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

<table>
<thead>
<tr>
<th>Instruction Type</th>
<th>Contact Hours</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Lecture/Lab</td>
<td>60</td>
<td>4</td>
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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.