenesis in domestic animals. (S/U grading only.)—III. Madewell

432R. Graduate Veterinary Neurosurgery Seminar (1.5)
Lecture/laboratory—15 sessions. Prerequisite: small animal surgery residency program or the neurology/neurosurgery residency program in the School of Veterinary Medicine. Graduate students and residents in other disciplines with consent of instructor. Overview of the diagnosis and treatment of neurological disease in small animals with an emphasis on neurosurgery. Laboratory sessions allow residents to develop familiarity with anatomical landmarks and the neurosurgical skills necessary to perform a variety of neurosurgical procedures. May be repeated for credit. (S/U grading only.)—II, III. LeCouteur

450R. Veterinary Ophthalmology Slide Review (1)
Discussion—1 hour. Prerequisite: resident in Veterinary Medical Teaching Hospital Ophthalmology program or consent of instructor. Review and critical evaluation of 35 mm projection slides involving clinical and microscopic depictions of normal and abnormal conditions seen in the field of veterinary ophthalmology. Discussion of current treatment modalities, diagnostic capabilities and other related and relevant issues. (S/U grading only.)—I, II, III. Maggs, Hollingsworth

451R. Veterinary Ophthalmology Literature Review (1)
Discussion—1 hour. Prerequisite: resident in Veterinary Medical Teaching Hospital Ophthalmology program or consent of instructor. Survey and critical evaluation of contemporary literature in or related to the field of veterinary ophthalmology. (S/U grading only.)—I, II, III. Maggs, Hollingsworth

460. Emergency and Critical Patient Care (2)
Lecture—20 sessions. Prerequisite: third-year standing in School of Veterinary Medicine. Introduction to the essential and practical concepts of care for emergency and critically ill patients.—III. Haskins

461. Management of Small Animal Musculoskeletal Trauma (1.6)
Lecture—16 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine and Veterinary Medicine 460. Introduction to principles of small animal orthopedic surgery including: orthopedic anatomy and examination, orthopedic instrumentation, fracture management, traumatic joint disease and traumatic muscle and tendon disease.—II. Schulz

461L. Small Animal Orthopedic Surgery Laboratory (0.4)
Laboratory—4 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine and course 461 concurrently. Hands-on experience in application of external coaptation and basic principles of application of different types of fixation for fractures. (S/U grading only.)—II. Schulz

462. Radiographic Diagnosis: Small Animal (1)
Lecture—1 session; discussion—9 sessions. Prerequisite: course 404A, third-year standing in the School of Veterinary Medicine. Small animal radiographic case studies. Presentation and discussion of assigned cases before knowing the actual diagnosis. (S/U grading only.)—III. Hornof

463. Surgical and Anesthetic Considerations in Small Animal Soft Tissue Surgery (2.2)
Lecture—22 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Pathophysiology and surgical treatment of selected soft tissue diseases.—III. Gregory

464R. Principles of Veterinary Radiation Oncology (2)
Lecture—2 hours. Prerequisite: house officers in the Veterinary Medical Teaching Hospital. Graduate students or veterinary students with consent of instructor. Principles and practice of veterinary radiation therapy. Topics include physical methods of radiation therapy, biological effects of therapeutic radiation and applications in veterinary patients. (S/U grading only.) Offered in alternate years.—I. Theon

465R. Biology and Practice of Veterinary Radiation Oncology (2)
Lecture—2 hours. Prerequisite: house officers in the Veterinary Medical Teaching Hospital. Graduate students or veterinary students with consent of instructor. Principles and practice of veterinary radiation therapy. Topics include physical methods of radiation therapy, biologic effects of therapeutic radiation and applications in veterinary patients. (S/U grading only.) Offered in alternate years.—II. Theon

466. Large Animal Applied Anesthesiology (1.5)
Lecture—15 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine or consent of instructor. Applied clinical anesthesiology. Special techniques and consideration for anesthetizing a variety of species including horses, swine, ruminants, camelids, and large non-domestic species.—II. Hildebrand

467. Small Animal Anesthesiology (1.5)
Lecture—15 sessions. Prerequisite: third-year standing in School of Veterinary Medicine or consent of instructor. Approved for graduate degree credit. Presentation of material which is basic to safe clinical administration of anesthetic drugs to small animals. Clinical applications, indications and contraindications, and methods of use of common anesthetic drugs and techniques will be discussed.—II. Ilkiw

468. Equine Lameness and Radiology (4)
Lecture—40 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Principles for the clinical evaluation and radiographic interpretation of lameness disorders of the fore- and hindlimbs of horses. Methods used in large animal radiography and the latest techniques for managing and treating equine lameness. Anatomy and pathology of some areas of the musculoskeletal system.—III. MacDonald

468L. Equine Lameness and Radiology Laboratory (1.1)
Laboratory—11 sessions. Prerequisite: course 468 concurrently, third-year standing in School of Veterinary Medicine. Focus on clinical gait evaluation, and various diagnostic strategies for localizing lameness disorders in the fore- and hindlimbs of horses. Radiographs from clinical cases. Clinical evaluation and treatment of various disorders of the foot. Equine chiropractic and acupuncture therapy.—III. Galuppo

469. Equine Surgery (3)
Lecture—30 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Appropriate methods of diagnosis for surgical diseases, an understanding of different treatment options, and development of a framework for establishing a prognosis for the disease considering particular uses of horses.—II. Snyder

469L. Equine Surgery Laboratory (1.4)
Laboratory—8 sessions; discussion—6 sessions. Prerequisite: course 469 concurrently, third-year standing in School of Veterinary Medicine. Common equine surgical procedures and other techniques useful in equine practice. (S/U grading only.)—II. Van Hoogmoed

470R. Equine Surgery Journal Discussion (1)
Discussion—1 hour. Prerequisite: course 471R concurrently, resident in Veterinary Medical Teaching Hospital or consent of instructor. Current veterinary literature and other related topics in preparation for board certification in the American College of Veterinary Surgeons. Critical evaluation of journal articles for content, methodology and statistical methods. (S/U grading only.)—I, II, III. Galuppo

471R. Equine Surgery Case Management Conference (1)
Discussion—1.5 hours. Prerequisite: course 470R concurrently, resident in Veterinary Medical Teaching Hospital or consent of instructor. Discussion of soft tissue, orthopedic and lameness clinical disorders that focus on pathophysiology of disease, appropriate treatment options, and evaluation of prognosis. Simulation of mock oral examination for the American College of Veterinary Surgeons board examination. (S/U grading only.)—I, II, III. Galuppo

481R. Clinical Soft Tissue Surgery Conference (1)
Discussion—1 hour. Prerequisite: open to students with D.V.M. or equivalent degree who are residents in specialty training. Graduate students in a related discipline with consent of instructor. Review current medical literature and discuss presentation, diagnosis and treatment of small animal surgical conditions, review the morbidity and mortality of clinical cases and provide mock examinations in preparation for ACVS specialty boards. May be repeated for credit. (S/U grading only.)—I, II, III. Kyles

491. Anesthesia/Critical Care Basic Science Conference (1)
Discussion—1 hour. Prerequisite: postdoctoral, medical, or graduate student; consent of instructor. Advanced course in scientific foundations of animal anesthesia and critical care. Format is directed by discussion following reading of assigned material emphasizing foundations in pharmacology and physiology. (S/U grading only.)—I, II, III.

493. Anesthesia/Critical Care Case Management Conference (1)
Discussion—1 hour. Prerequisite: postdoctoral, medical or graduate student; consent of instructor. Discussion of Veterinary Medical Teaching Hospital case material to illustrate specific medical problems and their preventive and corrective management. (S/U grading only.)—I, II, III.

Viticulture and Enology

(College of Agricultural and Environmental Sciences)

James A. Wolpert, Ph.D., Chairperson of the Department

Department Office, 1023 Wickson Hall (530-752-0380)

http://wineserver.ucdavis.edu

Faculty

Douglas O. Adams, Ph.D., Associate Professor
Linda F. Bisson, Ph.D., Professor
David E. Block, Ph.D., Associate Professor *(Viticulture and Enology, Chemical Engineering)*
Roger B. Boulton, Ph.D., Professor *(Viticulture and Enology, Chemical Engineering)*
Susan E. Ebeler, Ph.D., Associate Professor
Hildegarde Heymann, Ph.D., Professor
Mark A. Matthews, Ph.D., Professor
David A. Mills, Ph.D., Assistant Professor
David R. Smart, Ph.D., Assistant Professor
M. Andrew Walker, Ph.D., Professor
Andrew L. Waterhouse, Ph.D., Professor
Larry E. Williams, Ph.D., Professor

Emeriti Faculty

L. Peter Christensen, Cooperative Extension Specialist, Emeritus
W. Mark Kliewer, Ph.D., Professor Emeritus
Ralph E. Kunkee, Ph.D., Professor Emeritus
Lloyd A. Lider, Ph.D., Professor Emeritus
Carole P. Meredith, Ph.D., Professor Emerita
Ann C. Noble, Ph.D., Professor Emerita
Harold P. Olmo, Ph.D., Professor Emeritus
Cornelius S. Ough, D.Sc., Professor Emeritus
Vernon L. Singleton, Ph.D., Professor Emeritus, *Academic Senate Distinguished Teaching Award*

Affiliated Faculty

Nick K. Dokoozlian, Ph.D., Lecturer, Associate Specialist in Cooperative Extension
Matthew W. Fidelibus, Ph.D., Assistant Specialist in Cooperative Extension
James T. Lapsley, Ph.D., Adjunct Associate Professor
James A. Wolpert, Ph.D., Specialist in Cooperative Extension

The Major Program

The Viticulture and Enology major provides an interdisciplinary education in the biological and physical principles underlying grape and wine production as well as practical knowledge of grape growing (viticulture) and wine making (enology). This program provides the knowledge base for problem-solving and decision-making in commercial grape and wine production.

Preparatory Requirements. Before transferring into the Viticulture and Enology major, students must complete the following courses with a grade of C- or better and with a combined grade point average of at least 2.5 at the University of California (at least 3.0 for similar courses taken at community college) for these and all other preparatory courses. In addition, students' overall GPA must be 2.25 or higher. All courses must be taken for a letter grade.

Biological Sciences 1A .....5 units
Chemistry 2A, 2B, 2C, 8A .....17 units
Mathematics 16A .....3 units
Physics 1A, 1B or 7A.....4-6 units

Recommendations. Completion of UC Davis equivalents of the following preparatory courses for the major are not required for entry but are highly recommended. Failure to complete these will delay entry into required upper division courses and may thus delay graduation. Some courses may be available at UC Davis during Summer Session.

Chemistry 8B.....4 units
Mathematics 16B .....3 units
Biological Sciences 1C .....5 units
Biological Sciences 102.....3 units

The Program. The curriculum builds upon a foundation of biology, chemistry, biochemistry and mathematics with specialized courses related to grape and wine production. To complete the program, students may choose to place particular emphasis on viticulture, enology or economics. Credit may also be earned for foreign language study and internships.

Career Alternatives. Graduates are qualified for a variety of vineyard and winery positions, including production management, quality control and research. Additionally they may work in related fields such as pest management, nursery production and analytical services.

B.S. Major Requirements

UNITS

English Composition Requirement..... 0-8
See College requirement..... 0-8

Breadth/General Education 24
See General Education requirement

Preparatory Subject Matter 41-51
Biological Sciences 1A, 1C..... 10
Chemistry 2A-2B-2C 15
Chemistry 8A, 8B 6
Agricultural Management and Rangeland Resources 21 or equivalent and adviser approval) 0-3
Mathematics 16A-16B..... 6
Physics 1A, 1B or 7A..... 4-6
Viticulture and Enology 2, 3 or equivalent and adviser approval) 0-5

Depth Subject Matter..... 50-53
Biological Sciences 102, 103..... 6
Microbiology 102, 102L..... 6
Agricultural Management and Rangeland Resources 120 or Food Science and Technology 117 or Statistics 100 or 106 3-4
Viticulture and Enology 101A, 101B, 101C, 110, 118 and, in consultation with the adviser, choose one of Viticulture and Enology 115, 116. If both are taken, one will count as a restricted elective in Area A. 14-15
Viticulture and Enology 123, 124, 125, 126, 128, 135 and in consultation with the adviser, choose 3 of the following courses: 123L, 124L, 125L, 126L, 128L. If more than 3 are taken, the extra courses will count as restricted electives in Area B..... 21-22

Restricted Electives 28
In consultation with adviser, choose 28 units from three of the following five areas. At least 12 units must be from one of the following areas: (A) Plant Science, (B) Food Science and Microbiology, or (C) Economics and Business.

A. Plant Science Area
The following lower division courses not listed among the prerequisites for the major are required or recommended for one or more of the restricted electives in this area: Agricultural Management and Rangeland Resources 2, Biological Sciences 1B, Food Science and Technology 2, Geology 50, Plant Biology 10A.

Biological Sciences 101, Entomology 110, Hydrologic Science 110, 117, 124, Molecular and Cellular Biology 126, Nematology 100, Plant Biology 111, 112, 123, 142, 143, 146, 154, 157, 158, 160, 171, 172, 172L , 176, Plant Pathology 120, 125, Soil Science 100, 102, 109, Viticulture and Enology 111, one of 115, 116 (whichever was not used for depth)

B. Food Science and Microbiology Area
The following lower division courses not listed among the prerequisites for the major are required or recommended for

one or more of the restricted electives in this area: Biological Sciences 1B, Physics 7B, 7C.

Biological Sciences 101, Food Science and Technology 102A, 102B, 104, 104L, 108, 109, 110A, 110B, Microbiology 140, 150, 155L, Viticulture and Enology 140, 190X. Viticulture and Enology 190X may be taken a maximum of twice for restricted elective credit.

C. Economics and Business Area
Agricultural and Resource Economics 100A, 112, 113, 118, 130, 140, 150, Economics 1A, 1B, Management 11A, 11B, Viticulture and Enology 111, 130

D. Language Area
Maximum 12 units, not counting course 1, of one of the following languages: French, German, Italian, Portuguese or Spanish. At least one course must be Intermediate or Conversational (qualifying Intermediate or Conversational courses are listed below:)

French 8, 21, 22, 23, 38, German 6, 11, 20, 21, 22, Italian 4, 5, Spanish 8, 21, 22, 28, 31, 32, 33,

Courses taught in English will not count as restricted electives in this major.

E. Internship Area
A maximum of 8 units of Viticulture and Enology 190, 192, 198, 199, 290 or 298 may be counted as restricted electives by prior arrangement with adviser. May be increased to 12 units in exceptional circumstances.

Unrestricted Electives.....16-37

Total Units for the Degree..... 180

Major Adviser. M. Matthews

Related Major Programs. Food Science and Technology, Agricultural Management and Rangeland Resources, and Crop Science.

Graduate Study. Several graduate groups offer programs of study leading to advanced degrees in the fields of viticulture and enology. For the M.S. or Ph.D. degree see Agricultural and Environmental Chemistry, Chemical Engineering, Ecology, Food Science, Genetics, Horticulture and Agronomy, Microbiology, Plant Biology, Plant Pathology, Soil Science, and Viticulture and Enology.

Courses in Viticulture and Enology (VEN)

Lower Division Courses

2. Introduction to Viticulture (2)
Lecture—2 hours. Fundamental principles of biology and culture of the grapevine including taxonomy, morphology, physiology, distribution, domestication, utilization, propagation, production systems, harvesting, and storage and processing of grapes. Successful completion of the course should prepare students for upper division courses in viticulture.—I. (I.) Williams

3. Introduction to Winemaking (3)
Lecture—3 hours. Overview of the history of wine, viticulture, fermentation, winery operations, the physiology of wine consumption, wines produced in California and other major wine-producing regions and the sensory evaluation of wine. GE credit: SciEng or SocSci.—I, II, III. (I, II, III.) Heymann, Waterhouse, Adams

90X. Lower Division Seminar (2)
Seminar—1 hour; term paper (required)/discussion. Prerequisite: lower division standing and consent of instructor. Introduction to current issues surrounding wine and health as they relate to diet, nutrition, and toxicology. May not be repeated for credit. GE credit: Wrt.

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

101A. Viticultural Practices (3)
Lecture—1.5 hours; discussion/laboratory—3.5 hours. Prerequisite: course 2. Identification, cultivation, and use of the major wine, table, raisin, and rootstock cultivars. Includes practices specific to the fall such as fruit contracts, maturity sampling, harvesting, cover crops, and soil-pests. One field trip required.—I. (I.) Walker

101B. Viticultural Practices (3)
Lecture—1.5 hours; discussion/laboratory—3.5 hours. Prerequisite: course 2. Theory, principles, and practices of pruning and grapevine propagation. Plant materials and the certification process, weed control and weed identification, wood diseases, and frost protection. One field trip required.—II. (II.) Walker

101C. Viticultural Practices (3)
Lecture—1.5 hours; discussion/laboratory—3.5 hours. Prerequisite: course 2. Field oriented experience in the principles and practices of grapevine production, including vineyard establishment, vine training, trellising, canopy management practices, irrigation and water management, and methods of crop adjustment for improvement of fruit quality. One field trip required.—III. (III.) Smart

110. Grapevine Growth and Physiology (3)
Lecture—3 hours. Prerequisite: course 2. Botanical aspects including morphology and domestication will precede lectures covering flower development and energy budget concepts. Impact of physiological variables such as photosynthesis translocation, mineral nutrition, and water relations on fruit ripening and composition will be covered.—II. (II.) Matthews

111. World Viticulture (3)
Lecture—3 hours. Prerequisite: upper division standing. Study of the diversity of viticulture, both geographical and historical. History of grape growing and its spread throughout the world will be covered, along with discussions of current viticultural practices in different parts of the world, including California.

111L. Critical Evaluation of Wines of the World (1)
Laboratory/discussion—3 hours. Prerequisite: course 111 (must be taken concurrently), course 125 with a grade of C or better. Critical analysis of wines produced in different parts of the world with emphasis on the relationship between sensory properties of the wines and factors associated with their place of origin. (P/NP grading only.)

