

## ELEG 5533 - POWER ELECTRONICS AND MOTOR DRIVES

Spring Semester, 1996

Catalog Data: ELEG 5533. Power Electronics and Motor Drives. 3 credit hours. V-I characteristics of Insulated Gate bipolar Transistors (IGBTs) and MOS-controlled Thyristors (MCTs), design of driver and snubber circuits, induction-, permanent magnet-, brushless dc-motor drives; and resonant inverters. 1995-96 Prerequisite: graduate standing or ELEG 3223 and 3303.

Textbook: N. Mohan, T. Undeland, W. Robbins, Power Electronics: Converters, Applications and Design, John Wiley & Son, 1995.

References: J. Kassakian, M. Schlecht, G. Verghese, Principles of Power Electronics, Addison Wesley, 1991. M. Rashid, Power Electronics: Circuits, Devices and Applications, Prentice Hall, 1988.

Coordinator: Juan Carlos Balda, Associate Professor of Electrical Engineering

Goals: To acquaint the students with the design of power electronics converters, specially inverters, as well as the operation and design of motor drive systems.

Prerequisites by Topic:

1. Basic knowledge of diode and transistors circuits.
2. Basic knowledge of electric machines.

Topics:

1. Insulate Gate Bipolar Transistors
2. Driver circuits for IGBTs
3. Snubber circuits for IGBTs
4. Design and layout for power electronics
5. Introduction to motor drives
6. Induction motor drives
7. Permanent magnet synchronous motor drives
8. Brushless dc motor drives
9. Resonant inverters

Computer Usage:

Homework and class-project assignments requiring the use of Pspice.

Laboratory and Class Projects:

Students are required to perform four experiments dealing with the use of lab equipment as well as the connection and operation of different types of motor drives. In addition, the students are given a class project; the design of a boost converter for power factor correction of a three-phase diode bridge rectifier is the class project for the Spring 1996.

ABET category content as estimated by faculty member who prepared this course description:

Engineering Science: 1 credit or 33%.  
Engineering Design: 2 credits or 67%.

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_