

## **ECE6683 -- ELECTRIC DRIVES**

Objective: The design of an electrical drive system involves consideration of many factors such as steady-state performance, starting, dynamic and regenerative braking, plugging and reverse direction operation, speed control, sudden and temporary overloads, ambient conditions and mechanical coupling. The course is designed to treat the above topics through theory and analytical studies that include technical understanding of mechanical characteristics of the electrical motors as well as the driven machines.

Course outline: Translation of load performance characteristics to the motor shaft; Electromechanical energy conversion; Acceleration and deceleration time; Construction of load diagram; Choice of motor type and size for different duty cycles; Four quadrant motor operation; Basics of Direct-Current and Induction motor drives; Permanent magnet and synchronous drives; Electrical braking modes; Conventional and modern speed control of DC and AC drives. Also included are many worked examples taken from practical electric drive systems.

Intended audience: Design and supervising engineers working in the area of electrical power systems for utility, architects and engineering firms, and commercial and industrial companies.

Prerequisite: ECE3824 – Electric Energy Conversion Systems.

Text book: G.K. Dubey, “Fundamentals of Electric drives,” Alpha Science, 2nd Ed., 2001; ISBN #1-84265-083-1  
Chapters: 1; 2; 4; 5.1 to 5.3, 5.5 to 5.9, 5.12, 5.18, 5.19; 6.1, 6.5, 6.6, 6.8, 6.9, 6.11, 6.12, 6.13, 6.20

Grading Policy:  
Home work ..... 10%  
Midterm exam ..... 30%  
Final exam ..... 60%