

Introduction to Programmable Logic Controllers

Outline of Instruction

Course Information

Organization	Monroe County Community College, Applied Science and Engineering Technology
Development Date	8/26/2009
Course Number	ELEC-130
Potential Hours of Instruction	60
Total Credits	3

Description

The course introduces the concepts and applications of the control and protection of industrial machines and systems through the use of programmable logic controllers (PLCs).

Major Units:

1. PLC Definition, Configuration and History
2. Basic Ladder Logic: Relays, Contacts, Programming
3. Program Control, Subroutines, Scan Sequence
4. Timers and Counters
5. Number Systems and Math Operations
6. Analog I/O
7. Compare Operations
8. Sequencers
9. Touchscreens/Graphic Displays
10. Safety
11. Troubleshooting

Types of Instruction

Instruction Type	Contact Hours	Credits
Lecture/Lab	60	4

Textbooks

Mazur and Weindorf. *Introduction to Programmable Logic Controllers*.

Learner Supplies

Proto-board.

Scientific Calculator.

Optional: Needle-Nose pliers, Diagonal Cutters and Wire Strippers.

Prerequisites

ELEC 125 (Fundamentals of Electricity)

Exit Learning Outcomes

General Education Outcomes

- A. Apply mathematical approaches to the interpretation of numerical information
- B. Use computer technology to communicate information
- C. Communicate ideas in writing using the rules of standard English
- D. Apply mathematical approaches to the analysis of numerical information
- E. Demonstrate an understanding of the process of scientific inquiry
- F. Use computer technology to retrieve information

Course Outcomes

- 1. **Explain the advantages of Programmable Logic Controllers (PLCs) versus hard-wired automation.**
- 2. **List the component parts of a PLC and describe the function of each.**
- 3. **Configure a PLC system by defining I/O, Internal Memory, and Communication Parameters.**
- 4. **Program a PLC using standard interface software.**
- 5. **Apply I/O addresses in accordance with the PLC manufacturer's addressing scheme and in accordance with the physical wiring to the input rack and from the output rack**
- 6. **Debug a PLC program to verify correct function.**
- 7. **Apply relay type PLC instructions properly (Examine-On, Examine-Off, and Output Energize) in a program.**
- 8. **Apply timer and counter instructions in a program.**
- 9. **Perform calculations in hex, binary and octal number systems and program PLC's to do similar math operations.**
- 10. **Write PLC Logic to Manipulate String Data.**
- 11. **Program Touchscreens or other Human Machine Interfaces (HMI's) to Interface with PLC Logic.**