

## **ELEI 212**

### **Programmable Controllers**

**3 Credits (2 hours lecture, 2 hours lab)**

## Community College of Baltimore County Common Course Outline

### Description

**ELEI 212 - Programmable Controllers:** provides an overview of commonly used industrial programmable controllers, ladder logic emphasizing applications, and troubleshooting of programmable controller systems. Students gain hands-on experience in the lab portion of the course with programmable logic controller (PLC) software and hardware.

**Pre-requisites:** ELEI/ENSC 204 or consent of the program director

### Overall Course Objectives

Upon completion of this course, students will be able to:

1. analyze the hardware organization and operation of a PLC;
2. describe the interaction of PLCs and Distributed Control Systems (DCSs) in plant automation systems;
3. analyze PLC relay logic;
4. analyze ladder logic diagrams;
5. write PLC ladder logic programs using basic instructions;
6. use timer instructions to develop PLC applications;
7. troubleshoot PLC logic programs;
8. use counter instructions to develop PLC applications;
9. apply data manipulation and math instructions to develop PLC applications;
10. diagnose PLC software and hardware faults;
11. analyze different methods in which a PLC can be used for process control; and
12. analyze different schemes used to network PLCs in plant floor applications.

### Major Topics

- I. PLC Hardware and Systems
  - a. Processors
  - b. Power Supply
  - c. Memory and I/O
- II. PLC Programming
  - a. Analog and Discrete I/O Systems
  - b. Special Function I/O
  - c. Serial Communications

- III. Designing Applications
  - a. Using Timer Instructions
  - b. Using Counter Instructions
  - c. Using Math Instructions
- IV. Diagnosing PLC Software and Hardware Faults
- V. Process and Plant Systems

### **Course Requirements**

Grading will be determined by the individual faculty member, but shall include the following, at minimum:

- 4 Homework Assignments
- 2 Exams
- 5 Lab Assignments
- Final Exam

### **Other Course Information**

Components of this course are taught in a computerized lab environment.

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