115. Raisin and Table Grape Production (2)
Lecture—2 hours. Prerequisite: course 2. Overview of the raisin and table grape industries in California and other production areas of the world. Cultural practices associated with raisin and table grape production will also be discussed.—I. (I.) Williams

118. Grapevine Pests, Diseases and Disorders (3)
Lecture—3 hours. Prerequisite: course 2. Describes the various pests and diseases of vineyards throughout California. Pest/disease identification and control methods (to include sampling techniques) also will be discussed. Integrated management approach to pest control methods will be emphasized.—I. (I.) Williams

123. Analysis of Musts and Wines (2)
Lecture—2 hours. Prerequisite: Chemistry 2C and 8B or the equivalent. Students enrolled only in the lecture portion of this course are required to enroll in 1 unit of course 199 or 299. Restricted to upper division students majoring in fermentation science or viticulture and enology or graduate students in food science. Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking.—I. (I.) Ebeler

123L. Analysis of Musts and Wines Laboratory (2)
Laboratory—3 hours; independent study—3 hours. Prerequisite: Chemistry 2C and 8B or the equivalent, course 123 concurrently. Restricted to upper division students majoring in fermentation science or viticulture and enology or graduate students in food science; others by consent of instructor. Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. Laboratory exercises demonstrating various chemical, physical and biochemical methods. GE credit: Wrt.—I. (I.) Ebeler

124. Wine Production (2)
Lecture—2 hours. Prerequisite: course 3, 123 (may be taken concurrently), Biological Sciences 102. Principles and practices of making standard types of wines, with special reference to grape varieties used and methods of vinification.—I. (I.) Bisson

124L. Wine Production Laboratory (3)
Laboratory—3 hours; independent study—3 hours; term paper. Prerequisite: course 124 (may be taken concurrently). Restricted to undergraduate students in fermentation science, viticulture and enology, biotechnology, microbiology, food science and applied plant biology or graduate students in food science, agricultural and environmental chemistry and horticulture. Current technologies used in production of California table wines; analysis and monitoring of impact of fermentation variables on microbial performance and product quality; student-designed independent research project.—I. (I.) Bisson

125. Wine Types and Sensory Evaluation (2)
Lecture—2 hours. Prerequisite: Agricultural Management and Rangeland Resources 120 or Food Science and Technology 117, course 124. Introduction to principles of sensory evaluation and application to wines. Investigations of factors influencing wine flavor, data from sensory analysis of model solutions.—III. (III.) Heymann

125L. Sensory Evaluation of Wine Laboratory (2)
Laboratory—3 hours; term paper. Prerequisite: course 125 (may be taken concurrently). Restricted to upper division majors in fermentation science or viticulture and enology or graduate students in food science. Sensory evaluation of wines and model systems using discrimination tests, ranking, descriptive analysis and time-intensity analysis. Data analyzed by appropriate statistical tests and results interpreted in extensive weekly lab reports.—III. (III.) Heymann

126. Wine Stability (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 124. Restricted to students in viticulture and enology, fermentation science, applied plant biology majors, or graduate students in food science, microbiology, horticulture, and horticulture and agronomy. Principles of equilibria and rates of physical and chemical reactions in wines; treatment of unstable components in wines by absorption, ion exchange, refrigeration, filtration, and membrane processes; and protein, polysaccharide, tartrate, oxidative, and color stabilities.—II. (II.) Boulton

126L. Wine Stability Laboratory (2)
Laboratory—3 hours; independent study—3 hours. Prerequisite: course 126 (may be taken concurrently). Restricted to upper division fermentation science, viticulture and enology majors, or graduate students in food science, agricultural and environmental chemistry, microbiology or by consent of instructor. Practical application of principles of equilibria and rates of physical and chemical reactions to wine stability.—II. (II.) Boulton

128. Wine Microbiology (2)
Lecture—2 hours. Prerequisite: courses 123 and 124; Microbiology 102 and 102L, or Food Science and Technology 104 and 104L; courses 125 and 126 recommended. Nature, development, physiology, biochemistry, and control of yeasts and bacteria involved in the making, aging and spoilage of wine.—II. (II.) Mills

128L. Wine Microbiology Laboratory (2)
Laboratory—6 hours. Prerequisite: course 123, 124, and 128 (may be taken concurrently), Microbiology 102L or Food Science and Technology 104 and 104L; course 125 and 126 recommended. Restricted to upper division students in fermentation science,

viticulture and enology or graduate students in food science. Nature, development, physiology, biochemistry and control of yeasts and bacteria involved in the making, aging and spoilage of wine.—II. (II.) Mills

130. Management, Marketing, and Economics of the California Wine Industry (9)
Lecture—24 hours; lecture/discussion—4 hours; fieldwork—8 hours. Prerequisite: course 124. Introduction to management, marketing and economics of wine in the United States with particular emphasis on California. Reviews market segmentation and explores alternative strategies for grape acquisition, production, brand development, distribution, and social policy formation. GE credit: Wrt.—summer. (summer.)

135. Wine Technology and Winery Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 124. Restricted to upper division majors in fermentation science, viticulture and enology, or graduate students in food science. Course includes three field trips. Process technologies and process systems that are used in modern commercial wineries. Overview of winemaking systems; winemaking operations and equipment; barrel aging and barrel management; membrane separation processes; specialized contacting systems; cleaning and sanitation systems; process control systems; refrigeration systems; air conditioning and humidity systems; electrical systems; waste water systems; solid waste handling; work place safety.—III. (III.) Boulton, Block

140. Distilled Beverage Technology (3)
Lecture—3 hours. Prerequisite: Chemistry 8B; Food Science and Technology 110A. Distillation principles and practices; production technology of brandy, whiskey, rum, vodka, gin, and other distilled beverages; characteristics of raw materials, fermentation, distillation, and aging. Offered in alternate years.—(III.) Boulton

181. Readings in Enology (1)
Discussion—1 hour. Prerequisite: course 3. Critical evaluation of selected monographs in enology. Discussion leadership rotates among the students. May be repeated three times for credit. (P/NP grading only.)—III. (III.) Matthews

186. Fermentation Science (3)
Lecture—3 hours. Prerequisite: Microbiology 102, Biological Sciences 101. Basic principles of fermentation science and biotechnology with emphasis on industrial fermentation processes that generate useful products including fermented food and beverages, pharmaceuticals, fine chemicals, and other gene products.

190X. Winemaking Seminar (1)
Seminar—1 hour; discussion—1 hour. Prerequisite: course 3. Open to Viticulture and Enology majors and graduate students. Outside speakers on a specific winemaking topic chosen for the quarter. Discussion with the speaker hosted by the faculty member(s) in charge. May be repeated for credit up to 3 times. (P/NP grading only.)—III. (III.)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units. Work experience related to Fermentation Science (Enology) or Plant Science (Viticulture) majors. Internships must be approved and supervised by a member of the department or major faculty, but are arranged by the student. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

200. Introduction to Scientific Methods (2)
Lecture/discussion—1 hour; term paper. Prerequisite: graduate standing or consent of instructor. Processes involved in conducting scientific research. Topics include conducing literature review, formulating hypotheses, and analyzing and reporting results. Annotated bibliography and written and oral research proposal.—III. (III.)

210. Grape Development and Composition (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 102, 103. The anatomy, physiology and biochemistry of grape berry development, with emphasis on the development of grape composition relevant to winemaking. Offered in alternate years.—III. Adams, Polito

215. Sensometrics (3)
Lecture—3 hours. Prerequisite: Food Science and Technology 117 or the equivalent, course 125 and 125L or Food Science and Technology 107A or 107B. Experimental design and statistical analysis, including multivariate analysis, for both sensory and instrumental data in enology and food-related studies.—I. (I.) Heymann

216. Vineyard Establishment and Development (4)
Lecture/discussion—3 hours; fieldwork—3 hours; term paper. Prerequisite: courses 101A, 101B, 101C, and one of courses 115 or 116, and course 118 or consent of instructor; course 110, Soil Science 100, Atmospheric Science 133 and Agricultural and Resource Economics 140 recommended. Application of plant, meteorological, soil, water, and economic sciences to vineyard establishment and development. Preparation of a comprehensive study to determine the viticultural and economic feasibility of a given site for raisin, table, or wine grape production.—I. (I.) Dokoozlian

219. Natural Products of Wine (3)
Lecture—3 hours. Prerequisite: courses 123 and 124, or natural products background and consent of instructor. Structure, occurrence, and changes due to wine production to the natural products found in wine. Chemicals with a sensory impact will be emphasized, including flavonoids and other phenolics, terpenes and norisoprenoids, pyrazines, oak volatiles and other wine constituents.—II. (II.) Waterhouse

220. Secondary Nutrients, Chemistry (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Chemistry 8B, Biological Sciences 102. Introduction to phytochemicals with possible health or nutritional effects, with a focus on chemical structure, reactivity and occurrence in foods, including phenolics, glucosinylates, carotenoids and fiber. Students will give oral reports.

223. Instrumental Analysis of Must and Wine (4)
Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 123 or Food Science and Technology 103; Biological Sciences 102, Chemistry 107B or 115 recommended. Open to upper division students in Fermentation Science, Viticulture and Enology, or graduate students in Food Science, Agricultural and Environmental Chemistry or Viticulture and Enology. Theory and practice of instrumental analysis of wines and musts. Emphasis on the principles of analytical techniques (e.g., CE, GC, HPLC, Mass Spectrometry) and factors determining correct choice of instrumental method.—III. (III.) Ebeler

224. Advances in the Science of Winemaking (3)
Lecture—3 hours. Prerequisite: course 125, 126 and graduate standing or consent of instructor. Selected topics in the science and technology of winemaking. Topics drawn from current research of participating faculty. Critical analysis of the technical content of published material.—III. (III.) Block

225. Advanced Sensory Analysis of Wines (3)
Lecture/discussion—2 hours; laboratory—4 hours. Prerequisite: courses 124 and 125 (or Food Science and Technology 107) and Agricultural Management and Rangeland Resources 120 or the equivalent. Sensory descriptive analysis experiments will be designed and conducted using standard sensory science methods. Data will be analyzed by analyses of variance, principal component analyses and generalized Procrustes analysis to evaluate the judge's performance and interpret the significance of the results.—III. (III.) Heymann

235. Winery Design (4)
Lecture—2 hours; discussion—1 hour; independent study. Prerequisite: course 124, 135 or consent of instructor. Design of wineries. Includes process calculations, equipment selection, process layout and building choice and siting. Project scheduling, capital costs, and ten-year cash flow analysis for the winery. One field trip required. Offered in alternate years.—II. Boulton

270. Critical Evaluation of Scientific Literature (2)
Discussion—2 hours. Prerequisite: consent of instructor. Contemporary research topics in biological sciences. Discussion of recent research articles in a special topic area. Intended to develop skills in critical evaluation of scientific publications. May be repeated for credit. (S/U grading only.)—II, III. (II, III.) Bisson

290. Seminar (1)
Seminar—1 hour. Prerequisite: consent of instructor. (S/U grading only.)—I, III. (I, III.)

290C. Advanced Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Planning and results of research programs, proposals, and experiments. Discussion and critical evaluation of original research being conducted by the group. Discussion led by individual research instructors for research group. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291. Advanced Viticulture (2)
Lecture/discussion—2 hours. Prerequisite: course 110, 116, 124, 125; course 210 recommended. Critical evaluation of scientific and popular literature on selected topics of current interest that relate viticulture to fruit or wine sensory attributes or quality. May be repeated once for credit. Offered in alternate years.—(II.) Matthews

297T. Tutoring in Viticulture and Enology (1-5)
Prerequisite: graduate standing and consent of instructor. Designed for graduate students who desire teaching experience, but are not teaching assistants. Student contact primarily in laboratory or discussion sections, and under direction of a faculty member. (S/U grading only.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Courses

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.) I, II, III. (I, II, III.)

Viticulture and Enology (A Graduate Group)

Roger B. Boulton, Ph.D., Chairperson of the Group

Group Office, 1023 Wickson Hall (530-752-0380; Fax: 530-752-0382)

http://wineserver.ucdavis.edu

Faculty. See under Department of Viticulture and Enology.

Graduate Study. The M.S. program offers advanced studies in viticulture and enology, ranging from the genetics, physiology and biochemistry of grapevines to the chemistry, microbiology and sensory science of wines and the chemical engineering of winemaking. Graduate students will usually work on a project that requires at least two of these fields of science

and may involve grapevines, grapes, and wine or wine distillates. Topics can vary; examples include the molecular biology of grapevines, bacteria or yeast, the grape and wine chemistry associated with fermentation and aging and the correlation of analytical and sensory analyses. All application material must be received in the group office by February 15.

Ph.D. studies are offered through one of the following Graduate Groups: Agricultural and Environmental Chemistry, Chemical Engineering, Food Science, Horticulture and Agronomy, Genetics, Microbiology, and Plant Biology.

Preparation. Applicants to the program are required to have a level of competence equivalent to that of a strong science undergraduate program. This includes coursework in general chemistry, organic chemistry, calculus, statistics (analysis of variance), biochemistry, and microbiology. Specific requirements are outlined in detail and may be obtained from the group office or Web site.

Graduate Advisers. R.B. Boulton, S.E. Ebeler.

War–Peace Studies

(College of Letters and Science)

The interdisciplinary minor in War-Peace Studies examines the causes and dynamics of intra- and international wars and efforts to prevent and settle such conflicts.

Students in the minor are encouraged to participate in the educational activities of the Davis Program of the UC Institute on Global Conflict and Cooperation (IGCC).

The minor is sponsored by the International Relations Program.

Minor Program Requirements:

UNITS

War-Peace Studies 19-20

One or two courses from each of the following areas:

Approaches:
Anthropology 123AN, 126B, Comparative Literature 157, Philosophy 115, 118, Physics137/Applied Science Engineering 137, Political Science 121, 123, 124,132, 176, Sociology 119, 157, Women's Studies 102

Northern and Western Regions:
History 134A, 138C, 142, 143, 144A, 144B, 145, 170B, 171B, 174B, Native American Studies 130B, Political Science 130, 131

Southern and Eastern Regions:
Anthropology 142, 143A, 143B, 144, History 165, 191F, 194C, Native American Studies 120, Political Science 126, 134, 145, 149, 178

Restriction: No more than two courses from a single department may be offered in satisfaction of the minor requirements.

Advising. International Relations Program, 752-3063.

Water Science

See Hydrologic Sciences; Hydrology; and Soil and Water Science

Wildlife, Fish, and Conservation Biology

(College of Agricultural and Environmental Sciences)

Dirk Van Vuren, Ph.D., Chairperson of the Department

Department Office, 1088 Academic Surge (530-752-6586)

http://wfcb.ucdavis.edu

Faculty

Daniel W. Anderson, Ph.D., Professor
Louis W. Botsford, Ph.D., Professor
Tim Caro, Ph.D., Professor
Joseph J. Cech, Jr., Ph.D., Professor
John M. Eadie, Ph.D., Professor
Deborah L. Elliott-Fisk, Ph.D., Professor
Douglas A. Kelt, Ph.D., Associate Professor
A. Peter Klimley, Ph.D., Associate Adjunct Professor
Peter B. Moyle, Ph.D., Professor
Dirk Van Vuren, Ph.D., Professor
Rosie Woodroffe, Ph.D., Assistant Professor

Emeriti Faculty

Ronald E. Cole, B.S., Lecturer Emeritus
Don C. Erman, Ph.D., Professor Emeritus
Nancy A. Erman, M.S., Lecturer Emerita
Walter E. Howard, Ph.D., Professor Emeritus
Nadine K. Jacobsen, Ph.D., Professor Emerita
Rex E. Marsh, A.B., Lecturer Emeritus

Affiliated Faculty

Christopher M. Dewees, Ph.D., Marine Fisheries Specialist in Cooperative Extension, Lecturer
Andrew Engilis, Jr., B.S., Principal Museum Scientist
Lee E. Fitzhugh, Ph.D., Wildlife Enhancement Specialist in Cooperative Extension
Terrell P. Salmon, Ph.D., Wildlife Damage Specialist in Cooperative Extension
Lisa C. Thompson, Ph.D., Assistant Specialist in Cooperative Extension
Desley A. Whisson, Ph.D., Associate Vertebrate Pest Ecology Specialist in Cooperative Extension

The Major Program

The Wildlife, Fish, and Conservation Biology major deals with the relationships between the requirements of wildlife and the needs of people. Understanding these relationships is vital for the maintenance of ecological diversity, recreational resources, and food supplies.

The Program. The major emphasizes broad training in biological and physical sciences, with specialization in one of nine areas. The major is primarily for students interested in becoming professionals in wildlife, fish, and conservation biology, but its breadth of course requirements, when combined with electives, also make it suitable as a preparatory major for such areas as veterinary medicine and secondary school teaching. Certification by professional societies such as The Wildlife Society, American Fisheries Society, or the Ecological Society of America or preparation for specialized resource-related graduate studies may also be achieved by careful planning of electives with a faculty adviser.

Career Alternatives. Positions now held by graduates in this major include wildlife, fisheries, management of problem vertebrates, and resource biologists and managers with local, state and federal agencies. Some graduates are biologists or consultants with private industries such as commercial fishing businesses, electrical utilities, sportsman's clubs, aquaculture operations, and environmental consulting firms. Also, some are veterinarians, medical physicians, and professors/researchers who teach and/or conduct research in academic institutions.

B.S. Major Requirements:

UNITS

Written/Oral Expression 8
English 1 4
Communication 1 4
Above requirements simultaneously satisfy the College requirements.

Preparatory Subject Matter 47-53
Biological Sciences 1A, 1B, 1C 15
Chemistry 2A, 2B, 8A, 8B 16
Mathematics 16A, 16B 6
Physics 1A, 1B or 7A, 7B, 7C 6-12
Statistics 100, 102 or Agricultural Management and Rangeland Resources 120 .. 4

Breadth/General Education 6-24
Satisfaction of General Education requirement

Depth Subject Matter 49-61
Students graduating with this major are required to attain at least a C average (2.0) in all courses taken at the university in depth subject matter.

Environmental Science and Policy 100 or Evolution and Ecology 101 4
Evolution and Ecology 100 4
Biological Sciences 101 4
Neurobiology, Physiology, and Behavior 101 5
Anatomy, Physiology, and Cell Biology 100 or Evolution and Ecology 105 3-4
Choose three lecture courses and two (laboratory) courses. Wildlife, Fish, and Conservation Biology 110, (110L), 111, (111L), 120, (120L), or Evolution and Ecology 134, (134L) 12-13
Wildlife, Fish, and Conservation Biology 122 and Neurobiology, Physiology, and Behavior 102, and either Wildlife, Fish, and Conservation Biology 121 or 130 11-12
Choose one course (two recommended) from Statistics 104, 106 or 108 3-8
Wildlife, Fish, and Conservation Biology 100, or 101 and 101L, or 102 and 102L 3-7

Restricted Electives 9-34
Choose one from the nine Areas of Specialization shown below. Students must maintain a C average (2.0 GPA) and pass all course work in their chosen specialization.

Areas of Specialization

1. Behavioral ecology: Complete Wildlife, Fish, and Conservation Biology 141. Choose one course from Neurobiology, Physiology, and Behavior 150 or Entomology 104. Choose two courses from Animal Science 103, 104, 105, Anthropology 101, 122A, 128A, 154A, 154B, Neurobiology, Physiology, and Behavior 152, 159, 162, Psychology 127, or Wildlife, Fish, and Conservation Biology 151.

2. Conservation biology: Complete Wildlife, Fish, and Conservation Biology 154 and 155. Choose one course from Environmental Science and Policy 161, 166, 170 or 171. Choose one course from a or b:

a. Plant Biology 117, Environmental Horticulture 160, Evolution and Ecology 117, 147, or Wildlife, Fish, and Conservation Biology 156;

b. Evolution and Ecology 115, 138, or Wildlife, Fish, and Conservation Biology 157, 158.

3. Ecotoxicology and disease ecology: Complete Wildlife, Fish, and Conservation Biology 153, 158 and either Biological Sciences 102, 103 or Animal Biology 102, 103. Choose one course from a or b:

a. Environmental Toxicology 101, 112A (112B recommended) or 138;

b. Pathology, Microbiology, and Immunology 101, Medical Microbiology 115 or 116.

4. Fisheries biology: Complete Wildlife, Fish, and Conservation Biology 102, 102L, 120, 120L and 121. Complete one of the following options:

Option 1: Complete Environmental Science and Policy 116 or Evolution and Ecology 115; complete the Bodega Marine Lab Spring Quarter Program.

Option 2: Complete Biological Sciences 102, 103, or Animal Biology 102, 103; complete one course from a and one course from b:

a. Entomology 116, Evolution and Ecology 112-112L or Environmental Science and Policy 151L;

b. Environmental Science and Policy 116, 151, Evolution and Ecology 115, Geology 175, Hydrologic Science 122, or Wildlife, Fish, and Conservation Biology 157.

Option 3: Complete one course from Entomology 116, Evolution and Ecology 112-112L or Environmental Science and Policy 151L. Choose four courses from Environmental and Resource Sciences 100, Environmental Science and Policy 116, 151, Evolution and Ecology 115, Geology 175, Hydrologic Science 122, 143 or Wildlife, Fish, and Conservation Biology 157.

5. Physiological ecology: Complete Wildlife, Fish, and Conservation Biology 121 and 130 and either Biological Sciences 102, 103 or Animal Biology 102, 103. Choose two courses from Neurobiology, Physiology, and Behavior 126, 127, 128, 140 or 141.

6. Wildlife damage management: Complete Wildlife, Fish, and Conservation Biology 152, Agricultural Management and Rangeland Resources 105, Evolution and Ecology 104, and choose one course from Nature and Culture 140 or Veterinary Medicine 170.

7. Wildlife biology: Complete Wildlife, Fish, and Conservation Biology 100 or 101-101L, Wildlife, Fish, and Conservation Biology 151, and two courses from Evolution and Ecology 134L or Wildlife, Fish, and Conservation Biology 110L or 111L; and

a. Choose one course from Plant Biology 102, 108, 117, 144, 147, 178, or Evolution and Ecology 117; and

b. Choose one course from Agricultural Management and Rangeland Resources 130, Environmental Science and Policy 155, Environmental Horticulture 160, Wildlife, Fish, and Conservation Biology 155, 156 or 157; and

c. Choose two courses from Environmental Science and Policy 121, Wildlife, Fish, and Conservation Biology 136, 152, 153, 154 or 158.

