

Common Course Numbering System

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Course: ELT 258

Title: Programmable Logic Controllers

Long Title: Programmable Logic Controllers

Course Description: Covers the fundamentals of programmable logic controllers (PLCs) as they are applied in robotics and automation. Includes history, terminology, typical applications, hardware, and software. Incorporates lab and project activities that address operating, monitoring, programming, troubleshooting, and repairing PLC controlled lab trainers as well as actual industrial equipment.

Min Credit: 3

Max Credit:

Origin Notes:

PCC

STANDARD COMPETENCIES:

- I. Discuss the evolution and history of relay logic controls from electromechanical relays, drum switches, mechanical timers/counters, etc. to the multiprocessor, multitasking Programmable Logic Controllers (PLC) systems used today.
- II. Define critical terminology used with PLCs and PLC controlled automation systems.
- III. Match definitions with a broad range of terms used in PLC controlled automation systems.
- IV. Describe typical and specific applications of Programmable Controllers in the manufacturing sector.
- V. Name and describe the function of each block in a PLC system block diagram.
- VI. Label and describe the major parts on the electronic schematic for a PLC digital input and output card.
- VII. Differentiate between sinking and sourcing input/output interface circuits.
- VIII. Demonstrate the different voltage measurement methods for testing sinking as opposed to sourcing input/output cards.
- IX. Demonstrate quality wiring practices while interfacing equipment to PLC I/O cards.
- X. Draw the symbols and explain the three basic elements of relay logic: normally open contacts, normally closed contacts and coils.
 - A. Correlate the on/off status of internal bit addresses with the conditions of the corresponding I/O terminals and devices.
 - B. Enter, download and test a PLC ladder diagram using PLC programming software.
- XI. Use online monitoring to locate and record the status of inputs, outputs, and program logic during the operation cycle of machines and processes.
- XII. Correlate ladder programs logic with machines and process descriptions.

- XIII. Write ladder logic programs based on machine and process descriptions.
- XIV. Use on line monitoring to locate and record critical PLC status information.
- XV. Discuss safety considerations in the configuration, programming and maintenance of PLC hardware and software.
- XVI. Discuss advanced PLC topics including analog I/O, intelligent I/O modules, PLC networking etc.
- XVII. Demonstrate proper and safe practices while removing and replacing PLC modules.
- XVIII. Apply a methodical troubleshooting approach to locate malfunctioning I/O devices (switches, sensors, relays, solenoids etc.) on PLC controlled machines and processes.
- XIX. Apply a methodical troubleshooting approach to diagnose and correct malfunctions within the PLC itself.

TOPICAL OUTLINE:

- I. Introduction to PLCs
- II. PLC Hardware Architecture
- III. I/O Interfacing and Addressing
- IV. Relay Logic and PLC Ladder Logic Programs
- V. Online Monitoring I/O and Processes
- VI. PLC Programming
- VII. Troubleshooting PLC Controlled Machines and Processes
- VIII. Troubleshooting PLC Hardware and Software
- IX. PLC Safety Considerations

Course Offered At:

Front Range Community College FRCC
Pueblo Community College PCC
Pikes Peak Community College PPCC

RELEASE: 8.5.3

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