

**MIAMI UNIVERSITY
SCHOOL OF APPLIED SCIENCE
DEPARTMENT OF ENGINEERING TECHNOLOGY**

ENT 291	INDUSTRIAL ELECTRONICS	3
Course Number	Title	Credit Hours

DESCRIPTION:

A study of the basic components and systems used in industrial electronics including operational amplifiers, linear integrated circuits, brushless and stepper dc motors, ac motors, control devices, optoelectronics, pulse modulation, sequential process control and digital logic.

PREREQUISITE: ENT 196 Electronics

This course, ENT 291 is a prerequisite to ENT 296 Programmable Logic Controllers

TEXT MATERIAL:

Humphries, J. Industrial Electronics, Fourth Edition, Delmar

COURSE OBJECTIVES:

The student will develop an understanding of the application of linear, digital, and power electronics to industrial control systems.

COURSE OUTCOMES:

Students completing this course will have an understanding of, and ability to apply:

- Operational amplifiers
- Linear integrated circuits – VFC, VCO, PLL. FVC
- DC motor controls
- Stepper motor controls
- AC controls
- Optoelectronics
- Digital logic
- Pulse modulation
- Sequential process control

MEETING PLACE AND TIME:

INSTRUCTOR:

Instructor:

Office Hours:

NOTES:

1. The instructor may make changes as deemed necessary.
2. The order may be changed depending upon students'/instructor's needs.
3. Homework assignments and laboratory reports are due at the beginning of the next class meeting.
4. Late submissions of assignments will result in a reduced grade.

METHOD OF EVALUATION:

Tests	10% ea.	40%
Homework		10%
Labs		20%
Final Exam		25%
Oral presentation		5%

90-100% = A, 80-89% = B, 70-79% = C, 60-69% = D, below 60% = F

TOPICAL OUTLINE AND SCHEDULE:

Class	Date	Book Section & Topics	Labs and Tests	Homework
1		Ch. 1: Operational Amplifiers p.1-20	Lab 1: Instrumentation Amplifier	1,3,5,6,9
2		Ch. 1: Operational Amplifiers p.20-41	Lab 2: Active filter	13,17,21,29
3		Ch. 2: Linear Integrated Circuits	Lab 3: VFC and FVC	1,3,5,7,13,15
4		Ch. 2: Linear Integrated Circuits	Test 1	17,19,21,24,25
5		Ch. 3: DC Generator and Motor p.91-109 Ch. 4: PM DC Motor p.136-143	Lab 4: Stepper Motor	1-4 ($K_{emf} = .311$) 1,2
6		Ch. 4: Brushless and Stepper DC Motors, Optical Encoders p.143-171	Lab 4: Stepper Motor (cont.)	3,4
7		Ch. 6: Industrial Control Devices, SCR p.212-241	Test 2	1,2,8
8		Ch. 6: Thyristers with AC p.242-253 Ch. 7: DC Power Control Circuits p.269-281	Lab 5: SCR	9,19 1,4
9		Ch. 5: AC Motors p.173-187 Ch. 7: AC Motor Control p.297-301	Lab 6: Variable Frequency Drive	4,5,6 2,3
10		Ch. 9: Optoelectronics p.375-388, 418-432	Test 3	1,2,3,4,12,13,14
11		Digital Logic - Combinational	Lab 7: Comb. Logic	Handout
12		Digital Logic – Flip-Flops and Sequential	Lab 8: Sequential Logic	Handout
13		Digital Logic – MSI circuits	Test 4	Handout
14		Ch. 11: Pulse Modulation	Lab 9: PWM	9,11,12,13,14
15		Ch. 13: Sequential Process Control, Eval.	Lab 10: Relay Control	4,5,9
16			Final Exam	

MIAMI UNIVERSITY LEARNING COMMUNITY:

Miami University is committed to fostering a supportive learning environment for all students irrespective of individual differences in gender, race, national origin, religion, handicapping condition, sexual preference, or age. Students should expect, and help create, a learning environment free from all forms of prejudice. Disparaging comments, sexist or racist humor, or questioning the academic commitment of students based upon these individual differences are behaviors that undermine our learning community. If such behaviors occur in class or lab, please seek the assistance of your instructor or department chair.