ECE500 - Advanced Industrial Electronics and Motor Contorls

Fall 2002

Catalog data (Proposed 2002-03

Prerequisite: ECE311, ECE415, ECE446, ECE460 and equivalents
Motor drives including DC, induction, synchronous and reluctance; industrial and residential application of power electronics; practical aspects of the design of power electronics devices including snubber circuit, gate drives, heat sink design and magnetic components design. Three lecture hours per week and one three-hour lab every two weeks

Textbook

Mohan, Undeland and Robbins, *Power Electronics,* John Wiley & Sons, Second Edition

Reference

Bose, B K, *Power Electronics and Variable Frequency Drives: Technology and Applications*, IEEE Press, 1997

Coordinator

Prof. C. Mi, Dept. of Elec. & Comp. Eng.

Prerequisites by topics

1) Circuits Analysis
2) Electronics
3) Power Electronics
4) Electrical Energy Conversion
5) Automatic Control Systems

Topics

1)	Review of power electronics	1.5 hours
2)	Review of electrical machines	1.5 hours
3)	DC motor drives	4.5 hours
4)	Induction motor drives	6 hours
5)	Synchronous motor drives	6 hours
6)	Reluctance motor drives	1.5 hours
7)	Residential applications	3 hours
8)	Industrial applications	3 hours
9)	Snubber circuits	3 hours
10)	Gate drive circuits	3 hours
11)	Heat sink design	3 hours
12)	Design of magnetic components	3 hours
13)	Exam	3 hours

Laboratory projects

1) Switching DC power supplies
2) Closed-loop control and four quadrate operation of DC machines
3) Field oriented control of induction machines
4) Closed-loop speed control of synchronous machine

Computer Usage

1) Simulation of closed-loop control using Matlab
2) Programming using Assembly C

Prepared by Prof C. Mi **Date: October 18, 2001**