

ECE 31000 – Motor Engine Control

Type of Course

Elective for the CmpE (Group 2) and EE (Group 1) programs

Catalog Description

This course provides students with an introduction to electrical motors, generators, and related electrical and mechanical devices used in industrial applications. Topics include the design and applications of transformers, semiconductor amplification and switching devices, solid state relays, semiconductor input devices, programmable logic controllers, and motor drives.

Credits

3

Contact hours

3

Prerequisite Courses

ECE 20100 and PHYS 25100

Corequisite Courses

None

Prerequisites by Topics

Understanding of the design and analysis of basic linear circuits, elementary electromagnetics, and elementary physics and mechanics.

Textbook

Electrical Motor Controls for Integrated Systems, Gary J. Rockis and Glen A. Mazur, American Technical Publishers, 5th edition.

Course Objectives

To provide the students with practical applications knowledge of electric motors and drives utilized in industrial control systems, mechatronics, and industrial automation.

Course Outcomes

Students who successfully complete this course will have demonstrated

1. An understanding of the structure, design, and operating characteristics of AC and DC motors in various types of industrial applications. (1)

2. An ability to analyze a given mechatronic system containing motors and design an appropriate control system. (2)
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4. 3. An understanding of various manufacturing processes requiring motion control. (4)
5. An ability to determine the proper sensing devices for a given
6. motor control application and how to interface with a programmable logic controller. (6)
7. Knowledge of real world applications for motion and control devices. (7)

Lecture Topics

1. Basic electric theory review
2. Logic functions, control circuits, line diagrams
3. Electromagnetic solenoids and coils
4. AC/DC motors and generators
5. Electric braking of motors
6. Motor load, torque, and starting circuits
7. DC power sources
8. Photoelectric Sensors and semiconductor input devices
9. Power switching devices and solid state relays
10. AC/DC motor drives
11. Programmable Logic Controllers

Computer Usage

Medium

Laboratory Experience

Low

Design Experience

Low

Coordinator

Guoping Wang, Ph.D.

Date

08/18/2022