Mohawk valley community college  
Utica and Rome New york

ET 141 Programmable Logic Controllers

3.0 Credit Hours

1. Course or Catalog Description:

ET141 Programmable Logic Controllers C-2 P-2 Cr-3

This course is a study of the types, applications, and use of Programmable Logic Controllers (PLCs). It includes methods for developing PLC ladder programs, PLC installation, wiring, operation, maintenance, and troubleshooting. Experience is provided using Allen Bradley MicroLogix, SLC500, and Compactlogix PLCs, as well as the Logixpro PLC Simulator.

Prerequisites: ET151 Circuits 1 and ET153 Introduction to Electronics or ET111 and ET104 Systems Diagrams.

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Co-requisite: None

1. Required Texts, Reading, Materials:
2. STUDENT LEARNING OUTCOMES:

By the end of this course, the student should be able to:

1. Describe the operation and components of a PLC system.
2. Identify electrical and safety requirements to install and interface a PLC system.
3. Explain I/O addressing and the corresponding file image table.
4. Describe the PLC scan sequence and PLC operating modes.
5. Create correct ladder logic programs.
6. Use PLC timers and counters with associated circuitry to control a system.
7. Interpret relay ladder schematics and convert to ladder logic diagrams.
8. Identify sensors, actuators, and controls used in PLC systems.
9. Explain the methods used for program control in a PLC system.
10. Differentiate between data manipulation methods and explain purposes of data instructions.
11. Use PLC sequencers and shift-registers with associated circuitry to control a system.
12. MAJOR COURSE TOPICS:

**Topics**

1. Programmable Logic Controllers (PLC) an overview
2. PLC Hardware components
3. Number Systems and Codes
4. Fundamentals of Logic
5. Basic of PLC Programming
6. Developing Fundamental PLC Wiring Diagrams and Ladder Logic Programs
7. Programming Timers
8. Programming Counters
9. Program Control Instructions
10. Data Manipulation Instructions
11. Math Instructions
12. Sequencers and Shift Registers Instructions
13. PLC Installation Practices, Editing and troubleshooting
14. Process Control Network

Optional: PLC Standards and IEC 61131-3 Sequential Flow Charts

1. LABORATORY TOPICS:

Student will participate in the laboratory exercises. At the end of each laboratory a lab report will be submitted as part of the grading.

1. LAB – Programmable Logic Controllers (PLC) overview and start up
2. LAB – PLC Hardware components and Data
3. LAB – Number Systems and Codes
4. LAB – Fundamentals of Logic
5. LAB – Basics of PLC Programming
6. LAB – Development of Fundamental PLC Wiring Diagrams and Ladder Logic Programs
7. LAB – Programming Timers
8. LAB – Programming Counters
9. LAB – Program Control Instructions
10. LAB – Data Manipulation Instructions
11. LAB – Math Instructions
12. LAB – Sequencer and Shift Register Instructions
13. LAB – Project or HMI lab
14. LAB – Project or Make up as needed

# **COURSE NAME: \_\_\_\_\_** **ET 141 Programmable Logic Controllers**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## **DATE FACULTY NAME CHANGE INPUT MEASUREMENT ASSESSMENT ACTION**

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| **2/1/14** | **R.C. Decker** | **New Outline for Proposed Course** | **Industry and Grant Activity** | **Course review and adaptation** |  |  |
| **1/21/16** | **M Higgins** | **Add disclaimers** | **College Requirements** |  |  |  |
| **6/9/17** | **M Higgins** | **Update course outline**  **And add boiler plate** | **From Sybil web page** |  |  |  |
| **8/17/19** | **M Higgins** | **Update CRNs, Sec #’s, Text** | **SIRS** |  |  |  |
| **8/22/21** | **M Higgins** | **Update CRNs, Sec #’s, Text** | **SIRS** |  |  |  |
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