8. Population Dynamics: Complete Mathematics 16C (17A-17B-17C or 21A-21B-21C recommended), Statistics 108, Environmental Science and Policy 121 and Engineering 6. Complete one additional upper division statistics course (e.g. Statistics 104, 106; note that Statistics 100, 102 do not fulfill this requirement).

9. Individualized: Students may, with prior approval of their adviser and the curriculum committee, design their own individualized specialization within the major. The specialization will consist of 4-6 courses with a common theme.

Unrestricted Electives.....0-62

Total Units for the Degree (minimum)..... 180

Major Adviser. D. Kelt

Students transferring to Davis from another institution or new students declaring the major of Wildlife, Fish, and Conservation Biology must consult the Master Adviser so that their program can be evaluated and a faculty adviser assigned. See the receptionist in 1088 Academic Surge Building or telephone 754-4323.

Graduate Study. See the Graduate Studies chapter in this catalog.

Courses in Wildlife, Fish and Conservation Biology (WFC)

Lower Division Courses

10. Wildlife Ecology and Conservation (4)
Lecture—3 hours; discussion—1 hour. Introduction to the ecology and conservation of vertebrates. Complexity and severity of world problems in conserving biological diversity. GE credit: SciEng, Div, Wrt.—I. (I.) Moyle, Kelt

11. Introduction to Conservation Biology (3)
Lecture—3 hours. Introduction to conservation biology and background to the biological issues and controversies surrounding loss of species and habitats for students with no background in biological sciences. GE credit: SciEng, Wrt.—III. (III.) Caro, Elliott-Fisk

92. Internship (1-6)
Internship—3-18 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the department. Internships supervised by a member of the faculty. (P/NP grading only.)

Upper Division Courses

100. Field Methods in Wildlife, Fish, and Conservation Biology (4)
Lecture—2 hours; laboratory—3 hours; fieldwork—3 hours. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 and consent of instructor. Introduction to field methods for monitoring and studying wild vertebrates and their habitats, with an emphasis on ecology and conservation. Required weekend field trips.—III. (III.) Anderson, Eadie, Kelt, Van Vuren

101. Field Research in Wildlife Ecology (2)
Lecture/discussion—2 hours. Prerequisite: one upper division course in each of ecology, statistics, and ornithology, mammology, or herpetology and consent of instructor. Field research in ecology of wild vertebrates in terrestrial environments; formulation of testable hypotheses, study design, introduction to research methodology, oral and written presentation of results. Limited enrollment. Offered in alternate years. GE credit: Wrt.—I. Anderson, Eadie, Kelt, Van Vuren

101L. Field Research in Wildlife Ecology: Laboratory (4)
Lecture/discussion—2 hours; field work—15 hours. Prerequisite: consent of instructor, course 101 (may be taken concurrently), and one upper division course in each of ecology, statistics, and ornithology, mammalogy, or herpetology. Field research in ecology of wild vertebrates in terrestrial environments; testing ecological hypotheses through field research, application of research methodology, supervised independent research projects. Held between Labor Day and fall quarter. Limited enrollment. Offered in alternate years.—I. Anderson, Eadie, Kelt, Van Vuren

102. Field Studies in Fish Biology (1)
Lecture/discussion—1 hour. Prerequisite: upper division course in each of ecology, aquatic biology, fish biology, and statistics, and consent of instructor. Emphasis on theory of quantitative fish capture methods and design of individual research projects on ecology, behavior, physiology or population biology of fishes. Offered in alternate years.—III. Moyle, Cech

102L. Field Studies in Fish Biology: Laboratory (6)
Fieldwork—15 hours; laboratory—12 hours; discussion/laboratory—3 hours. Prerequisite: course 102, upper division course in each of ecology, aquatic biology, fish biology, and statistics, and consent of instructor. Field investigations of fish biology are emphasized including quantitative capture methods and individual research projects on ecology, behavior, physiology or population biology of fishes at the field site in relation to their habitats. Offered in alternate years. (Deferred grading only, pending completion of projects.) GE credit: SciEng, Wrt.—III. Moyle, Cech

110. Biology and Conservation of Wild Mammals (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, Evolution and Ecology 101 or Environmental Science and Policy 100. Origins, evolution, diversification, and geographical and ecological distributions of mammals. Morphological, physiological, reproductive, and behavioral adaptations of mammals to their environment.—III. (III.) Kelt

110L. Laboratory in Biology and Conservation of Wild Mammals (2)
Laboratory—6 hours. Prerequisite: course 110 (may be taken concurrently) and consent of instructor. Laboratory exercises in the morphology, systematics, species identification, anatomy, and adaptations of wild mammals to different habitats. Limited enrollment.—III. (III.) Kelt

111. Biology and Conservation of Wild Birds (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, and Evolution and Ecology 101. Phylogeny, distribution, migration, reproduction, population dynamics, behavior and physiological ecology of wild birds. Emphasis on adaptations to environments, species interactions, management, and conservation.—I. (I.) Anderson, Eadie

111L. Laboratory in Biology and Conservation of Wild Birds (2)
Laboratory—6 hours. Prerequisite: course 111 (may be taken concurrently); consent of instructor. Laboratory exercises in bird species identification, anatomy, molts, age and sex, specialized adaptations, behavior, research, with emphasis on conservation of wild birds. Limited enrollment.—I. (I.) Anderson, Eadie

120. Biology and Conservation of Fishes (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1B. Evolution, ecology, and conservation of marine and freshwater fishes.—I. (I.) Moyle

120L. Laboratory in Biology and Conservation of Fishes (1)
Laboratory—3 hours. Prerequisite: course 120 (may be taken concurrently). Morphology, taxonomy, conservation, and identification of marine and freshwater fishes with emphasis on California species. Limited enrollment.—I. (I.) Moyle

121. Physiology of Fishes (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: upper division courses in nutrition and physiology or consent of instructor. Comparative physiology, growth, reproduction, behavior, and energy relations of fishes. GE credit: SciEng, Wrt.—II. (II.) Cech

122. Population Dynamics and Estimation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16A-16B; Statistics 13 or the equivalent; an upper division course in ecology. Description of bird, mammal and fish population dynamics, modeling philosophy, techniques for estimation of animal abundance (e.g., mark-recapture, change-in-ratio, etc.), mathematical models of populations (e.g., Leslie matrix, logistic, dynamic pool, stock-recruitment); case histories.—III. (III.) Botsford

130. Physiological Ecology of Wildlife (4)
Lecture—4 hours. Prerequisite: course 110, 111, or 120; Neurobiology, Physiology and Behavior 101; and Evolution and Ecology 101. Animal functions, adaptations, and ecological energetics of wildlife. Nutrition, metabolism, and productivity are emphasized as a pattern of relationships for understanding the distribution and abundance of wild ectotherms

and endotherms in time and space. Not offered every year.—II. (II.)

136. Ecology of Waterfowl and Game Birds (3)
Lecture—2 hours; laboratory—3 hours; field trip. Prerequisite: courses 111 and 111L or the equivalent. Detailed examination of distribution, behavior, population dynamics, and management of waterfowl and upland game birds. Offered in alternate years.—(II.) Eadie

141. Behavioral Ecology (4)
Lecture—3 hours; film viewing—1 hour. Prerequisite: Evolution and Ecology 101. Basic theories underlying the functional and evolutionary significance of behavior, and the role of ecological constraints. Supporting empirical evidence taken mainly from studies of wild vertebrates. Offered in alternate years.—(II.) Caro

151. Wildlife Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences, 1A, 1B, 1C or the equivalents; course 110L or 111L recommended. Ecology of wild vertebrates, including habitat selection, spatial organization, demography, population growth and regulation, competition, predation, and community dynamics, set in the context of human-caused degradation of environments in North America.—I. (I.) Van Vuren

152. Ecological Management of Problem Wildlife (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, and 1C, or the equivalent. Ecological approaches to managing wild vertebrates that cause problems for agriculture, public health, or conservation of biodiversity. Offered in alternate years.—II. Van Vuren

153. Wildlife Ecotoxicology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: introductory courses in organic chemistry, ecology, and physiology, or consent of instructor; Environmental Toxicology 101 recommended. Various forms of environmental pollution in relation to fish and wildlife, the effects and mechanisms of pollutants, effects on individuals and systems, laboratory and field ecotoxicology, examples/case histories, philosophical/management considerations. Offered in alternate years. GE credit: SciEng, Wrt.—II. Anderson

154. Conservation Biology (4)
Lecture—3 hours; term paper (will be one or more book reviews). Prerequisite: Evolution and Ecology 101 or Environmental Studies 100 or the equivalent. An introduction to conservation biology and background to the biological issues and controversies surrounding loss of species and habitats. Offered in alternate years.—(I.) Woodroffe

155. Habitat Conservation and Restoration (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: introductory ecology course; course 154 and Environmental Horticulture 160 recommended. Analysis of the characteristics of wildlife and fish habitats, the conservation of habitats, and restoration. GE credit: SciEng, Wrt. Offered in alternate years.—(II.) Elliott-Fisk

156. Plant Geography (4)
Lecture—3 hours; laboratory—3 hours; term paper. Field trips will be substituted for some in-lab activities. Prerequisite: Environmental Science and Policy 100 or Evolution and Ecology 101; Plant Biology 102 or 108 strongly recommended. Survey of the geographical distribution of vegetation types and habitats, with consideration of the environmental and historical factors that determine these patterns. Conservation and management approaches. Analytical field and lab techniques introduced. Offered in alternate years. GE credit: SciEng, Wrt.—II. Elliott-Fisk

157. Coastal Ecosystems (4)
Lecture—3 hours; laboratory/fieldwork—3 hours. Prerequisite: Environmental Studies 100 or Evolution and Ecology 101; course work in organismal biology, physical geography, and geology recommended. Overview of costal ecosystems, physical and biological elements and processes, and coastal zone dynamics, including sandy, rocky and muddy shorelines, estuaries, dunes and coastal watersheds. Discussion of the role of historical factors and conservation, restoration, and management approaches. Not offered every year.—(II.) Elliott-Fisk

158. Infectious Disease in Ecology and Conservation (3)
Lecture—3 hours. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or Veterinary Medicine 409 or the equivalent. Introduction to the dynamics and control of infectious disease in wildlife, including zoonotic diseases and those threatening endangered species. Basic epidemiological models and their applications. Role of scientists in developing disease control policies. Offered in alternate years.—III. Woodroffe

190. Departmental Research Seminar (1)
Seminar—1 hour. Prerequisite: upper division standing in the biological sciences. Reports and discussions of recent advances related to wildlife and fisheries biology. May be repeated for credit up to 3 times. (P/NP grading only.)—I, II, III.

191. Museum Science (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: upper division standing and consent of instructor. Principles and methods required to preserve and present biological specimens for research, teaching collections, and museums. Offered in alternate years. (P/NP grading only.)—II. Engilis

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the department. Internships supervised by a member of the faculty. (P/NP grading only.)

195. Field and Laboratory Research (3)
Laboratory—6 hours; discussion—1 hour. Prerequisite: course 110L, 111L, or 120L; 121 or 130; Evolution and Ecology 101 or the equivalent; and consent of instructor. Critique and practice of research methods applied to field and/or laboratory environments of wild vertebrates. Students work independently or in small groups to design experimental protocol, analyze data, and report their findings. May be repeated twice for credit.—I, II, III. (I, II, III.)

197T. Tutoring in Wildlife and Fisheries (1-5)
Prerequisite: major in Wildlife, Fish, and Conservation Biology and consent of instructor. Experience in teaching under guidance of faculty member. (P/NP grading only.)

198. Directed Group Study (1-5)
(P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

222. Advanced Population Dynamics (3)
Lecture—3 hours. Prerequisite: graduate standing; advanced course in ecology (e.g., Evolution and Ecology 101), population dynamics (e.g., course 122), and one year of calculus; familiarity with matrix algebra and partial differential equations recommended. Logical basis for population models, evaluation of simple ecological models, current population models with age, size, and stage structure, theoretical basis for management and exemplary case histories. Emphasis on development and use of realistic population models in ecological research. Not offered every year.—II. (II.) Botsford

223. Conservation Biology and Animal Behavior (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: Ecology 208 or Animal Behavior 221. Influences of concepts of animal behavior (functional, evolutionary, developmental, mechanistic, and methodological issues) on conservation biology theory and practice. Offered in alternate years. (III.)—Caro

290. Seminar (1-3)
Seminar—1-3 hours. Prerequisite: consent of instructor. Seminar devoted to a highly specific research topic in any area of wildlife or fisheries biology. Special topic selected for a quarter will vary depending on interests of instructor and students. (S/U grading only)—I, II, III. (I, II, III.)

290C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Weekly conference on research problems, progress and techniques in wildlife and fishery sciences. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

291. Seminar in Aquatic Ecology (2)
Seminar—2 hours. Prerequisite: graduate standing in biology. Presentation and analysis of assigned topics in aquatic ecology emphasizing fish, fisheries and aquatic conservation. Offered in alternate years. (S/U grading only.)—III. (III.) Moyle

292. Physiology of Fishes Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing and at least two courses in physiology; consent of instructor. Seminar devoted to current topics concerning the physiological functioning of fishes. May be repeated twice for credit. (S/U grading only.)—I. (I.) Cech

293. Seminar in Wildlife Disease Ecology (2)
Seminar—2 hours. Prerequisite: graduate standing or advanced undergraduate in biology. Presentation and analysis of assigned research papers on disease ecology of wild vertebrates related to considerations of habitat quality, population regulation, wildlife management, and/or implications for human or domestic animal health. (S/U grading only.)—II. (II.)

294. Behavioral Ecology of Predators and Prey (3)
Seminar—2 hours. Prerequisite: graduate standing. Presentation and analysis of research papers on social and foraging behavior of predatory animals, antipredator strategies of prey species, co-evolution of predators and prey, and ecology of predator prey interactions. May be repeated twice for credit. (Same course as Animal Behavior 294.) Offered in alternate years.—II. Caro

295. Seminar in Wildlife Ecotoxicology (3)
Seminar—2 hours; term paper. Prerequisite: graduate standing in biology. Presentation and analysis of assigned and searched research papers on transport, exposure, and effects of environmental contaminants on wildlife-associated ecosystem components, especially at individual/population levels. Specific subjects vary each offering. Offered in alternate years. (S/U grading only.)—II. Anderson

297T. Supervised Teaching in Wildlife and Fisheries Biology (1–3)
Tutorial—3–9 hours. Prerequisite: meet qualifications for teaching assistant; graduate standing; and consent of instructor. Tutoring and teaching students in undergraduate courses in Wildlife, Fish, and Conservation Biology. Weekly conferences with instructor; evaluations of teaching; preparing for and conducting demonstrations, laboratories, and discussions; preparing and grading examinations. May be repeated for a total of 6 units when a different course is tutored. (S/U grading only.)

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only.)

Students transferring to Davis from another institution or new students declaring the major of Wildlife, Fish, and Conservation Biology must consult the Master Adviser so that their program can be evaluated and a faculty adviser assigned. See the receptionist in 1088 Academic Surge Building or telephone 754-4323.

Graduate Study. See the Graduate Studies chapter in this catalog.

Wine Production

See Fermentation Science; Food Science and Technology; Microbiology; Viticulture and Enology

Women and Gender Studies

(College of Letters and Science)

Leslie Rabine, Ph.D. Program Director

Program Office, 2222 Hart Hall (530-752-4686)

http://wms.ucdavis.edu/wgssite/index.htm

Committee in Charge

Gayatri Gopinath, Ph.D. *(Women and Gender Studies)*
Wendy Ho, Ph.D. *(Asian American Studies, Women and Gender Studies)*
Suad Joseph, Ph.D. *(Anthropology, Women and Gender Studies)*
Susan Kaiser, Ph.D. *(Textiles and Clothing, Women and Gender Studies)*
Caren Kaplan, Ph.D. *(Women and Gender Studies, Cultural Studies)*
Anna K. Kuhn, Ph.D. *(Women and Gender Studies)*
Kimberly Nettles, Ph.D. *(Women and Gender Studies)*
Judith Newton, Ph.D. *(Women and Gender Studies)*
Leslie Rabine, Ph.D. *(Women and Gender Studies)*
Juana Rodriguez, Ph.D. *(Women and Gender Studies)*
Margaret Swain, Ph.D. *(Center for Gender and Global Issues)*

Faculty

Gayatri Gopinath, Ph.D., Assistant Professor
Wendy Ho, Ph.D., Associate Professor *(Asian American Studies, Women and Gender Studies)*
Carole Joffe, Ph.D., Professor *(Sociology, Women and Gender Studies)*
Suad Joseph, Ph.D., Professor *(Anthropology, Women and Gender Studies)*
Susan Kaiser, Ph.D., Professor *(Textiles and Clothing, Women and Gender Studies)*
Anna K. Kuhn, Ph.D., Professor
Kimberly Nettles, Ph.D., Assistant Professor
Judith Newton, Ph.D., Professor
Leslie Rabine, Ph.D., Professor
Juana Rodriguez, Ph.D., Associate Professor

The Major Program

Women's Studies is an interdisciplinary major founded on the premise that gender is a historically variable construction that centrally shapes the historical experience and everyday lives of women as well as men. Women's Studies also assumes that gender, race, class, and sexual and national identities are constructed in relation to each other. The intersections of these categories of experience as well as the history of debate over what these categories mean is an important strand of the Women's Studies curriculum. Women's Studies at UC Davis is particularly rich in faculty doing comparative, cross-cultural work on women and gender. Among the faculty offering courses for the major are scholars working on women and gender in Africa, the Caribbean, the Americas, China, Europe, Japan, India, various countries of the Middle East, Southeast Asia, and the United States.

The Program. Students majoring in this field may take courses in African American and African studies, American studies, anthropology, comparative literature, English, history, linguistics, Chicana/o studies, political science, psychology, sociology, Asian American studies, Native American studies, French, German, Italian, Spanish, textiles and clothing, and other related disciplines. Depending on individual career goals, each student will design a program in consultation with an adviser.

Career Alternatives. The B.A. degree in Women's Studies provides excellent grounding for undergraduates with career aspirations in law, medicine, public administration, and social services. Students wishing to pursue doctoral work will also find that interdisciplinary training in Women's Studies equips them with theoretical and methodological strengths in most disciplines and applied research fields. Increasingly, specialists in Women's Studies are being used as consultants in industry, higher education, insurance companies, and personnel firms. State and federal government agencies require people who have special training in understanding gender relations. Finally, educational institutions need specialists to develop and administer women's studies programs, women's centers, and other institutional structures designed specifically to study and assist women.

Women's Studies

A.B. Major Requirements:

UNITS

Preparatory Subject Matter 20

Two courses from Women's Studies 20, 50, 60, 70 8

Three courses selected from the following: African American and African Studies 10, 15, American Studies 1E, 1F, Anthropology 2, 20, 21, Art History 15, Asian American Studies 1, 2, Chicana/o Studies 10, 50, Classics 15, Comparative Literature 12, Dramatic Art 1, English 30A or 30B, 45, 46A or 46B or 46C, History 72A, 72B, Humanities 10, Native American Studies 1, 10, Nature and Culture 1, Political Science 7, Psychology 1, Science and Society 1, 15, Sociology 1, 2, 3, Textiles and Clothing 7, Women's Studies 80 12

Depth Subject Matter..... 44

Women's Studies 103, 104, 190 and one additional upper division Women's Studies course..... 16

Cross-Cultural Requirement..... 16

Choose four courses (at least one from each category). Courses used to meet this requirement may not duplicate those used to meet other Women's Studies major requirements. The list that follows represents a partial list of options; other courses may be included with the consent of the Women's Studies Adviser.

