

ENGR 570

COUPLED ELECTROMECHANICAL SYSTEMS

Offered in Fall

Prereqs: ECE202 or ECE204

DESCRIPTION

Coupled electrical and mechanical systems and the analysis of energy transfer between these systems. Analysis of field energy and the relationship between electrical, mechanical and electromagnetic forces. Analysis and design of linear motors, servomotors, DC and motors are presented. Other topics include inductively coupled charging circuits and vibrational modes that can arise between coupled electrical and mechanical systems.

COURSE OBJECTIVES

Numerous practical applications require energy transfer between coupled electrical and mechanical systems. Through the examination of coupling fields and derivation of physics-based equivalent circuit representations, students will gain the ability to understand, model, and design a large class of electromechanical devices such as linear, servo, DC and AC machines. This course also provides a foundational knowledge for other courses such as robotics and hybrid electric vehicles.

Students successfully completing this course will be able to:

- Describe energy transfer between electromechanical systems through field coupling
- Model electromagnetic circuits and devices
- Interpret basic principles for drive systems
- Illustrate the basic principles of inductively coupled charging
- Explain the basic principles of vibrational modes

