

<b>Course</b>	ECE 31000 – Motor Engine Control
<b>Type of Course</b>	Elective for the CmpE (Group 2) and EE (Group 1) programs
<b>Catalog Description</b>	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.
<b>Credits</b>	3
<b>Contact hours</b>	3
<b>Prerequisite Courses</b>	ECE 20100 and PHYS 25100
<b>Corequisite Courses</b>	None
<b>Prerequisites by Topics</b>	Understanding of the design and analysis of basic linear circuits, elementary electromagnetics, and elementary physics and mechanics.
<b>Textbook</b>	<i>Electrical Motor Controls for Integrated Systems, Gary J. Rockis and Glen A. Mazur, American Technical Publishers, 5th edition.</i>
<b>Course Objectives</b>	To provide the students with practical applications knowledge of electric motors and drives utilized in industrial control systems, mechatronics, and industrial automation.
<b>Course Outcomes</b>	Students who successfully complete this course will have demonstrated: <ol style="list-style-type: none"><li>1. An understanding of the structure, design, and operating characteristics of AC and DC motors in various types of industrial applications. (1)</li><li>2. An ability to analyze a given mechatronic system containing motors and design an appropriate control system. (2)</li></ol>

3. An understanding of various manufacturing processes requiring motion control. (4)
4. An ability to determine the proper sensing devices for a given motor control application and how to interface with a programmable logic controller. (6)
5. 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.

**Instructor**

Steve O'Shaughnessey  
Mfg Engineering & Facilities Manager  
Trelleborg Sealing Solutions US, Inc.

**Date**

08/18/2022