Ethnic Studies: Women of Color in the United States
African American and African Studies 123, 133, Anthropology 139, Asian American Studies 112, Chicana/o Studies 111, 122, 131, Native American Studies 134, 180, Sociology 134, 172, Women's Studies 160, 180.

Cultures Outside the United States
Anthropology 130, 131, 148B, Comparative Literature 135, 138, 159, English 185A, 185B, French 133, German 112A, 128A, 129, History 102G, 102H, 148A, 148B, Italian 141, Russian 142, Sociology 145B, Women's Studies 102, 182, 184.

Historical Material Prior to 1900
African American and African Studies 123, Asian American Studies 112, English 185A, History 148A, 148B, Italian 141, Native American Studies 180.

Gender-based Courses..... 12

Choose one of two tracks: Disciplinary or Thematic. Courses used to meet this requirement may not duplicate those used to meet other Women's Studies major requirements.

Disciplinary track

Choose three courses from one of the following focus groups:

Anthropology focus:
Anthropology 129, 130, 131, 134, 139, 148B, 158, Women's Studies 102, 182, 184.

History focus:
African American and African Studies 123, Asian American Studies 112, English 185A, History 102H, 102G, 148A, 148B, Italian 141, Native American Studies 180.

Literature and Language focus:
Comparative Literature 135, 138, 159, English 185A, 185B, French 133, German 112A, 128A, 129, Italian 141, Linguistics 163, Russian 142, Women's Studies 180.

Sociology and Psychology focus:
Anthropology 129, Chicana/o Studies 122, Psychology 149, Sociology 131, 132, 134, 145B, 172, Women's Studies 187.

Thematic track

In consultation with a Women's Studies adviser, choose three courses that form a thematic cluster (for example, Gender and Race in the United States; The Cultural Representations of Gender; Gender and Public Policy; Gender and Global Issues; Gender and Autobiography; The Body, Theory and Representation; Sexualities; Gender and Science). Other clusters may be developed in consultation with a Women's Studies adviser.

Total units for the major..... 64

Major Adviser. All Women's Studies majors and minors must consult with a faculty adviser, individually, at least once each academic year.

Minor Program Requirements:

UNITS

Women's Studies 24

Women's Studies 20, 50, 60, 70 or 80..... 4

Choose one from African American and African Studies 123, 133, Anthropology 139, Asian American Studies 112, Chicana/o Studies 102, 111, 122, 131, Native American Studies 134, 180, Sociology 134, 172, Women's Studies 160, 180... 4

Choose one from Anthropology 130, 131, 148B, Comparative Literature 135, 138, 159, English 185A, 185B, French 133, German 112, 128A, 129, History 148A, 148B, Italian 141, Russian 142, Sociology 145B, Women's Studies 102, 182, 184 4

Additional Electives from approved list of upper division cross-listed and Women's Studies courses..... 12

Note: With prior consultation with an adviser, other upper division courses may be accepted toward the minor program. Under no circumstances may more than one lower division course be offered in satisfaction of requirements for the minor.

Minor Adviser. All Women's Studies majors and minors must consult with a faculty adviser, individually, at least once each academic year.

Graduate Study. The Women's Studies Program offers a designated emphasis in Feminist Theory and Research for students enrolled in the Ph.D. programs of twelve other affiliated departments. See "Feminist Theory and Research."

Courses in Women's Studies (WMS)

Lower Division Courses

20. Cultural Representations of Gender (4)
Lecture/discussion—4 hours. Prerequisite: one course specified for the Women's Studies major. Interdisciplinary investigation of how specific cultures represent gender difference. Examine a variety of cultural forms and phenomena including film, television, literature, music, popular movements, and institutions. GE credit: ArtHum, Div, Wrt.—III. (III.)

25. Gender and Global Cinema (4)
Lecture—3 hours; film viewing—3 hours. The role gender plays in film history/culture in various geo-

graphical contexts and in aspects of contemporary globalization. Films from nations such as China, Colombia, Cuba, Ethiopia, India, Iran, Korea, New Zealand, and the U.S. GE credit: ArtHum, Div, Wrt.—II. (II.) Projansky

50. Introduction to Women and Gender Studies (4)
Lecture—3 hours; discussion—1 hour. Interdisciplinary introduction surveys and integrates anthropological, artistic, cultural studies, historical, legal, literary, philosophical, psychological, scientific, and sociological perspectives on the study of gender and its relationship to race, sexuality, class, and other aspects of social experience. GE credit: ArtHum or SocSci, Div, Wrt.—I, II, III.

60. Introduction to Feminist Interpretations of Western Thought (4)
Lecture/discussion—4 hours. A critical introduction to major traditions of social thinking in the West from a feminist perspective. Not offered every year. GE credit: ArtHum or SocSci, Div, Wrt.—Kuhn, Rabine

70. Theory and History of Sexualities (4)
Lecture/discussion—4 hours. Key issues in the social construction, organization, and reproduction of sexualities such as the intersection of sexual identity with gender, race, ethnicity, and class, and the relation between movements for sexual liberation and the regulation of the body. GE credit: ArtHum or SocSci, Div.—(I.)

80. Special Topics in Women's Studies (4)
Lecture/discussion—4 hours. In-depth examination of a women's studies topic related to the research interest of the instructor. May be repeated for credit when topic differs. Limited enrollment.

90X. Lower Division Seminar (2)
Seminar—2 hours. Examination of a special topic in Women's Studies through shared readings, discussions, and written assignments. Offered in alternate years.

91. Research Seminar in the Transnational Production and Consumption of Fashion (1-2)
Seminar—1-2 hours. Preparation for a research conference. May be repeated for credit when topic varies.—II. (II.) Kaiser, Rabine, Freitas

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

102. Colonialism, Nationalism, and Women (4)
Lecture/discussion—4 hours. Prerequisite: one course specified for Women's Studies major. Explores key dimensions of women's relationship to colonialism and nationalism in one or more societies. GE credit: SocSci, Div.—I.

103. Introduction to Feminist Theory (4)
Lecture/discussion—4 hours. Prerequisite: one course specified for the Women's Studies major. Introduction to the emergence of feminist theory and to key concepts in feminist theorizing. Examination of past and current debates over sexuality, race, identity politics, and the social construction of women's experience.—I. (I.)

104. Feminist Approaches to Inquiry (4)
Lecture/discussion—4 hours. Prerequisite: one course specified for the Women's Studies major. Feminist applications and transformations of traditional disciplinary practices; current issues and methodologies in feminist interdisciplinary work.—II. (II.)

130. Feminism and the Politics of Family Change (4)
Lecture/discussion—4 hours. Prerequisite: any Women's Studies course or Sociology 131 or 132. An examination of contemporary conflicts over family values and the changing family from a feminist perspective. Offered in alternate years. GE credit: ArtHum or SocSci, Div.—(II.)

137. Feminist Interpretations of Contemporary Western Thought (4)
Lecture/discussion—4 hours. Prerequisite: one course in Women's Studies, or consent of instructor. Introduction to deciphering, demystifying, and interpreting poststructuralist, postmodern, and postcolonial thought from a feminist perspective: applications to gender, race, sexuality, and class. Not offered every year. GE credit: ArtHum or SocSci, Div, Wrt.—Kuhn, Rabine

138. Transnational Studies of Dress, Fashion, and Gender (4)
Lecture/discussion—4 hours. Prerequisite: one course in Women's Studies or Textiles and Clothing 7, 107, or 174. Dress and fashion as cultural communication, aesthetic expression, capitalist commodity. History, sociology, semiotics of fashion. Fashion as means of gender oppression and liberation. Use of dress in identity construction across cultures. Clothing workers on the global assembly line. Not offered every year. GE credit: ArtHum or SocSci, Div, Wrt.—Rabine, Kaiser

139. Feminist Cultural Studies (4)
Lecture/discussion—4 hours. Prerequisite: one course in Women's Studies or American Studies. The histories, theories, and practices of feminist traditions within Cultural Studies. (Same as course American Studies 139.) GE credit: SocSci, Div, Wrt.—(II.)

140. Gender and Law (4)
Lecture/discussion—4 hours. Prerequisite: one course in Women's Studies. Exploration of women's legal rights in historical and contemporary context, discussing a variety of legal issues and applicable feminist theories. Topics include constitutional equal protection, discrimination in employment and education, sexual orientation discrimination, and the regulation of abortion. GE credit: SocSci, Div.—III.

158. Contemporary Masculinities (4)
Lecture/discussion—4 hours. Prerequisite: one course specified for the Women's Studies major. A multicultural study of contemporary trends in masculinity and the economic, social and political forces that have shaped them. Topics may include men's movements, ethnic nationalist masculinities, and images of masculinity in popular culture. GE credit: ArtHum or SocSci, Div.—III.

160. Representations of Women of Color in Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 20 or another film course. The representations of women of color in commercial and independent films from a feminist perspective. GE credit: ArtHum, Div.—(III.)

162. Feminist Film Theory and Criticism (4)
Lecture/discussion—3 hours; film-viewing—3 hours. Prerequisite: one course from the Women's Studies major and Humanities 10 or consent of instructor. Historical overview of and contemporary issues in feminist film theory, including representation, spectatorship, and cultural production. Film stars, women filmmakers, and the intersections of gender, race, sexuality, and class in films and their audiences. Offered in alternate years. GE credit: ArtHum, Div.—III. Projansky

164. Topics in Gender and Cinematic Representation (4)
Lecture/discussion—3 hours; film-viewing—3 hours. Prerequisite: one course from the Women's Studies major and Humanities 10 or consent of instructor. Examination of a specific topic within the broad rubric of gender and cinema. Possible topics include Latinas in Hollywood; gender, nation, cinema; and gender and film genre. Topics vary. May be repeated twice for credit when topic differs. Offered in alternate years. GE credit: ArtHum, Div.—Projansky, Gopinath

170. Queer Studies (4)
Lecture/discussion—4 hours. Prerequisite: course 20, or 50, or 70, or consent of instructor. Study of queer sexualities, identities, theories, practices. Alternative sexualities as historical, social, and cultural constructions in intersections with race, gender, class, nationality. Interdisciplinary exploration of sexual liberation and the regulation of sexuality through history, theory and expressive cultural forms. GE credit: ArtHum, or SocSci, Div, Wrt. Not offered every year.—Gopinath, Rodriguez

178A-F. Transnationalism and Writing by Women of Color (4)
Lecture/discussion—4 hours. Prerequisite: one course in Women's Studies, or consent of instructor. Writings by women of color in a transnational framework, understood in their cultural, socio-economic, and historical contexts. The interrelation among gender, writing, nationalism, and transnationalism, with focus on women's writing in specific geographic/national locations and their diasporas: **(A)** The Arab World; **(B)** Asia; **(C)** The Caribbean; **(D)** Africa; **(E)** Diasporic Women Writers in Europe; **(F)** Topics on Women Writers of Color. Not offered every year. GE credit: ArtHum, Div, Wrt.

179. Gender and Literature (4)
Lecture/discussion—4 hours. Prerequisite: one course in Women's Studies, or consent of instructor. Role of literature, especially novels, in constructing, challenging, and transforming normative genders in society. Transhistorical and transnational focus on gender in its intersections with race, class, sexuality, and politics. Not offered every year. GE credit: ArtHum, Div, Wrt.—Gopinath, Ho, Kuhn, Nettles, Newton, Rabine, Rodriguez

180. Women of Color Writing in the United States (4)
Lecture/discussion—4 hours. Prerequisite: course 20 or 50. Literature, especially novels, written by contemporary women of color in the United States, understood in their socio-economic, cultural and historical contexts. GE credit: ArtHum, Div.—II.

182. Globalization, Gender and Identity (4)
Lecture/discussion—4 hours. Prerequisite: course 50. Feminist theories on affects of gender on self and identity and cross cultural study as it intersects gender with race, class, ethnicity. Impact of globalization processes on gender and identity. Offered in alternate years. GE credit: SocSci, Div, Wrt.—III.

184. Gender in the Arab World (4)
Lecture/discussion—4 hours. Prerequisite: course 50. Examination of the history, culture, and social/political/economic dynamics of gender relations and gendering in the Arab world. GE credit: SocSci, Div, Wrt.—II.

187. Gender and Social Policy (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing and a course in Women's Studies. The role of gender in the creation of social policies, especially with respect to issues brought into the policy arena by contemporary feminism. Offered in alternate years. GE credit: SocSci, Div.—(III.)

189. Special Topics in Women and Gender Studies (4)
Lecture/discussion—4 hours. Prerequisite: one course from the Women's Studies major. In-depth examination of a women's studies topic related to the research interests of the instructor. May be repeated once for credit when topic differs. Not offered every year.—I. Newton, Projansky

190. Senior Seminar (4)
Seminar—4 hours. Prerequisite: senior standing in Women's Studies. Capstone course for senior Women's Studies majors, which focuses on current issues on feminism as they impact theory, public policy, and practice.—III. (III.)

191. Capstone Seminar (4)
Seminar—4 hours. Prerequisite: course 104 or Textiles and clothing 107, and course 194HA, course 199, or Textiles and Clothing 199, or consent of instructor. Revision, completion, and presentation of senior research or creative project. Creating a multimedia website for publishing research and creative projects. GE credit: Wrt.—III. (III.) Kaiser, Rabine

192. Internship in Women's Studies (1-12)
Internship—3-36 hours; written report. Prerequisite: completion of a minimum of 84 units and consent of instructor; enrollment dependent on availability of intern positions with priority to Women's Studies majors. Supervised internship and study in positions/institutional settings dealing with gender-related problems or issues, as for example, a women's center, affirmative action office, advertising agency, or social welfare agency. Final written report on internship experience. (P/NP grading only.)

193. Gender and Global Issues Internship Seminar (2)
Seminar—2 hours. Prerequisite: course 192 concurrently. The ethics of working in communities and community projects, emphasizing feminist understandings of activism, communities, globalization, multiculturalism, and the politics of institutions, agencies, and organizations. May be repeated for credit. (P/NP grading only.)—I, II, III. (I, II, III.) Swain

194HA-194HB. Senior Honors Project in Women's Studies (4-6)
Independent study—12 hours. Prerequisite: senior standing, Women's Studies major, and adviser's approval. In consultation with an adviser, students complete a substantial research paper or significant creative project on a Women's Studies topic. (Deferred grading only, pending completion of sequence.)

195. Thematic Seminar in Women's Studies (4)
Seminar—4 hours. Prerequisite: two courses specified for women's studies major. Group study of a topic, issue or area in feminist theory and research involving intensive reading and writing. May be repeated for credit when topic differs. Limited enrollment. GE credit: ArtHum or SocSci, Div.—III.

197T. Tutoring in Women's Studies (1-4)
Tutoring—3-12 hours. Prerequisite: upper division standing and consent of director. Leading small, voluntary discussion groups affiliated with a Women's Studies course. May be repeated for credit for a total of 8 units. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)

Graduate Courses

200A. Current Issues in Feminist Theory (4)
Seminar—4 hours. Current issues in feminist theory; techniques employed to build feminist theory in various fields.—I. (I.)

200B. Problems in Feminist Research (4)
Seminar—4 hours. Prerequisite: course 200A with a grade of B+ or better. Application of feminist theoretical perspectives to the interdisciplinary investigation of a problem or question chosen by the instructor(s). May be repeated for credit when subject area differs.—II. (II.)

201. Special Topics in Feminist Theory and Research (4)
Lecture/discussion—4 hours. Explores in depth a topic in feminist theory and research related to the research interests of the instructor. May be repeated for credit when topic differs. Limited enrollment.—(III.)

250. Cultural Study of Masculinities (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Interdisciplinary approaches to understanding the social and cultural construction of masculinities; attention to the effects of biology, gender, race, class, sexual and national identities; criticism of oral, printed, visual, and mass mediated texts, and of social relations and structures. (Same course as American Studies 250.)—Newton, Mechling

299. Special Study for Graduate Students (1-12)
(S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Zoology

See Evolution and Ecology

GENERAL EDUCATION OPTIONS/COURSES

UCDAVIS




2004–2005 · 2005–2006

Topical Breadth: Assigned Subject Areas for Majors and Minors

Arts and Humanities

Majors

African American and African Studies
American Studies
Art History
Art Studio
Asian American Studies (Humanities emphasis)
Chicana/Chicano Studies (Cultural emphasis)
Chinese
Classical Civilization
Comparative Literature
Design
Dramatic Art
English
French
German
History
Italian
Japanese
Landscape Architecture
Medieval Studies
Music
Native American Studies
Philosophy
Religious Studies
Russian
Spanish
Women's Studies

Minors

African American and African Studies
American Studies
Art History
Art Studio
Asian American Studies
Chicana/Chicano Studies
Chinese
Classical Civilization
Comparative Literature
Dramatic Art
English
Film Studies
French
German
Global and International Studies (Arts and Humanities emphasis)
Greek
History
Italian
Japanese
Jewish Studies
Latin
Medieval Studies
Music
Native American Studies
Philosophy
Religious Studies
Russian
Social and Ethnic Relations
Spanish
Women's Studies

Science and Engineering

Majors

Agricultural Management and Rangeland Resources
Animal Biology
Animal Science
Animal Science and Management
Anthropology (B.S. degree only)
Applied Mathematics
Applied Physics
Atmospheric Science
Avian Sciences
Biochemistry and Molecular Biology
Biological Sciences
Biotechnology
Cell Biology
Chemistry
Clinical Nutrition
Computer Science
Crop Science and Management
Engineering (all majors)
Entomology
Environmental Biology and Management
Environmental Horticulture and Urban Forestry
Environmental and Resource Sciences
Environmental Toxicology
Evolution and Ecology
Exercise Biology
Fermentation Science
Fiber and Polymer Science
Food Biochemistry
Food Science
Genetics
Geology
Hydrology
Mathematical and Scientific Computation
Mathematics
Microbiology
Natural Sciences
Nature and Culture
Neurobiology, Physiology, and Behavior
Nutrition Science
Physics
Plant Biology
Psychology (B.S. degree)
Range and Wildlands Science
Soil and Water Science
Statistics
Viticulture and Enology
Wildlife, Fish and Conservation Biology

Minors

Agricultural Entomology and Bee Biology
Agricultural Systems and Environment
Animal Biology
Animal Genetics
Anthropology (Biological Emphasis)
Apiculture
Applied Biological Systems Technology
Applied Computing and Information Systems
Aquaculture
Atmospheric Science
Avian Sciences
Biological Sciences
Chemistry
Community Nutrition
Computer Science
Dairy/Livestock
Environmental Geology
Environmental Horticulture
Environmental Toxicology
Equine
Exercise Biology
Fiber and Polymer Science
Food Service Management
Fungal Biology and Ecology
Geographic Information Systems
Geographic Studies
Geology
Geophysics
Hydrology
Insect Biology
Insect Ecology and Evolution
Landscape Restoration
Mathematics
Medical-Veterinary Entomology
Nature and Culture
Nematology
Nutrition and Food
Nutrition Science
Physics
Plant Biology
Precision Agriculture
Recreation
Science and Society
Soil Science
Statistics

Social Sciences

Majors

Anthropology (A.B. degree)
Asian American Studies (Social Sciences emphasis)
Chicana/Chicano Studies (Social /Policy Studies emphasis)
Communication
Community and Regional Development
East Asian Studies
Economics
Environmental Policy Analysis and Planning
Human Development
International Agricultural Development
International Relations
Linguistics
Managerial Economics
Political Science
Political Science–Public Service
Psychology (A.B. degree)
Sociology
Sociology–Organizational Studies
Textiles and Clothing

Minors

Aging and Adult Development
Agricultural Economics
Anthropology (Social–Cultural Emphasis)
Anthropology (General Emphasis)
Communication
Community Development
Contemporary Leadership
East Asian Studies
Economics
Education
Environmental and Natural Resource Economics
Environmental Policy Analysis
Global and International Studies (Social Science emphasis)
History and Philosophy of Science
Human Development
International Agricultural Development
Linguistics
Managerial Economics
Managerial Economics General
Political Science
Psychology
Science and Society
Sociology
Textiles and Clothing
War–Peace Studies

