

University of Toledo

Electrical Engineering Technology

Master Syllabus

Course Title: Mechatronics I

Course Code & Number: EET-2410

Credit Hour Total: 4

Weekly Contact Lecture Hours: 3

Lab Hours: 2

Prerequisite: EET-2210

Text: Web based text at www.emg.utoledo.edu/~wevans "Hybrid Text"

Course Coordinator: Evans

A. Course Description:

A study of programmable controllers emphasizing program development, logic development and troubleshooting. Emphasis on relays, timers, counters, integer math and scan-dependent programming. Factory floor control concepts are stressed.

B. Related Program Outcomes:

ABET/Student Outcomes

- d. Students are encouraged to use creativity in the design and use of programmable logic controller systems and processes.
- e. In lab experiments, students are encouraged to function as part of a team.

EET Program Outcomes

None

C. Course Objectives:

In this course students are expected to:

1. Develop an understanding of the programming processes necessary to control a real-time process
2. Develop an understanding of the interaction between hardware and software in a real-time system
3. Work effectively in the laboratory with lab partners
4. Develop an understanding of the processes necessary to organize and complete a programmable controller project

D. Course Outline – Major Content Areas

- Introduction to Relay Logic
- Introduction to PLC programming on the PC
- Introduction to the A-B instruction set
- The Siemens instruction set
- Hardware considerations
- Addressing
- Relay Instructions
- Timer and Counter instructions
- Integer Math
- Comparison Instructions
- Control Panel Construction
- Control Elements exterior to the Control Panel
- Sequential Logic Programming and State Diagrams
- User Specific Instructions

E. Major Laboratory Topics

- Basic Ladder Logic wiring
- Motor Starter wiring
- Introduction to RSLogix
- Introduction to simple combinational logic
- Simple timer and combinational logic to control a traffic intersection
- Simple math and counter operations to control a McDonald's style cash register
- Full adder logic to add/subtract 16-bit binary integers
- A multiplexer wired and programmed
- More complicated logic – Three pump floating master
- Sequential batching program using indirect addressing