ELC-228 PLC Applications

COURSE DESCRIPTION:

Prerequisites: None

Corequisites: None

This course continues the study of the programming and applications of programmable logic controllers. Emphasis is on advanced programming, networking, advanced I/O modules, reading and interpreting error codes, and troubleshooting. Upon completion, students should be able to program and troubleshoot programmable logic controllers.
Course Hours per Week: Class, 2. Lab, 6. Semester Hours Credit, 4.

LEARNING OUTCOMES:

Upon completing requirements for this course, the student will be able to:

1. Become proficient at programming in ladder logic
2. Learn structured text programming
3. Learn sequential function chart programming
4. Learn function block programming
5. Learn how to use tag addressing
6. Use compare and logic instructions
7. Design new programs in many of the programming languages
8. Practice using subroutines in Studio 5000
9. Implement a start-stop functions in other programming languages

OUTLINE OF INSTRUCTION:

I. Introduction to IEC 61131-3 Programming
   - A. Overview
   - B. Ladder Diagram
   - C. Sequential Function Chart
   - D. Function Block Diagram
   - E. Structured Text

II. Alarm Instructions
   - A. Digital Alarm
   - B. Analog Alarm

III. Input/Output Instructions
   - A. Message
   - B. Get System Value
   - C. Set System Value
   - D. Immediate Output

IV. File and Miscellaneous Instructions
   A. File Arithmetic and Logic
   B. File Search and Compare
   C. Copy File
   D. Fill File
   E. Average File
   F. Sort File
   G. Standard Deviation
   H. Size in Elements

V. File and Shift Instructions
   A. Bit Shift Left
   B. Bit Shift Right
   C. FIFO Load
   D. FIFO Unload
   E. LIFO Load
   F. LIFO Unload

VI. Sequencer Instructions
   A. Sequencer Input
   B. Sequencer Output
   C. Sequencer Load

VII. Equipment Phase Instructions

VIII. Program Control Instructions
   A. Jump to Label
   B. Label
   C. Jump to Subroutine
   D. Jump to External Routine
   E. Return from Subroutine
   F. Subroutine Label
   G. Temporary End

IX. For/Break Instructions

X. Special Instructions

XI. Trigonometry Instructions

XII. Advanced Math Instructions

XIII. Math Conversion Instructions

XIV. Motion Instructions
   A. Motion State
   B. Motion Move
   C. Motion Group
   D. Motion Event
   E. Motion Configuration
   F. Motion Coordinated

XV. ASCII Instructions

A. ASCII Serial Port
B. ASCII String
C. ASCII Conversion

XVI. Debug Instructions
A. Breakpoint
B. Tracepoint

XVII. Advanced LogixPro Simulations
A. Traffic Simulator
B. Batch Simulator
C. Bottle Line Simulator
D. Elevator Simulator

XVIII. Specialized I/O Modules

REQUIRED TEXTBOOK AND MATERIAL:

The textbook and other instructional material will be determined by the instructor.