General Education Courses

Arts & Humanities

African American and African Studies 12 ..... D W
African American and African Studies 15 ..... D W
African American and African Studies 16 ..... D W
African American and African Studies 50 ..... D W
African American and African Studies 52 ..... D W
African American and African Studies 100 ..... D
African American and African Studies 107A ..... D W
African American and African Studies 107B ..... D W
African American and African Studies 107C ..... D W
African American and African Studies 111 ..... D W
African American and African Studies 123 ..... D
African American and African Studies 150A ..... D
African American and African Studies 150B ..... D
African American and African Studies 152 ..... D W
African American and African Studies 160 ..... D
African American and African Studies 162 ..... D W
African American and African Studies 163 ..... D W
African American and African Studies 168 ..... D
African American and African Studies 169 ..... D
African American and African Studies 170 ..... D W
African American and African Studies 171 ..... D
American Studies 1A ..... D W
American Studies 1B † ..... D W
American Studies 1C † ..... D W
American Studies 1E † ..... D W
American Studies 5 † ..... W
American Studies 10 † ..... D W
American Studies 21 ..... D W
American Studies 30 † ..... D W
American Studies 110 † ..... D W
American Studies 120 † ..... D W
American Studies 130 † ..... D W
American Studies 132 † ..... D W
American Studies 151 † ..... D W
American Studies 152 † ..... D W
American Studies 153 † ..... D W
American Studies 154 † ..... D W
American Studies 155 † ..... D W
American Studies 156 † ..... D W
American Studies 157 † ..... D W
American Studies 158
Art History 1A
Art History 1B
Art History 1C ..... D
Art History 1D ..... D
Art History 1DV ..... D
Art History 5 ..... D W
Art History 10
Art History 25 ..... ‡
Art History 110 ..... W
Art History 150 ..... D
Art History 151 ..... D
Art History 152 ..... D
Art History 153 ..... D W
Art History 163A ..... D W
Art History 163B ..... D W
Art History 163C ..... D W
Art History 163D ..... D W
Art History 164 ..... D W
Art History 168 ..... W
Art History 172A ..... W
Art History 172B ..... W
Art History 173 ..... W
Art History 175 ..... D W
Art History 176A ..... W
Art History 176B ..... W
Art History 177A ..... W
Art History 177B ..... W
Art History 178A ..... W
Art History 178B ..... W
Art History 178C ..... W
Art History 179B ..... W
Art History 182 ..... W
Art History 183A
Art History 183B ..... D W
Art History 183C ..... D W
Art History 184 ..... W
Art History 185 ..... D W
Art History 186 ..... D W
Art History 188A ..... D W
Art History 188B ..... W
Art History 188D ..... W
Art History 188E ..... W
Art History 189 ..... D W
Art Studio 10
Art Studio 30 ..... D W
Art Studio 132A ..... W
Art Studio 132B ..... D W
Art Studio 147 ..... W
Art Studio 148 ..... W
Art Studio 149 ..... D W
Art Studio 150 ..... W
Asian American Studies 112 † . D
Asian American Studies 130 .... D
Chicana/o Studies 111
Chicana/o Studies 154 ..... D
Chicana/o Studies 160 ..... D
Chicana/o Studies 181 ..... D W
Chinese 10 ..... D W
Chinese 11 ..... D W
Chinese 50 ..... D W
Chinese 104 ..... D W
Chinese 105 ..... D W
Chinese 106 ..... D W
Chinese 107 ..... D W
Chinese 108 ..... D W
Chinese 109A ..... D W
Chinese 109B ..... D W
Chinese 109C ..... D W
Chinese 109D ..... D W
Chinese 109E ..... D W
Chinese 109F ..... D W
Chinese 109G ..... D W
Chinese 109H ..... D W
Chinese 109I ..... D W
Chinese 110 ..... D W
Classics 1 ..... W
Classics 2 ..... W
Classics 3 ..... W
Classics 10
Classics 15 ..... D W
Classics 20 ..... W
Classics 50 ..... W
Classics 102 ..... W
Classics 110 ..... W
Classics 140 ..... W
Classics 141 ..... W
Classics 142 ..... W
Classics 143 ..... W
Classics 150 ..... W
Classics 171 ..... D W
Classics 172A ..... W
Classics 172B ..... W
Classics 173 ..... W
Classics 174 ..... W
Classics 175 ..... D W
Classics 190 ..... W
Comparative Literature 1 ..... *
Comparative Literature 2 ..... *
Comparative Literature 3 ..... *
Comparative Literature 4 ..... D *
Comparative Literature 5 ..... D W
Comparative Literature 6 ..... D W
Comparative Literature 7 ..... D W
Comparative Literature 8 ..... W
Comparative Literature 9 ..... D W
Comparative Literature 12 ..... D W
Comparative Literature 13 ..... W
Comparative Literature 14 ..... W
Comparative Literature 20 ..... W
Comparative Literature 25 ..... D W
Comparative Literature 53A .... D W
Comparative Literature 53B .... D W
Comparative Literature 53C .... D W
Comparative Literature 120 ..... W
Comparative Literature 135 .... D W
Comparative Literature 138 .... D W
Comparative Literature 140 ..... W
Comparative Literature 141 ..... W
Comparative Literature 144 ..... W
Comparative Literature 145 ..... W
Comparative Literature 146 ..... W
Comparative Literature 147 .... D W
Comparative Literature 151 .... D W
Comparative Literature 152 .... D W
Comparative Literature 153 .... D W
Comparative Literature 154 .... D W
Comparative Literature 157 ..... W
Comparative Literature 158 ..... W
Comparative Literature 159 .... D W
Comparative Literature 160A ..... W
Comparative Literature 160B ..... W
Comparative Literature 161A ..... W
Comparative Literature 161B ..... W
Comparative Literature 163 ..... W
Comparative Literature 164A ..... W
Comparative Literature 164B ..... W
Comparative Literature 164C ..... W
Comparative Literature 164D ..... W
Comparative Literature 165 .... D W
Comparative Literature 166 .... D W
Comparative Literature 166A ..... W
Comparative Literature 166B ..... W
Comparative Literature 167 ..... W
Comparative Literature 168A ..... W
Comparative Literature 168B ..... W
Comparative Literature 169 ..... W
Comparative Literature 170 ..... W
Comparative Literature 180 ..... W
Critical Theory 101 ..... W
Design 1 ..... W
Design 40A ..... W
Design 40B ..... W
Design 100 ..... W
Design 142A ..... W
Design 142B ..... W
Design 143 ..... W
Design 144 ..... W
Dramatic Art 1
Dramatic Art 20
Dramatic Art 150 ..... D W
Dramatic Art 154 ..... D W
Dramatic Art 155 ..... D W
Dramatic Art 156A ..... D W
Dramatic Art 156B ..... D W
Dramatic Art 156C ..... D W
East Asian Studies 88 ..... D W
East Asian Studies 113 ..... D W
English 3 ..... *
English 4 ..... W
English 30A ..... D W
English 30B ..... D W
English 105 ..... W
English 106
English 107 ..... W
English 111 ..... W
English 113A ..... W
English 113B ..... W
English 117A ..... W
English 117B ..... W
English 117C ..... W
English 118 ..... W
English 139 ..... D W
English 156 ..... W
English 160 ..... W
English 161A ..... W
English 161B ..... W
English 162 ..... W
English 163S ..... W
English 171A ..... D W
English 171B ..... D W
English 173 ..... W
English 175 ..... W
English 179 ..... D W
English 180 ..... W
English 182 ..... D W
English 184 ..... W
Entomology 1 †
Film Studies 1 ..... W
Film Studies 120 ..... D W
Film Studies 124 ..... W
Film Studies 125 ..... W
Film Studies 176A ..... W
Film Studies 176B ..... W
French 50 ..... W
French 51 ..... D W
French 52 ..... D W
French 101
French 102
French 103
French 107
French 108
French 115
French 116
French 117A
French 117B
French 118A

* This course may not be used to satisfy a college or university composition requirement and GE *writing experience* simultaneously.
† Also assigned to another area of *topical breadth*. ‡ Credit for *writing experience* allowed if co-course taken concurrently (see *Writing Experience* list).

French 118B
French 119A
French 119B
French 119C
French 120
French 121
French 124 ..... D
French 125
French 127
French 130
French 133 ..... D
French 162
German 47 ..... D W
German 48 ..... W
German 101A
German 101B
German 112 ..... W
German 113 ..... W
German 115 ..... W
German 118A ..... W
German 118B ..... W
German 118C ..... W
German 118D
German 118E ..... W
German 119 ..... W
German 120
German 121
German 122A
German 122B
German 123
German 124
German 125
German 126
German 127
German 129 ..... D
German 131
German 132
German 133
German 134
German 140 ..... W
German 141 ..... W
German 143
German 160
German 168 ..... D
German 185
Greek 100N ..... W
Greek 101 ..... W
Greek 102 ..... W
Greek 103A ..... W
Greek 103B ..... W
Greek 104 ..... W
Greek 105N ..... W
Greek 111 ..... W
Greek 112 ..... W
Greek 113 ..... W
Greek 114 ..... W
Greek 115 ..... W
Greek 116 ..... W
History 3
History 4A ..... W
History 4B ..... W
History 4C ..... W
History 6 † ..... D W
History 7 ..... W
History 7A † ..... D W
History 7B † ..... D W
History 7C † ..... D W
History 8 ..... D
History 9A ..... D W
History 9B ..... D W
History 10A † ..... D W
History 10B ..... W
History 10C ..... W
History 15 ..... D W
History 17A ..... D W
History 17B ..... D W
History 72A ..... D W
History 72B ..... D W
History 85
History 110
History 111A ..... W
History 111B ..... W
History 111C ..... W
History 112A ..... D W
History 112B ..... D W
History 113 ..... D W
History 115A ..... D W
History 115B ..... D W
History 115C ..... D W
History 116
History 121A ..... W
History 121B ..... W
History 121C ..... W
History 122
History 125 ..... W
History 130A ..... D W
History 130B
History 130C
History 131A
History 131B ..... W
History 131C ..... W
History 133
History 134A
History 135A
History 135B
History 136 ..... W
History 138A ..... W
History 138B ..... W
History 138C ..... W
History 139A † ..... W
History 139B † ..... W
History 141 ..... W
History 142A ..... D W
History 142B ..... D W
History 143 ..... D W
History 144B ..... D W
History 145 ..... W
History 146A ..... W
History 146B ..... W
History 147A † ..... W
History 147B † ..... W
History 147C † ..... D W
History 148A ..... D W
History 148B ..... D W
History 148C ..... D W
History 149 † ..... D W
History 151A ..... W
History 151B ..... W
History 151C ..... W
History 151D ..... D W
History 160 ..... D W
History 161A ..... D W
History 161B ..... D W
History 162 ..... D W
History 163A
History 163B
History 164
History 165
History 166A
History 166B
History 167 ..... W
History 168
History 169A ..... D W
History 169B ..... D W
History 170A ..... D W
History 170B ..... D W
History 170C
History 171A ..... D W
History 171B ..... D W
History 171D ..... W
History 172 ..... W
History 173 ..... D W
History 174A ..... W
History 174B ..... W
History 174C ..... W
History 174D
History 175 ..... W
History 176A
History 176B
History 177A ..... D W
History 177B ..... D W
History 178A ..... D W
History 178B ..... D W
History 180AN ..... W
History 180BN ..... W
History 181 ..... W
History 183A ..... D W
History 183B ..... D W
History 184 ..... D W
History 185A ..... W
History 185B ..... W
History 189 ..... W
History 191A ..... D W
History 191B ..... D W
History 191C ..... D W
History 191D ..... D W
History 191E ..... D W
History 191F ..... D W
History 193A † ..... D W
History 193B † ..... D W
History 194A ..... D W
History 194B ..... D
History 194C ..... D
History 194D
History 194E
History 195B ..... D W
History 196A ..... D W
Humanities 1D (course 1 required concurrently) ..... W
Humanities 4D (course 4 required concurrently) ..... W
Humanities 5 † ..... W
Humanities 6 † ..... W
Humanities 7 ..... D W
Humanities 8 † ..... D W
Humanities 9 (course 9D required concurrently) ..... ‡
Humanities 11 ..... W
Humanities 12 † ..... W
Humanities 15 ..... D W
Humanities 60 † ..... D W
Humanities 144 ..... W
Humanities 180 ..... W
Integrated Studies 8B ..... W
Italian 50 ..... W
Italian 105
Italian 105S ..... D W
Italian 107
Italian 107S
Italian 108 ..... D W
Italian 108S ..... D W
Italian 112
Italian 113
Italian 114
Italian 115A
Italian 115B
Italian 115C
Italian 115D
Italian 118
Italian 119
Italian 120A
Italian 120B
Italian 131
Italian 139B
Italian 140 ..... W
Italian 141 ..... D W
Italian 142 ..... W
Italian 150 ..... D W
Japanese 10 ..... D W
Japanese 50 ..... D W
Japanese 101 ..... D W
Japanese 102 ..... D W
Japanese 103 ..... D W
Japanese 104 ..... D W
Japanese 105 ..... D W
Japanese 106 ..... D W
Japanese 107 ..... D W
Japanese 108 ..... D W
Japanese 109 ..... D
Jewish Studies 101 ..... D W
Jewish Studies 110 ..... D W
Jewish Studies 111 ..... D W
Jewish Studies 112 ..... D W
Jewish Studies 120 ..... D W
Landscape Architecture 1 † ..... W
Landscape Architecture 30 ..... W
Landscape Architecture 168 † ..... W
Latin 100N ..... W
Latin 101 ..... W
Latin 102 ..... W
Latin 103 ..... W
Latin 104 ..... W
Latin 105 ..... W
Latin 106 ..... W
Latin 108 ..... W
Latin 109 ..... W
Latin 110N ..... W
Latin 111 ..... W
Latin 112 ..... W
Latin 114 ..... W
Latin 115 ..... W
Latin 116 ..... W
Latin 125 ..... W
Linguistics 1 † ..... W
Linguistics 106
Linguistics 150 † ..... W
Medieval Studies 20A ..... W
Medieval Studies 20B ..... W
Medieval Studies 20C ..... W
Medieval Studies 120A ..... W
Medieval Studies 120D ..... W
Medieval Studies 120E ..... W
Medieval Studies 121 ..... D W
Medieval Studies 130A ..... W
Medieval Studies 130B ..... W
Music 10 ..... W
Music 105 ..... D W
Music 106 ..... W
Music 110A ..... W
Music 110B ..... W
Music 110C ..... W
Music 110D ..... W
Music 110E ..... W
Music 110F ..... W
Native American Studies 5 ..... D *
Native American Studies 10 † ..... D W
Native American Studies 33 ..... D
Native American Studies 101 ..... D

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* This course may not be used to satisfy a college or university composition requirement and GE *writing experience* simultaneously.
† Also assigned to another area of *topical breadth*. ‡ Credit for *writing experience* allowed if co-course taken concurrently (see *Writing Experience* list).

Native American Studies 156 .. D W
Native American Studies 181A ..... D W
Native American Studies 181B ..... D W
Native American Studies 181C ..... D W
Native American Studies 191 .. D
Nature and Culture 1 † ..... W
Nature and Culture 100 † ..... W
Nature and Culture 120 ..... W
Nature and Culture 140 ..... W
Neurobiology, Physiology, and Behavior 90B † ..... W
Philosophy 1 ..... W
Philosophy 11 ..... D W
Philosophy 14 ..... D W
Philosophy 15 ..... W
Philosophy 21 ..... W
Philosophy 22N ..... W
Philosophy 24 ..... W
Philosophy 30 † ..... W
Philosophy 31 †
Philosophy 32 † ..... W
Philosophy 38 ..... W
Philosophy 101 ..... W
Philosophy 102 ..... W
Philosophy 103 ..... W
Philosophy 105 ..... W
Philosophy 107 † ..... W
Philosophy 108 † ..... W
Philosophy 109 † ..... W
Philosophy 114 ..... W
Philosophy 115 ..... W
Philosophy 123 ..... W
Philosophy 125 ..... W
Philosophy 127 ..... W
Philosophy 143 ..... W
Philosophy 145 ..... W
Philosophy 151
Religious Studies 1 ..... D W
Religious Studies 2 ..... D W
Religious Studies 3A ..... D W
Religious Studies 3B ..... D W
Religious Studies 3C ..... D W
Religious Studies 21 ..... D W
Religious Studies 23 ..... D W
Religious Studies 40 ..... W
Religious Studies 65C ..... D W
Religious Studies 115 ..... D W
Religious Studies 141A ..... W
Religious Studies 141B ..... W
Religious Studies 141C ..... W
Religious Studies 142 ..... W
Religious Studies 165 ..... D W
Russian 15 ..... D
Russian 41 ..... W
Russian 42 ..... W
Russian 44 ..... D W
Russian 102
Russian 121
Russian 123 ..... W
Russian 126 ..... W
Russian 127
Russian 128
Russian 129 ..... D W
Russian 130 ..... W
Russian 131 ..... W
Russian 132 ..... W
Russian 139 ..... D W
Russian 140 ..... D W
Russian 141 ..... D W
Russian 142 ..... D W
Russian 143 ..... D W
Russian 144 ..... D W
Russian 150 ..... D W
Russian 151 ..... W
Russian 154 ..... D W
Russian 159 ..... D
Russian 166 ..... D W
Science and Technology Studies 130A † ..... W
Science and Technology Studies 130B ..... W
Science and Technology Studies 131 † ..... W
Spanish 139 ..... D
Spanish 141 ..... D
Spanish 141S ..... D
Spanish 143
Spanish 148 ..... D
Spanish 148S ..... D
Spanish 149 ..... D W
Spanish 170 ..... D
Spanish 172 ..... D
Spanish 174 ..... D
Spanish 176 ..... D
Technocultural Studies 1
Technocultural Studies 2
Technocultural Studies 4
Technocultural Studies 5
Technocultural Studies 6
Technocultural Studies 150
Technocultural Studies 158
Women's Studies 20 ..... D W
Women's Studies 25 ..... D W
Women's Studies 50 † ..... D W
Women's Studies 60 † ..... D W
Women's Studies 70 † ..... D
Women's Studies 130 † ..... D
Women's Studies 137 † ..... D W
Women's Studies 138 † ..... D W
Women's Studies 158 † ..... D
Women's Studies 160 ..... D
Women's Studies 162 ..... D
Women's Studies 164 ..... D
Women's Studies 170 † ..... D W
Women's Studies 178A ..... D W
Women's Studies 178B ..... D W
Women's Studies 178C ..... D W
Women's Studies 178D ..... D W
Women's Studies 178E ..... D W
Women's Studies 178F ..... D W
Women's Studies 179 ..... D W
Women's Studies 180 ..... D
Women's Studies 195 † ..... D

Science & Engineering

Agricultural Management and Rangeland Resources 120
Agricultural Management and Rangeland Resources 121 ..... W
Agricultural Management and Rangeland Resources 130 ..... W
Animal Science 1 ..... W
Animal Science 2 ..... W
Animal Science 18
Animal Science 42 ..... W
Animal Science 104
Animal Science 105
Animal Science 106 ..... W
Animal Science 115
Animal Science 120
Animal Science 123
Animal Science 124 ..... W
Animal Science 136 ..... W
Animal Science 146 ..... W
Anthropology 1 ..... D W
Anthropology 5 ..... W
Anthropology 15 ..... D W
Anthropology 15V ..... D W
Anthropology 151 ..... W
Anthropology 152 ..... W
Anthropology 153 ..... W
Anthropology 154A ..... W
Anthropology 155 ..... W
Anthropology 156
Anthropology 157 ..... ‡
Anthropology 158 ..... D W
Anthropology 181
Anthropology 183 ..... W
Astronomy 10G
Astronomy 10S
Atmospheric Science 5
Atmospheric Science 6
Atmospheric Science 10 ..... W
Avian Sciences 11 ..... W
Avian Sciences 13 ..... W
Biological Sciences 1C ..... W
Biological Sciences 10 ..... W
Biological Sciences 10V ..... W
Chemistry 2A
Chemistry 2B
Chemistry 2C
Chemistry 10 ..... W
Chemistry 150 ..... W
Engineering 7
Engineering 10 ..... W
Engineering 160 †
Engineering: Applied Science-Davis 137 ..... W
Engineering: Biological Systems 75
Engineering: Computer Science 15 ..... W
Engineering: Computer Science 15AT ..... W
Entomology 1 †
Entomology 2 ..... W
Entomology 10
Entomology 100 ..... W
Entomology 101
Entomology 102
Entomology 103 ..... W
Entomology 104
Entomology 107 ..... W
Entomology 109 ..... W
Entomology 110 ..... W
Entomology 116
Entomology 117 ..... W
Entomology 119 ..... W
Entomology 153 ..... W
Entomology 156 ..... ‡
Entomology 158 † ..... W
Environmental Horticulture 1 ..... W
Environmental and Resource Sciences 60 ..... W
Environmental and Resource Sciences 100 ..... ‡
Environmental and Resource Sciences 121 ..... W
Environmental and Resource Sciences 131 ..... W
Environmental Science and Policy 10
Environmental Science and Policy 30 ..... ‡
Environmental Science and Policy 116 ..... ‡
Environmental Science and Policy 121 ..... W
Environmental Toxicology 10
Environmental Toxicology 127
Environmental Toxicology 128
Environmental Toxicology 135
Environmental Toxicology 146
Evolution and Ecology 2 ..... W
Evolution and Ecology 11
Evolution and Ecology 108
Evolution and Ecology 138 ..... W
Evolution and Ecology 141 ..... W
Exercise Biology 10 ..... D
Exercise Biology 110 ..... W
Exercise Biology 113
Exercise Biology 115
Exercise Biology 117
Exercise Biology 118 ..... W
Exercise Biology 126
Fiber and Polymer Science 110 .... W
Food Science and Technology 3
Food Science and Technology 10 †
Food Science and Technology 120
Food Science and Technology 128
Geology 1
Geology 2 ..... ‡
Geology 3 ..... ‡
Geology 4
Geology 10
Geology 32
Geology 35
Geology 36 ..... W
Geology 100 ..... W
Geology 101 ..... W
Geology 105 ..... W
Geology 106 ..... W
Geology 108 ..... W
Geology 109 (course 109L required concurrently) ..... ‡
Geology 110 ..... W
Geology 115 † ..... W
Geology 116 ..... ‡
Geology 134 ..... W
Geology 138
Geology 143 ..... W
Geology 145 ..... W
Human Development 117 ..... W
Hydrologic Science 10 ..... W
Integrated Studies 8A ..... W
International Agricultural Development 162 ..... D W
Landscape Architecture 50
Linguistics 175
Mathematical and Physical Sciences 1
Mathematics 16A
Mathematics 16B
Mathematics 16C
Mathematics 21A
Mathematics 21AH
Mathematics 21B
Mathematics 21BH
Mathematics 21C
Mathematics 21CH
Mathematics 21M
Mathematics 36
Medicine-Cell Biology and Human Anatomy 101 ..... ‡
Microbiology 10
Microbiology 100 †

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† Also assigned to another area of *topical breadth*. ‡ Credit for *writing experience* allowed if co-course taken concurrently (see *Writing Experience* list).

Molecular and Cellular Biology 10
Nature and Culture 1 † ..... W
Nature and Culture 100 † ..... W
Neurobiology, Physiology, and Behavior 10
Neurobiology, Physiology, and Behavior 12 ..... ‡
Neurobiology, Physiology, and Behavior 90B † ..... W
Nutrition 10
Nutrition 11 ..... W
Nutrition 20 †
Nutrition 114 ..... W
Nutrition 115 ..... W
Nutrition 127
Philosophy 13 † ..... W
Philosophy 30 † ..... W
Philosophy 31 †
Philosophy 32 † ..... W
Philosophy 107 † ..... W
Philosophy 108 † ..... W
Physics 10 ..... W
Physics 137 ..... W
Physics 160 †
Plant Biology 11 ..... W
Plant Biology 12 ..... D W
Plant Biology 108
Plant Biology 112
Plant Biology 116
Plant Biology 141 † ..... W
Plant Biology 142
Plant Biology 143 ..... W
Plant Biology 147 ..... W
Plant Pathology 140 ..... W
Pomology 10
Pomology 162 ..... D W
Science and Technology Studies 1 †
Science and Technology Studies 20 † ..... W
Science and Technology Studies 130A † ..... W
Science and Technology Studies 130B ..... W
Science and Technology Studies 131 † ..... W
Science and Society 1 † ..... D W
Science and Society 2 † ..... W
Science and Society 3 † ..... W
Science and Society 5 † ..... W
Science and Society 7 † ..... W
Science and Society 15 † ..... D W
Science and Society 20 † ..... W
Science and Society 30 † ..... W
Science and Society 105 ..... W
Science and Society 120 † ..... W
Soil Science 10 ..... W
Statistics 10 † ..... W
Statistics 12
Statistics 13
Statistics 13V
Statistics 32
Statistics 100
Statistics 102
Statistics 103
Statistics 104
Statistics 106
Statistics 108
Statistics 120
Statistics 138
Statistics 144
Textiles and Clothing 6
Textiles and Clothing 162
Viticulture and Enology 3 † ..... ‡
Wildlife, Fish and Conservation Biology 10 ..... D W
Wildlife, Fish and Conservation Biology 11 ..... W
Wildlife, Fish and Conservation Biology 102L ..... W
Wildlife, Fish and Conservation Biology 121 ..... W
Wildlife, Fish and Conservation Biology 153 ..... W
Wildlife, Fish and Conservation Biology 155 ..... W
Wildlife, Fish and Conservation Biology 156 ..... W

Social Sciences

African American and African Studies 80 ..... D W
African American and African Studies 110 ..... D
African American and African Studies 133 ..... D
African American and African Studies 145A ..... D
African American and African Studies 145B ..... D
African American and African Studies 165 ..... D
Agricultural and Resource Economics 1
Agricultural and Resource Economics 15 ..... D W
Agricultural and Resource Economics 115A ..... D
Agricultural and Resource Economics 115B
Agricultural and Resource Economics 120
Agricultural and Resource Economics 146
Agricultural and Resource Economics 147
Agricultural and Resource Economics 150 ..... D W
Agricultural and Resource Economics 175
Agricultural and Resource Economics 176
Agricultural Education 100 ..... W
Agricultural Education 160 ..... W
Agricultural Education 172 ..... W
American Studies 1B † ..... D W
American Studies 1C † ..... D W
American Studies 1E † ..... D W
American Studies 5 † ..... W
American Studies 10 † ..... D W
American Studies 30 † ..... D W
American Studies 110 † ..... D W
American Studies 120 † ..... D W
American Studies 130 † ..... D W
American Studies 132 † ..... D W
American Studies 133 ..... D W
American Studies 139 ..... D W
American Studies 151 † ..... D W
American Studies 152 † ..... D W
American Studies 153 † ..... D W
American Studies 154 † ..... D W
American Studies 155 † ..... D W
American Studies 156 † ..... D W
American Studies 157 † ..... D W
Animal Science 141 ..... W
Animal Science 148 ..... W
Animal Science 170 ..... W
Anthropology 2 ..... D W
Anthropology 3 ..... D
Anthropology 4 ..... D W
Anthropology 20 ..... D
Anthropology 23 ..... D W
Anthropology 100
Anthropology 101
Anthropology 102 ..... D W
Anthropology 104N ..... D
Anthropology 110
Anthropology 112
Anthropology 113 ..... D
Anthropology 117 ..... D W
Anthropology 119
Anthropology 120 ..... D W
Anthropology 122A ..... D W
Anthropology 122B ..... D W
Anthropology 124 ..... D W
Anthropology 125A ..... D
Anthropology 125B ..... D W
Anthropology 126A ..... D W
Anthropology 126B ..... D W
Anthropology 127 ..... D W
Anthropology 128A ..... D W
Anthropology 128B ..... D W
Anthropology 130A ..... W
Anthropology 130BN ..... W
Anthropology 130C ..... W
Anthropology 132 ..... W
Anthropology 135 ..... D W
Anthropology 136 ..... W
Anthropology 138
Anthropology 139AN ..... D W
Anthropology 139BN ..... D W
Anthropology 140A ..... D W
Anthropology 140B ..... D W
Anthropology 141A ..... D W
Anthropology 141B ..... D W
Anthropology 142 ..... D W
Anthropology 143A ..... D W
Anthropology 143B ..... D W
Anthropology 144 ..... D W
Anthropology 146 ..... D W
Anthropology 147 ..... D W
Anthropology 148A ..... D W
Anthropology 148AS ..... D W
Anthropology 148B ..... D W
Anthropology 148C ..... D W
Anthropology 149A ..... D W
Anthropology 149B ..... D W
Anthropology 170 ..... D W
Anthropology 171 ..... W
Anthropology 172 ..... D W
Anthropology 173 ..... D W
Anthropology 176 ..... D W
Anthropology 178 ..... D W
Anthropology 179 ..... D W
Anthropology 184
Asian American Studies 1 ..... D W
Asian American Studies 2 ..... D W
Asian American Studies 3 ..... D
Asian American Studies 100 .... D
Asian American Studies 110 .... D
Asian American Studies 111 .... D
Asian American Studies 112 † . D
Asian American Studies 140 .... D W
Asian American Studies 150B .. D W
Asian American Studies 150C . D
Asian American Studies 150D . D
Chicana/o Studies 110 ..... D W
Chicana/o Studies 120 ..... D
Chicana/o Studies 121 ..... D W
Chicana/o Studies 131 ..... D
Communication 101
Communication 103
Communication 105
Communication 130
Communication 134
Communication 135 ..... D
Communication 136
Communication 138
Communication 140
Communication 141
Communication 142
Communication 143 ..... W
Communication 146
Communication 152
Communication 165
Communication 170
Communication 189A ..... W
Communication 189B ..... W
Communication 189C ..... W
Communication 189D ..... W
Community and Regional Development 1 ..... D W
Community and Regional Development 2 ..... D W
Community and Regional Development 17 ..... D W
Community and Regional Development 118 ..... W
Community and Regional Development 140 ..... W
Community and Regional Development 151 ..... D W
Community and Regional Development 152 ..... W
Community and Regional Development 153A ..... D
Community and Regional Development 153B ..... D
Community and Regional Development 154 ..... D W
Community and Regional Development 157 ..... D W
Community and Regional Development 176 ..... D W
Consumer Sciences 100 ..... D W
Economics 1A
Economics 1B
Economics 104
Economics 105
Economics 110A
Economics 110B
Economics 111A
Economics 111B
Economics 115A ..... D
Economics 115B
Economics 116
Economics 121A
Economics 121B
Economics 162
Education 110 ..... W
Education 120 ..... W
Education 122 ..... D W
Engineering 160 †
Engineering: Civil and Environmental 165 ..... W

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* This course may not be used to satisfy a college or university composition requirement and GE *writing experience* simultaneously.
† Also assigned to another area of *topical breadth*. ‡ Credit for *writing experience* allowed if co-course taken concurrently (see *Writing Experience* list).

Entomology 158 † ..... W
Environmental and Resource Sciences 10 ..... ‡
Environmental Science and Policy 101 ..... D
Environmental Science and Policy 102 ..... D W
Environmental Science and Policy 161 ..... W
Environmental Science and Policy 169 †
Environmental Science and Policy 172
Environmental Science and Policy 175
Exercise Biology 102
Exercise Biology 120 ..... D
Fiber and Polymer Science 110 † ..... W
Food Science and Technology 10 †
Geography 2 ..... ‡
Geology 115 † ..... W
History 6 † ..... D W
History 7A † ..... D W
History 7B † ..... D W
History 7C † ..... D W
History 10A † ..... D W
History 115D ..... D W
History 132 ..... D W
History 139A † ..... W
History 139B † ..... W
History 140
History 147A † ..... W
History 147B † ..... W
History 147C † ..... D W
History 149 † ..... D W
History 193A † ..... D W
History 193B † ..... D W
History 196B ..... D W
Human Development 13
Human Development 15
Human Development 102 ..... W
Humanities 3 ..... W
Humanities 5 † ..... W
Humanities 6 † ..... W
Humanities 8 † ..... D W
Humanities 12 † ..... W
Humanities 60 † ..... D W
Integrated Studies 8C ..... W
International Agricultural Development 10 ..... D W
International Agricultural Development 103 ..... D
Jewish Studies 10 ..... D W
Jewish Studies 121 ..... W
Landscape Architecture 1 † ..... W
Landscape Architecture 2 ..... W
Landscape Architecture 168 † ..... W
Linguistics 1 † ..... W
Linguistics 150 † ..... W
Linguistics 160 ..... D W
Linguistics 163 ..... D W
Linguistics 171
Linguistics 173
Linguistics 177
Medicine-Epidemiology and Preventive Medicine 175W ... W
Microbiology 100 †
Native American Studies 1 ..... D
Native American Studies 10 † ..... D W
Native American Studies 46 .... D W
Native American Studies 55 .... D W
Native American Studies 115 .. D W
Native American Studies 116 .. D
Native American Studies 117 .. D
Native American Studies 118 .. D
Native American Studies 120 .. D W
Native American Studies 122 .. D W
Native American Studies 130A ..... D W
Native American Studies 130B ..... D W
Native American Studies 130C ..... D W
Native American Studies 133 .. D
Native American Studies 134 .. D W
Native American Studies 180 .. D W
Nutrition 20 †
Philosophy 13 † ..... W
Philosophy 109 † ..... W
Philosophy 118 ..... D W
Philosophy 119 ..... D W
Physical Education 120 ..... D
Physics 160 †
Plant Biology 141 † ..... W
Political Science 1 ..... W
Political Science 2 ..... W
Political Science 3 ..... W
Political Science 4 ..... W
Political Science 5 ..... W
Political Science 7 ..... W
Political Science 51
Political Science 100 ..... W
Political Science 102 ..... W
Political Science 105 ..... W
Political Science 106 ..... W
Political Science 107 ..... W
Political Science 108 ..... W
Political Science 109 ..... W
Political Science 112 ..... W
Political Science 113 ..... W
Political Science 114 ..... W
Political Science 115 ..... W
Political Science 116 ..... W
Political Science 118A ..... W
Political Science 118B ..... W
Political Science 118C ..... W
Political Science 121 ..... W
Political Science 122 ..... W
Political Science 123 ..... W
Political Science 124 ..... D W
Political Science 126 ..... D W
Political Science 129 ..... W
Political Science 130 ..... W
Political Science 131 ..... W
Political Science 132 ..... W
Political Science 142 ..... D
Political Science 143 ..... W
Political Science 151 ..... W
Political Science 152 ..... D W
Political Science 155 ..... W
Political Science 160 ..... W
Political Science 162 ..... W
Political Science 163 ..... W
Political Science 164 ..... W
Political Science 165 ..... W
Political Science 166 ..... D
Political Science 168 ..... D
Political Science 174 ..... W
Political Science 175 ..... W
Political Science 176 ..... D
Political Science 180 ..... W
Political Science 187 ..... W
Political Science 192A ..... W
Political Science 192B ..... W
Psychology 1
Psychology 142 ..... W
Psychology 155
Psychology 158 ..... D W
Psychology 162 ..... W
Psychology 162V ..... W
Psychology 168
Psychology 175 ..... W
Psychology 177 ..... W
Psychology 185 ..... W
Science and Technology Studies 1 †
Science and Technology Studies 20 † ..... W
Science and Technology Studies 150 ..... D W
Science and Society 1 † ..... D W
Science and Society 2 † ..... W
Science and Society 3 † ..... W
Science and Society 5 † ..... W
Science and Society 7 † ..... W
Science and Society 15 † ..... D W
Science and Society 20 † ..... W
Science and Society 30 † ..... W
Science and Society 120 † ..... W
Science and Society 140 ..... W
Sociology 1
Sociology 2 ..... W
Sociology 3 ..... W
Sociology 4 ..... D W
Sociology 5 ..... D W
Sociology 25 ..... W
Sociology 125
Sociology 131 ..... D W
Sociology 132 ..... D
Sociology 146 ..... D W
Sociology 156
Sociology 170
Statistics 10 † ..... W
Textiles and Clothing 7 ..... D W
Textiles and Clothing 8 ..... D
Textiles and Clothing 107 ..... D W
Textiles and Clothing 174 ..... D
Veterinary Medicine 170 ..... W
Viticulture and Enology 3 † ..... ‡
Washington Center 175 ..... W
Women's Studies 50 † ..... D W
Women's Studies 60 † ..... D W
Women's Studies 70 † ..... D
Women's Studies 102 ..... D
Women's Studies 130 † ..... D
Women's Studies 137 † ..... D W
Women's Studies 138 † ..... D W
Women's Studies 139 ..... D W
Women's Studies 140 ..... D
Women's Studies 158 † ..... D
Women's Studies 170 † ..... D W
Women's Studies 182 ..... D W
Women's Studies 184 ..... D W
Women's Studies 187 ..... D
Women's Studies 195 † ..... D

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* This course may not be used to satisfy a college or university composition requirement and GE *writing experience* simultaneously.
† Also assigned to another area of *topical breadth*. ‡ Credit for *writing experience* allowed if co-course taken concurrently (see *Writing Experience* list).

Social-Cultural Diversity

These courses satisfy the GE requirement for *social-cultural diversity.* Many of these courses also provide GE credit for *topical breadth* or *writing experience.* Refer to the *topical breadth* and *writing experience* course lists to determine if any additional GE credit applies.

African American and African Studies 10, 12, 15, 16, 17, 50, 52, 80, 100, 107A, 107B, 107C, 110, 111, 123, 133, 145A, 145B, 150A, 150B, 152, 156, 157, 160, 162, 163, 165, 168, 169, 170, 171
Agricultural and Resource Economics 15, 115A, 150
American Studies 1A, 1B, 1C, 1E, 10, 21, 30, 110, 120, 130, 132, 133, 139, 151, 152, 153, 154, 155, 156, 157
Anthropology 1, 2, 3, 4, 15, 15V, 20, 23, 102, 104N, 113, 117, 120, 122A, 122B, 124, 125A, 125B, 126A, 126B, 127, 128A, 128B, 135, 139AN, 139BN, 140A, 140B, 141A, 141B, 142, 143A, 143B, 144, 146, 147, 148A, 148AS, 148B, 148C, 149A, 149B, 158, 170, 172, 173, 176, 178, 179
Art History 1C, 1D, 1DV, 5, 150, 151, 152, 153, 163A, 163B, 163C, 163D, 164, 175, 183B, 183C, 185, 186, 188A, 189
Art Studio 30, 132B, 149
Asian American Studies 1, 2, 3, 100, 110, 111, 112, 120, 130, 140, 150B, 150C, 150D
Chicana/o Studies 10, 21, 30, 50, 70, 110, 120, 121, 130, 131, 154, 160, 181
Chinese 10, 11, 50, 104, 105, 106, 107, 108, 109A, 109B, 109C, 109D, 109E, 109F, 109G, 109H, 109I, 110
Classics 15, 171, 175
Communication 135
Community and Regional Development 1, 2, 17, 151, 153A, 153B, 154, 157, 176
Comparative Literature 4, 5, 6, 7, 9, 12, 25, 53A, 53B, 53C, 135, 138, 147, 151, 152, 153, 154, 159, 165, 166
Consumer Sciences 100
Dramatic Art 150, 154, 155, 156A, 156B, 156C
East Asian Studies 88, 113
Economics 115A
Education 122
English 30A, 30B, 139, 166, 167, 171A, 171B, 178, 179, 181A, 181B, 182, 185A, 185B, 186
Environmental Science and Policy 101, 102
Exercise Biology 10, 120
Film Studies 120
French 51, 52, 124, 133
German 47, 129, 168
History 6, 7A, 7B, 7C, 8, 9A, 9B, 10A, 15, 17A, 17B, 72A, 72B, 112A, 112B, 113, 115A, 115B, 115C, 115D, 130A, 132, 142A, 142B, 143, 144B, 147C, 148A, 148B, 148C, 149, 151D, 160, 161A, 161B, 162, 169A, 169B, 170A, 170B, 171A, 171B, 173, 177A, 177B, 178A, 178B, 183A, 183B, 184, 191A, 191B, 191C, 191D, 191E, 191F, 193A, 193B, 194A, 194B, 194C, 195B, 196A, 196B
Human Development 12, 103, 160
Humanities 7, 8, 15, 60
International Agricultural Development 10, 103, 162
Italian 105S, 108, 108S, 141, 150
Japanese 10, 50, 101, 102, 103, 104, 105, 106, 107, 108, 109
Jewish Studies 10, 101, 110, 111, 112, 120
Linguistics 160, 163, 166
Medieval Studies 121
Music 28, 105, 126, 129
Native American Studies 1, 5, 10, 32, 33, 46, 55, 101, 107, 115, 116, 117, 118, 120, 122, 130A, 130B, 130C, 133, 134, 156, 157, 180, 181A, 181B, 181C, 188, 191
Philosophy 11, 14, 118, 119
Physical Education 120
Plant Biology 12
Political Science 124, 126, 142, 152, 166, 168, 176
Pomology 162
Psychology 158, 170
Religious Studies 1, 2, 3A, 3B, 3C, 21, 23, 65C, 115, 165
Russian 15, 44, 129, 139, 140, 141, 142, 143, 144, 150, 154, 159, 166
Science and Technology Studies 150
Science and Society 1, 15
Sociology 4, 5, 30A, 128, 129, 130, 131, 132, 133, 134, 135, 145A, 145B, 146, 149, 172
Spanish 139, 141, 141S, 148, 148S, 149, 170, 172, 174, 176
Technocultural Studies 159
Textiles and Clothing 7, 8, 107, 174
Wildlife, Fish and Conservation Biology 10
Women's Studies 20, 25, 50, 60, 70, 102, 130, 137, 138, 139, 140, 158, 160, 162, 164, 170, 178A, 178B, 178C, 178D, 178E, 178F, 179, 180, 182, 184, 187, 195

Writing Experience

These courses satisfy the GE requirement for *writing experience,* provided you have previously satisfied the Subject A requirement. Many of these courses also provide GE credit for *topical breadth* or *social-cultural diversity.* Refer to the *topical breadth* and *social-cultural diversity* course lists to determine if any additional GE credit applies.

African American and African Studies 12, 15, 16, 17, 50, 52, 80, 107A, 107B, 107C, 111, 152, 157, 162, 163, 170
Agricultural Management and Rangeland Resources 121, 130
Agricultural and Resource Economics 15, 150
Agricultural Education 100, 160, 172
American Studies 1A, 1B, 1C, 1E, 5, 10, 21, 30, 110, 120, 130, 132, 133, 139, 151, 152, 153, 154, 155, 156, 157
Animal Science 1, 2, 42, 106, 124, 136, 141, 146, 148, 170
Anthropology 1, 2, 4, 5, 15, 15V, 23, 102, 117, 120, 122A, 122B, 124, 125B, 126A, 126B, 127, 128A, 128B, 130A, 130BN, 130C, 132, 135, 136, 139AN, 139BN, 140A, 140B, 141A, 141B, 142, 143A, 143B, 144, 146, 147, 148A, 148AS, 148B, 148C, 149A, 149B, 151, 152, 153, 154A, 154B, 155, 157L (course 157 required concurrently), 158, 170, 171, 172, 173, 176, 178, 179, 183
Art History 5, 25G (course 25 required concurrently), 110, 153, 163A, 163B, 163C, 163D, 164, 168, 172A, 172B, 173, 175, 176A, 176B, 177A, 177B, 178A, 178B, 178C, 179B, 182, 183B, 183C, 184, 185, 186, 188A, 188B, 188D, 188E, 189
Art Studio 30, 132A, 132B, 147, 148, 149, 150
Asian American Studies 1, 2, 140, 150B
Atmospheric Science 10
Avian Sciences 11, 13
Biological Sciences 1C, 10, 10V, 132
Chemistry 10, 115, 125, 150
Chicana/o Studies 10, 110, 121, 181
Chinese 10, 11, 50, 104, 105, 106, 107, 108, 109A, 109B, 109C, 109D, 109E, 109F, 109G, 109H, 109I, 110
Classics 1, 2, 3, 15, 20, 50, 102, 110, 140, 141, 142, 143, 150, 171, 172A, 172B, 173, 174, 175, 190
Communication 1*, 143, 189A, 189B, 189C, 189D
Community and Regional Development 1, 2, 17, 118, 140, 151, 152, 154, 157, 176
Comparative Literature 1*, 2*, 3*, 4*, 5, 6, 7, 8, 9, 12, 13, 14, 20, 25, 53A, 53B, 53C, 120, 135, 138, 140, 141, 144, 145, 146, 147, 151, 152, 153, 154, 157, 158, 159, 160A, 160B, 161A, 161B, 163, 164A, 164B, 164C, 164D, 165, 166, 166A, 166B, 167, 168A, 168B, 169, 170, 180
Consumer Sciences 100
Critical Theory 101
Design 1, 40A, 40B, 100, 142A, 142B, 143, 144
Dramatic Art 150, 154, 155, 156A, 156B, 156C
East Asian Studies 88, 113
Education 110, 120, 122
Engineering 10, 45
Engineering: Applied Science-Davis 137
Engineering: Chemical 155A, 155B, 161L
Engineering: Civil and Environmental 146, 155, 163, 165
Engineering: Computer Science 15, 15AT
Engineering: Materials Science 162L, 172L, 174, 174L, 180, 181, 182
English 1*, 3*, 4, 5F, 18*, 19*, 30A, 30B, 42, 43, 44, 45, 46A, 46B, 46C, 101*, 102A*, 102B*, 102C*, 102D*, 102E*, 102F*, 102G*, 104A*, 104B*, 104C*, 104D*, 104E*, 104F*, 105, 107, 110A, 111, 113A, 113B, 115, 117A, 117B, 117C, 118, 122, 123, 130, 133, 137N, 138, 139, 142, 143, 144, 146N, 147, 149, 150A, 150B, 152, 153, 155A, 155B, 155C, 156, 158A, 158B, 159, 160, 161A, 161B,

* This course may not be used to satisfy a college or university composition requirement and GE *writing experience* simultaneously.
† Also assigned to another area of *topical breadth.* ‡ Credit for *writing experience* allowed if co-course taken concurrently (see *Writing Experience* list).

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† Also assigned to another area of *topical breadth*. ‡ Credit for *writing experience* allowed if co-course taken concurrently (see *Writing Experience* list).

GENERAL EDUCATION THEME OPTIONS

General Education theme options are sets of GE courses sharing a common intellectual theme. These GE theme options are not a separate element of the GE requirement, but a way of selecting your GE courses so that you may benefit from a coherent focus of study while completing the GE requirement. Completion of a theme satisfies the GE requirement for students with majors assigned to the GE topical breadth area of Arts and Humanities. Students with majors assigned to the topical breadth area of either Science and Engineering or Social Science will need to complete additional GE courses in Arts and Humanities to satisfy the campus GE requirement.

Global Population and Environmental Issues

For centuries, there have been concerns and predictions about population growth and its potential effects on the environment and the quality of life. Perspectives on population and environmental issues often vary based on such factors as gender, social class, culture, nation, race/ethnicity, and religion. In this group of courses, students will learn about the complex interplay among environmental, economic, and ethical issues through the study of global population patterns. They will learn how science addresses the use of natural resources by humans, along with the fundamentals of environmental impacts such as global warming. This option group of courses explores diverse perspectives on global population and environmental issues by examining biological, physical, and social processes that influence the everyday lives of people around the world.

Topics might include the social, economic, and environmental challenges of population growth; and the ethics and dilemmas of natural resource use.

Global Population

Atmospheric Science 5 [or 10]	SciEng, Wrt
Environmental and Resource Sciences 60	SciEng, Wrt
Human Development 117	SciEng, Wrt
Agricultural and Resource Economics 15	SocSci, Div, Wrt
Science and Society 1	SciEng or SocSci, Div, Wrt
[or Fiber and Polymer Science 110	SciEng or SocSci, Wrt]
International Agricultural Development 10,	SocSci, Div, Wrt
[or Community & Regional Development 1	SocSci, Div, Wrt]

Biodiversity and Cultural Diversity

The nations with the greatest biodiversity often have tremendous ethnic and cultural diversity. This option examines diversity in many interrelated contexts: biological diversity and the impact of contemporary humans; values and cultural practices in regard to production and consumption; the clothes people wear; creation and use of social spaces; and the preservation of genetic resources for food, fiber, and pharmaceuticals

Topics might include conservation biology; integration of human and natural systems; cultural expression through clothing and appearance; and discussion of what are cultural and social rights.

Biodiversity and Cultural Diversity

Wildlife, Fish and Conservation Biology 10	SciEng, Div, Wrt
Plant Biology 11	SciEng, Wrt
Science and Society 105	SciEng, Wrt
Textiles and Clothing 7	SocSci, Div, Wrt
Community and Regional Development 2	SocSci, Div, Wrt
Landscape Architecture 2	SocSci, Wrt

Food and Fiber

This option focuses on food and fiber systems, from their plant, animal, or synthetic sources to their ultimate use by humans for health, safety, communication, and pleasure. Understanding these systems enables students to see the connections between the food and clothes that are part of our everyday lives and the scientific, social, and cultural issues that make them so significant to society as a whole.

Topics might include food and clothing safety, quality, and availability; media and consumer perceptions; and cultural histories, values, and meanings.

Food and Fiber

Animal Science 1	SciEng, Wrt
[or Plant Biology 12	SciEng, Div, Wrt]
Nutrition 10	SciEng
and Nutrition 11	SciEng, Wrt
[or Nutrition 20	SciEng or SocSci]
[or Food Science and Technology 10	SciEng or SocSci]
Textiles and Clothing 6	SciEng
Textiles and Clothing 7 or 107	SocSci, Div, Wrt
Science and Society 1	SciEng or SocSci, Div, Wrt
Viticulture and Enology 3-3W concurrently	SciEng or SocSci, Wrt

Changing Agriculture

Changing demographics, environmental issues, and social-political trends in California all play a role in public perceptions and policies related to our food and fiber systems, natural resources, and community values. These perceptions, policies, and values need to be critically examined in the context of larger global economic trends and environmental health and safety. In this option group of courses, students can explore a range of challenging issues related to the complex interplay between rural and urban needs and values.

Topics might include holistic approaches to agriculture; international migration and agricultural development; and how plants and animals influence the course of history.

Changing Agriculture Theme Option

Animal Science 1	SciEng, Wrt
Entomology 110	SciEng, Wrt
Plant Biology 12	SciEng, Div, Wrt
Agricultural and Resource Economics 15	SocSci, Div, Wrt
Environmental and Resource Sciences 10-10G concurrently	SocSci, Wrt
[or Environmental & Resource Sciences 121*	SciEng, Wrt]
Science and Society 2	SciEng or SocSci, Wrt

APPENDIX

UCDAVIS





2004–2005 · 2005–2006

RESIDENCE FOR TUITION INFORMATION

Tuition Fee for Nonresident Students

If you have not been living in California with intent to make it your permanent home for more than one year immediately before the residence determination date for each term in which you propose to attend the University, you must pay a nonresident tuition fee in addition to all other fees. The residence determination date is the day instruction begins at the last of the University of California campuses to open for the quarter, and for schools on the semester system, the day instruction begins for the semester.

Law Governing Residence

The rules regarding residence for tuition purposes at the University of California are governed by the California Education Code and implemented by Standing Orders of the Regents of the University of California. Under these rules, adult citizens and certain classes of aliens can establish residence for tuition purposes. There are particular rules that apply to the residence classification of minors (see below).

Who is a Resident?

If you are an adult student (18 years of age or older) you may establish residence for tuition purposes in California if: (1) you are a U.S. citizen; (2) you are a permanent resident or other immigrant; or (3) you are a nonimmigrant who is not precluded from establishing a domicile in the U.S. Nonimmigrants who are not precluded from establishing a domicile in the U.S. include those who hold visas of the following types: A, E, G, H-1, H-4, I, K, L, N, NATO, O-1, O-3, R or V. **To establish residence you must be physically present in California for more than one year and you must have come here with the intent to make California your home as opposed to coming to this state to go to school.** Physical presence within the state solely for educational purposes does not constitute the establishment of California residence, regardless of the length of your stay. You must demonstrate your intention to make California your home by severing your residential ties with your former state of residence and establishing those ties with California. Evidence of intent must be dated one year before the term for which you seek resident classification. If these steps are delayed, the one-year durational period will be extended until you have demonstrated both presence and intent for one full year. **Effective Fall 1993, if your parents are not residents of California or you were not previously enrolled as a UC student, you will be required to be financially independent in order to be a resident for tuition purposes. Your residence cannot be derived from your spouse or your parents.**

Requirement for Financial Independence

You will be considered "financially independent" if one or more of the following applies: (1) you are at least 24 years of age by December 31 of the calendar year for which you are requesting residence classification; (2) you are a veteran of the U.S. Armed Forces; (3) you are a ward of the court or both parents are deceased; (4) you have legal dependents other than a spouse; (5) you are married, or a graduate student or a professional student, and you were not claimed as an income tax deduction by your parents or any other individual for the tax year immediately preceding the term for which you are requesting resident classification; or (6) you are a single undergraduate student and you were not claimed as an income tax deduction by your parents or any other individual for the two tax years immediately preceding the term for which you are requesting resident classification, and you can demonstrate self-sufficiency for those years and the current year; (7) you are a graduate student instructor, graduate student teaching assistant, research assistant, junior specialist, post-graduate researcher, graduate student researcher or teaching associate who is employed 49% or more of full time or who has funding equivalent to employment that is 49% or more of full time for the term for which classification is sought.

Establishing Intent to Become a California Resident

Indications of your intent to make California your permanent residence can include the following: registering to vote and voting in California elections; designating California as your permanent address on all school and employment records, including military records if you are in the military service; obtaining a California driver's license or, if you do not drive, a California Identification Card; obtaining California vehicle registration; paying California income taxes as a resident, including taxes on income earned outside California from the date you establish residence; establishing a California residence in which you keep your personal belongings; and licensing for professional practice in California. The absence of these indicia in other states during any period for which you claim residence can also serve as an indication of your intent. Documentary evidence is required and all relevant indications will be considered in determining your classification. **Your intent will be questioned if you return to your prior state of residence when the University is not in session.**

General Rules Applying to Minors

If you are an unmarried minor (under age 18), the residence of the parent with whom you live is considered to be your residence. If you have a parent living, you cannot change your residence by your own act, by the appointment of a legal guardian, or by the relinquishment of your parent's right of control. If you lived with neither parent, your residence is that of the parent with whom you last lived. Unless you are a minor alien present in the U.S. under the terms of a nonimmigrant visa which precludes you from establishing domicile in the U.S., you may establish your own residence when both your parents are deceased and a legal guardian has not been appointed. If you derive California residence from a parent, that parent must satisfy the one-year durational residence requirement.

Specific Rules Applying to Minors

1. Divorced/Separated Parents
You may be able to derive California resident status from a California resident parent if you move to California to live with that parent on or before your 18th birthday. If you begin residing with your California parent after your 18th birthday, you will be treated like any other adult student coming to California to establish residence.

2. Parent of Minor Moves From California
You may be entitled to resident status if you are a minor U.S. citizen or eligible alien whose parent(s) was a resident of California who left that state within one year of the residence determination date if: (1) you remained in California after your parent(s) departed; (2) you enroll in a California public postsecondary institution within one year of the time your parent(s) depart and establish residence elsewhere; and (3) once enrolled, you maintain continuous attendance in that institution. Financial independence will not be required in this case.

3. Self-Support
You may be entitled to resident status if you are a U.S. citizen or eligible alien and either a minor or age 18 and can prove the following: (1) you lived in California for the entire year immediately preceding the residence determination date; (2) you have been self-supporting for that year; and (3) you intend to make California your permanent home.

4. Two-Year Care and Control
You may be entitled to resident status if you are a U.S. citizen or eligible alien and you have lived continuously with an adult who is not your parent for at least two years prior to the residence determination date. The adult with whom you are living must have been responsible for your care and control for the entire two-year period and must have been residing in California during the one year immediately preceding the residence determination date.

Exemptions from Nonresident Tuition

1. Member of the Military
If you are a member of the U.S. military stationed in California on active duty, unless you are assigned for educational purposes to a state-supported institution of higher education, you may be exempt from the nonresident tuition fee until you have lived in California long enough to become a resident. You must provide the residence deputy on campus with a statement from your commanding officer or personnel officer stating that your assignment to active duty in California is not for educational purposes. The letter must include the dates of your assignment to the state.

2. Spouse or Other Dependents of Military Personnel
You are exempt from payment of the nonresident tuition fee if you are a spouse or a natural or adopted child or stepchild who is a dependent of a member of the U.S. military stationed in California on active duty. The exemption is available until you have lived in California long enough to become a resident. If you are enrolled in an educational institution and the member of the military is transferred on military orders to a place outside California where he or she continues to serve in the armed forces, or the member of the military retires from active duty immediately after having served in California on active duty, you may retain this exemption under the conditions listed above.

3. Child or Spouse of Faculty Member
To the extent funds are available, if you are an unmarried dependent child under age 21 or the spouse of a member of the University faculty who is a member of the Academic Senate, you may be eligible for a waiver of the nonresident tuition fee. Confirmation of the faculty member's membership on the Academic Senate must be secured each term this waiver is granted.

4. Child or Spouse of University Employee
You may be entitled to resident classification if you are the unmarried dependent child or the spouse of a full-time University employee whose assignment is outside of California (e.g., Los Alamos Scientific Laboratory and University of California Washington D.C. Center). Your parent's or spouse's employment status with the University must be ascertained each term.

5. Child of Deceased Public Law Enforcement or Fire Suppression Employee
You may be entitled to a waiver of the nonresident tuition fee if you are the child of a deceased public law enforcement or fire suppression employee who was a California resident at the time of his or her death and who was killed in the course of fire suppression or law enforcement duties.

6. Dependent of a California Resident
A student who has not been an adult resident of California for more than one year and who is the dependent child of a California resident who has been a resident for more than one year immediately prior to the residence determination date may be entitled to resident classification until the student has resided in California for the minimum time necessary to become a resident so long as continuous attendance is maintained at an institution.

7. Native American Graduate of BIA School
You are eligible for an exemption from the nonresident fee if you are a graduate of a California school operated by the Federal Bureau of Indian Affairs and you enroll at one of the University of California campuses. Currently, Sherman Indian High School in Riverside is the only California high school operated by the BIA.

Temporary Absence

If you are a nonresident student who is in the process of establishing a residence for tuition purposes and you return to your former home during non-instructional periods, your presence in the state will be presumed to be solely for educational purposes and only convincing evidence to the contrary will rebut this presumption. **(A student who is in the state solely for educational purposes will NOT be classified as a resident for tuition purposes regardless of the length of his or her stay.)** If you are a student who has been classified as a resident for tuition purposes and you leave the state temporarily, your absence could result in the loss of your California residence. The burden will be on you (or your parents if you are a minor) to verify that you did nothing inconsistent with your claim of a continuing California residence during your absence. Steps that you (or your parents) should take to retain a California residence include:

1. Continue to use a California permanent address on all records—educational, employment, military, etc.

2. Satisfy California resident income tax obligations. (Note: If you are claiming California residence, you are liable for payment of income taxes on your total income from the date you establish California residence. This includes income earned in another state or country.)

3. Retain your California voter's registration and vote by absentee ballot.

4. Maintain a California driver's license and vehicle registration. If it is necessary to change your driver's license and/or vehicle registration while you are temporarily residing in another state, you must change them back to California within the time prescribed by law.

5. Maintain active bank accounts.

Classification to Resident Status

All changes of status must be initiated prior to the payment deadline for the term which you intend to be reclassified.

Incorrect Classification

If you were incorrectly classified as a resident, you are subject to reclassification and to payment of all nonresident tuition fees not paid. If you concealed information or furnished false information and were classified incorrectly as a result, you are also subject to University discipline. Resident students who become nonresidents must immediately notify the campus residence deputy.

Inquiries and Appeals

Inquiries regarding residence requirements, determination and/or recognized exceptions should be directed to the Residence Deputy, Office of the University Registrar, One Shields Avenue, Davis, California 95616, (530-752-4749). **NO OTHER UNIVERSITY PERSONNEL ARE AUTHORIZED TO SUPPLY INFORMATION RELATIVE TO RESIDENCE REQUIREMENTS FOR TUITION PURPOSES.** You are cautioned that this summary is **not** a complete explanation of the law regarding residence. *Please note that changes may be made in the residence requirement between the publication of this statement and the relevant residence determination date.* Any student, following a final decision on residence classification by the residence deputy, may appeal in writing to the legal analyst (Legal Analyst—Residence Matters, 1111 Franklin St., 8th Floor, Oakland, CA 94607-5200) within 45 days of notification of the residence deputy's final decision.

UNIVERSITY POLICY ON NONDISCRIMINATION, SEXUAL HARASSMENT, STUDENT RECORDS AND PRIVACY

Nondiscrimination. The University of California, in accordance with applicable Federal and State law and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (pregnancy includes pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), disability, age, medical condition (cancer-related), ancestry, marital status, citizenship, sexual orientation, or status as a Vietnam-era veteran or special disabled veteran. The University also prohibits sexual harassment. This nondiscrimination policy covers admission, access, and treatment in University programs and activities.

Inquiries regarding the University's student-related nondiscrimination policies may be directed to Director, Student Judicial Affairs, 530-752-1128.

Sexual Harassment. Sexual harassment is prohibited by law and by university regulation, and will not be condoned on the UC Davis

properties or in connection with campus functions or activities (Policy 380-12). The Sexual Harassment Education Program (752-2255) provides information and assists in resolving complaints of sexual harassment informally. Formal grievance procedures for student complaints charging legally impermissible discrimination (Policy 280-05) are available on the Internet and may be used to bring complaints of sexual harassment or other discrimination. Students should seek assistance as soon as possible (time limits apply to filing formal complaints) and may receive informal counseling and/or referrals by contacting the Sexual Harassment Education Program, the Office of Student Judicial Affairs, the ASUCD Student Grievance Center, the Counseling Center or the Women's Resources and Research Center.. Formal complaints may be filed with the vice chancellor or dean of the school or college in which the alleged discrimination or harassment occurred.

Disclosures from Student Records. In accordance with the Federal Family Educational Rights and Privacy Act of 1974 and campus procedures implementing the University of California Policies Applying to the Disclosure of Information from Student Records, students at the Davis campus have the following rights:

- To inspect and review their own student records within 45 days of the date of receipt of a written request for access. Students should submit their requests in writing, identifying the records they wish to inspect and review, to the University Registrar, dean, department chair, or other official for the office having custody of the requested records. The campus official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the official receiving the request, the student's request shall be redirected to the correct official and the student so advised.
- To request amendment of their own student records, if they believe the records are inaccurate or misleading, by submitting a written request to the campus official responsible for the record, clearly identifying the portion of the record they want changed, and specifying why it is believed to be inaccurate or misleading. If the official determines that the record should not be amended as requested by the student, the student is notified , advised of the right to a hearing, and provided with information regarding the hearing procedures.
- To restrict the disclosure of personally identifiable information contained in student records without the student's consent, except when law and policy otherwise permit. One exception is that student records may be disclosed without consent to campus officials having a legitimate educational interest in the records. A "campus official" is any individual designated to perform an assigned function on behalf of the campus. "Legitimate educational interest" means the record is relevant and necessary to accomplishing a task (i) specifically related to the official's participation in the student's education, (ii) specifically related to the discipline of the student; or (iii) specifically related to providing a service or benefit relating to the student or student's family, such as health care or financial aid. Another exception is "directory" information, [which would not generally be considered harmful or an invasion of privacy if disclosed], unless the student has notified the Office of the University Registrar that such information is to be treated as confidential with respect to him/herself. At UC Davis, the following categories of information regarding students are designated "directory" information: the student's name, address(es) and telephone number(s)(local and/or permanent including e-mail addresses); major field of study; dates of attendance; number of course units in which enrolled; degrees and honors received; most recent previous educational institution attended; participation in officially recognized activities, including intercollegiate athletics, and the name, weight, and height of participants on intercollegiate athletic teams.

  Parental/guardian information is confidential. It is used by UC Davis only for notification of events, ceremonies, awards, and development or in case of an emergency involving the student.
- To file a complaint with the U.S. Department of Education concerning alleged failures by UC Davis to comply with the requirements of the Federal Educational Rights and Privacy Act, addressed to the Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue, SW., Washington, DC. 20202-4605

These rights are implemented on the Davis campus by UCD Policy and Procedure Manual, Section 320-21, "Disclosure of Information from Student Records," http://www-mrak.ucdavis.edu/web-mans/ppm/welcome.htm. Questions about these rights should be referred to Student Judicial Affairs, 530-752-1128. Students may request in writing by the tenth day of instruction that their addresses, including e-mail address and telephone listings or all personally identifiable information from their records not be regarded as directory information—this means that disclosures would require the student's specific consent. Students who wish to keep their e-mail addresses confidential should go to http://mothra.ucdavis.edu/services and select "Change your whois information" from the options. If a student does not submit a form to withhold address and telephone number, the information may be released and included in a campus *Student Directory.* The decision to withhold address and phone number or all information can be initiated or reversed by filing a form with the Office of the University Registrar.

Students who withhold all information from the category of directory information must file a form in the Office of the University Registrar and should understand that if all information is designated confidential, the campus cannot make public any honors received by the student (e.g., Regents' Scholarship or Phi Beta Kappa) and cannot include the student's name and degree in the commencement program without the student's specific written consent. Similarly, the student's status as a student or graduate, as well as any degrees earned, cannot be verified for potential employers without the student's written consent.

Privacy Act. A student's Social Security number is used to verify personal identity in the UCD Student Records System. In accordance with the Federal Privacy Act of 1974, students are hereby notified that disclosure of their social security number is mandatory. This recordkeeping system was established prior to January 1, 1975 pursuant to the authority of The Regents of the University of California under Art. IX, Sec. 9, of the California Constitution.

CAMPUS SECURITY, CRIME AWARENESS, AND ALCOHOL AND DRUG ABUSE PREVENTION

In accordance with federal law, UC Davis annually provides students and employees with information regarding campus security, crime statistics, and alcohol and drug abuse prevention, pursuant to the Student Right to Know and Campus Security Act of 1990 and the Drug Free Schools Act of 1989. The UC Davis Police and Campus Administration make continual efforts to reduce crime on campus. A well-informed community is better served and safer.

For a copy of the complete UC Davis security and crime prevention report, including crime statistics, campus security measures and crime reporting procedures, applicants for admission or prospective employees may contact the UC Davis Campus Violence Prevention Office, located in the UC Davis Police Department, 530-752-3299, or e-mail jmbeeman@ucdavis.edu.

ACCREDITATION

The University of California, Davis is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges, 985 Atlantic Avenue, Suite 100, Alameda, CA 94501, (510) 748-9001, an institutional accrediting body recognized by the Council for Higher Education and the U.S. Department of Education.

UC Davis is also accredited by the Association of American Law Schools, American Bar Association, American Dietetic Association, Association of American Medical Colleges, American Association for

Accreditation of Laboratory Animal Care, Accreditation Council for Graduate Medical Education, Council on Education of the American Veterinary Medical Association, Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology, Computing Science Accreditation Commission, American Chemical Society, American Assembly of Collegiate Schools of Business, American Society of Landscape Architects, the Commission on Teacher Credentialing, and the Joint Commission on Accreditation of Hospitals. Students interested in reviewing the accreditation documents may do so by scheduling an appointment with the Office of the Provost, Mrak Hall.

THE BOARD OF REGENTS

Governance of the University is entrusted to a corporation called The Board of Regents. Of the individuals composing the board, 18 are California citizens appointed by the governor; and seven, including the president of the University and the governor of California, serve ex officio. A Student Regent is selected each year from a list of names submitted to the board by the Student Body Presidents' Council.

The Regents have delegated authority in academic matters to the Academic Senate of the faculty, which determines academic policy and supervises the instructional activities of the entire University. All of the permanent faculty, as well as key administrators, are members of the Senate.

The Regents have delegated authority for the organization of the University to the president. Robert C. Dynes is president and head of the Universitywide administration. Authority for the administration of each campus has been delegated to a chancellor.

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

Regents Ex Officio

Arnold Schwarzenegger
Governor of California and President of the Regents

Cruz M. Bustamante
Lieutenant Governor of California

Fabian Núñez
Speaker of the Assembly

Jack O'Connell
State Superintendent of Public Instruction

Laurence Seigler, M.D.
President of the Alumni Associations of the University of California

Barbara Bodine
Vice President of the Alumni Associations of the University of California

Robert C. Dynes
President of the University

Appointed Regents

(Current term expires on March 1 of year indicated)

Richard C. Blum	(2014)
Ward Connerly	(2005)
John G. Davies	(2004)
Judith L. Hopkinson	(2009)
Dolores Huerta	(2004)
Odessa P. Johnson	(2012)
Joanne C. Kozberg	(2010)
Sherry L. Lansing	(2010)
David S. Lee	(2006)
Monica Lozano	(2013)
George M. Marcus	(2012)
Velma Montoya	(2005)
John J. Moores	(2009)
Norman J. Pattiz	(2004)
Gerald L. Parsky	(2008)
Peter Preuss	(2008)
Haim Saban	(2013)
Tom Sayles	(2006)
Matthew Murray *Student Regent*	(June 30, 2004)
George Blumenthal *Faculty Representative*	(September 1, 2005)
Lawrence Pitts, M.D. *Faculty Representative*	(September 1, 2004)

Principal Officers of the Regents

James E. Holst
General Counsel

David H. Russ
Treasurer

Leigh Trivette
Secretary

ADMINISTRATIVE OFFICERS OF THE UNIVERSITY

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President of the University

C. Judson King
Provost and Senior Vice President—Academic Affairs

Joseph P. Mullinix
Senior Vice President—Business and Finance

Bruce B. Darling
Senior Vice President—University Affairs

W.R. Gomes
Vice President—Agriculture and Natural Resources

Lawrence C. Hershman
Vice President—Budget

William H. Gurtner
Vice President—Clinical Services Development

Winston C. Doby
Vice President—Educational Outreach

Anne C. Broome
Vice President—Financial Management

Michael V. Drake, M.D.
Vice President—Health Affairs

Admiral S. Robert Foley (Retired, U.S. Navy)
Vice President—Laboratory Management

Julius Zelmanowitz
Vice Provost—Academic Initiatives

Lawrence B. Coleman
Vice Provost—Research

UNIVERSITY CHANCELLORS

Robert M. Berdahl
Chancellor at Berkeley

Larry N. Vanderhoef
Chancellor at Davis

Ralph J. Cicerone
Chancellor at Irvine

Albert Carnesale
Chancellor at Los Angeles

Carol Tomlinson-Keasey
Chancellor at Merced

France A. Córdova
Chancellor at Riverside

Marsha A. Chandler
Acting Chancellor at San Diego

J. Michael Bishop
Chancellor at San Francisco

Henry T. Y. Yang
Chancellor at Santa Barbara

M.R.C. Greenwood
Chancellor at Santa Cruz

ADMINISTRATIVE OFFICERS—UC DAVIS

Chancellor

Larry N. Vanderhoef, Ph.D.

Chancellor Emeritus

Theodore L. Hullar, Ph.D.

Vice Chancellors

Virginia S. Hinshaw, Ph.D.
Provost and Executive Vice Chancellor

Stan Nosek, M.S.
Vice Chancellor—Administration

Barry M. Klein, Ph.D.
Vice Chancellor—Research

John Meyer, M.P.A.
Vice Chancellor—Resource Management and Planning

Judy K. Sakaki, Ph.D.
Vice Chancellor—Student Affairs

Celeste E. Rose, J.D.
Vice Chancellor—University Relations

Vice Provosts

Barbara A. Horwitz, Ph.D.
Vice Provost—Academic Personnel

John L. Bruno, Ph.D.
Vice Provost—Information and Educational Technology

Patricia A. Turner, Ph.D.
Vice Provost—Undergraduate Studies

William B. Lacy, Ph.D.
Vice Provost—University Outreach and International Programs

Associate Chancellor

Sally P. Springer, Ph.D.

Associate/Assistant Vice Chancellors/Provost

Rahim Reed, M.P.A., J.D.
Associate Executive Vice Chancellor—Campus Community Relations

Dennis W. Shimek, B.S.
Senior Associate Vice Chancellor—Human Resources and Risk Management and Special Advisor to the Chancellor

Karen Hull
Associate Vice Chancellor—Business Services

Kathleen Moore
Acting Associate Vice Chancellor—Facilities Operations and Management

J. Michael Allred, M.B.A.
Associate Vice Chancellor—Finance

Lynne Chronister, M.P.S.
Associate Vice Chancellor—Research Administration

Bernd Hamann, Ph.D.
Associate Vice Chancellor—Research

André Läuchli, Ph.D.
Associate Vice Chancellor—Research

Jill M. Blackwelder, B.S.
Associate Vice Chancellor—Safety Services

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Associate Vice Chancellor—Student Affairs

Cheryl Brown Lohse
Associate Vice Chancellor—University Relations (Development)

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Associate Vice Provost—International Programs

Barbara O. Schneeman, Ph.D.
Associate Vice Provost—University Outreach

Robert I. Loessberg-Zahl, M.P.P.
Assistant Executive Vice Chancellor

Beverly Sandeen, Ph.D.
Assistant Vice Chancellor—Alumni Relations/ Executive Director–CAAA

Kelly Ratliff, M.B.A.
Assistant Vice Chancellor—Budget Resource Management and Institutional Planning and Analysis

Robert Segar, M.L.A.
Assistant Vice Chancellor—Campus Planning

Richard F. Keller, B.A.
Assistant Vice Chancellor—Capital Resource Management

Marjorie M. Dickinson, B.A.
Assistant Vice Chancellor—Government and Community Relations

Maril R. Stratton, M.A.
Assistant Vice Chancellor—Public Communications

Janet C. Gong, Ed.D.
Assistant Vice Chancellor—Student Affairs

_____

Assistant Vice Chancellor—Student Affairs (Enrollment and Academic Support)

_____

Assistant Vice Chancellor—Student Affairs (Student Life)

University Librarian

Marilyn J. Sharrow, M.A.L.S.

Registrar

Jack R. Farrell, Ph.D.

Directors

Tom C. Compton, J.D.
Executive Director, Campus Unions and Campus Recreation

Greg Warzecka, M.S.
Director, Athletics

Michelle Famula, M.D.
Director, Cowell Student Health Center

Lora Jo Bossio, M.A.
Director, Financial Aid

Bob Smiggen, M.B.A.
Director, Student Housing

Daniel L. Wick, Ph.D.
Director, Summer Sessions

Leslie Campbell
Interim Director, Undergraduate Admissions and Outreach Services

Brian E. McCurdy, M.A.
Director, University Cultural Programs

College of Agricultural and Environmental Sciences

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James MacDonald, Ph.D., *Executive Associate Dean*
Lovell Jarvis, Ph.D., *Associate Dean—Human Sciences*
Michael Parrella, Ph.D., *Associate Dean—Agricultural Sciences*
Randal J. Southard, Ph.D., *Associate Dean— Environmental Sciences*
Annie King, Ph.D., *Associate Dean—Undergraduate Academic Programs*

College of Engineering

Enrique J. Lavernia, Ph.D, *Dean*
Bruce White, Ph.D., *Associate Dean—Academic Personnel and Planning*
Karen McDonald, Ph.D., *Associate Dean—Research and Graduate Studies*
Gary E. Ford, Ph.D., *Associate Dean—Undergraduate Studies*

College of Letters and Science

Elizabeth Langland, Ph.D., *Dean—Division ofHumanities, Arts, and Cultural Studies*
Winston Ko, Ph.D., *Dean—Division of Mathematical and Physical Sciences*
Steven M. Sheffrin, Ph.D., *Dean—Division of Social Sciences*
Fred E. Wood, Ph.D., *Associate Dean—Undergraduate Education*

Division of Biological Sciences (Intercollege)

Phyllis Wise, Ph.D., *Dean*
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School of Education

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Sharon Dugdale, Ph.D., *Associate Dean*

Graduate School of Management

Nicole Woolsey Biggart, *Dean*
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Melvin R. Ramey, Ph.D., *Associate Dean for Students*

School of Law

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Kevin Johnson, J.D., *Associate Dean—Academic Affairs*

School of Medicine

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Michael Wilkes, Ph.D., *Associate Dean—Medical Education*
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Beth Mourning, *Assistant Dean—Health Sciences Advancement*
Faith Fitzgerald, M.D., *Assistant Dean—Student Affairs*
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Kent K. C. Lloyd, D.V.M., Ph.D., *Associate Dean—Research and Graduate Education*
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Donald J. Klingborg, D.V.M., *Assistant Dean—Public Programs and Director—Veterinary Extension*
David W. Hird, D.V.M, M.P.V.M., Ph.D., *Director, Master's of Preventive Veterinary Medicine Program*

University Extension

Dennis Pendleton, Ph.D., *Dean*

PROPORTION OF UC DAVIS GRADUATES FINDING WORK IN THEIR FIELDS OF CHOICE[1]

The percent of alumni whose full-time job is in the field of their choice is shown by field of study. Figures do not include the 13 percent of graduates who had not decided on a career field at the time of the survey.

Field of Study[2], Percentage finding work in field of choice

Agricultural Sciences, 78
Biological Sciences, 74
Engineering, 86
Environmental Sciences, 83
Humanities, Arts and Cultural Studies, 68
Human Sciences, 75
Mathematical and Physical Sciences, 68
Social Sciences, 60

Total, 72

[1]Source: A 2003 survey of June 2002 graduates conducted by Student Affairs Research and Information.
[2]Fields of Study are groups of related undergraduate majors as organized into UC Davis colleges or divisions.

RETENTION DATA[1] AND GRADUATION RATES AT UC DAVIS

Freshmen

(Retention and graduation rates through Spring 2000 for all undergraduates entering UC Davis as freshmen.)

Fall Quarter of Initial Enrollment:	Number of Students	Percent Enrolled 4 Quarters	*Percent Graduating in 12 Quarters	*Percent Graduating in 15 Quarters
1990	3,230	94%	39%	74%
1991	2,356	93%	37%	73%
1992	2,930	93%	38%	73%
1993	3,179	94%	35%	73%
1994	3,232	93%	35%	70%
1995	3,319	92%	36%	73%

Transfer Students

(Retention and graduation rates through Spring 2000 for all undergraduates transferring to UC Davis as juniors.)

Fall Quarter of Initial Enrollment:	Number of Students	Percent Enrolled 4 Quarters	*Percent Graduating in 6 Quarters	*Percent Graduating in 9 Quarters
1991	658	93%	42%	80%
1992	862	93%	44%	78%
1993	863	93%	38%	78%
1994	1,066	94%	38%	78%
1995	1,091	94%	35%	77%
1996	1,111	92%	38%	76%
1997	1,017	92%	41%	77%

*These are not necessarily quarters of continuous enrollment. Students may drop out or go on Planned Educational Leave for a quarter or longer, and then resume their studies. (There are three quarters in each academic year.)

[1]Source: Student Affairs Research and Information, UC Davis (January 2002).

AVERAGE YEARLY SALARY OFFERED TO GRADUATES WITH BACHELOR'S, MASTER'S, AND DOCTORATE DEGREES[1]

Field of Study:	Average Yearly Salary		
	Bachelor's	Master's	Doctorate
Engineering	$48,329	$57,481	$75,030
Humanities/Social Sciences	$29,924	$37,858	$39,825
Health Sciences/Life Sciences	$32,038	$45,384	$40,400
Physical Sciences	$36,577	$47,060	$58,582

[1]Source: 2002–2003 National Salary Survey data provided by the National Association of Colleges and Employers.

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