

Course Overview for: PLC200 Programmable Controller I, 3 Credit Hour, 4/11/17

Course Description:

The course is a study of the installation, programming and troubleshooting of programmable controlled systems currently used in an industrial environment. The focus will be on Installation, Programming, Engineering and Maintenance tasks performed with PLC systems. The primary PLC used for this class will be the Allen Bradley SLC-500 and CompactLogix, using RSLogix 500, RSLogix5000 and RSLinx software. The topics presented will be learned through Online instructional material, and hands on labs.

This course will consist of 9 competencies (Objectives):

1. Explain the function of a PLC in an industrial environment
2. Set up communications between a PLC and a programming panel
3. Configure and program an Allen Bradley SLC-500 system.
4. Install and maintain basic control system based on the SLC-500
5. Troubleshoot an Allen Bradley SLC-500 system.
6. Configure and Program Allen Bradley CompactLogix with RSLogix5000
7. Interpret the basic instruction set of Allen Bradley CompactLogix system
8. Interpret AB PLC-5 hardware addressing & block transfer instructions
9. Explain the operation of an Allen Bradley Sequencer Output instruction

This course will consist of the following 8 Modules:

Module #1: Basic Allen Bradley SLC-500 operation

Module #2: RSLogix500 and the SLC-500 basic instruction set

Module #3: Allen Bradley SLC-500 timer & counter instructions

Module #4: Allen Bradley SLC-500 intermediate instruction set

Module #5: Maintain & Troubleshoot an AB SLC-500 system

Module #6: Basic Allen Bradley CompactLogix operation

Module #7: AB CompactLogix: Data Types, Timer & Counter Instructions

Module #8: Specialized Allen Bradley instructions & equipment

Module 1: Basic Allen Bradley SLC-500 operation: Hands-On Assessment Tasks:

1. Identify the processor, power supply, discrete input and output modules, and analog I/O module on an SLC-500 system
2. Identify the power supply, discrete input and discrete output modules on an electrical print and correlate to the SLC-500
3. Find an output on the electrical print and corresponding address as specified by the instructor (i.e. coolant valve).
4. Identify the communication ports on the processor, on the computer, and what cabling would be required
5. Interpret the diagnostic indicators on the SLC-500 processor and I/O module
6. Setup an RSLinx driver to communicate between the processor and program panel with RS-232

Module 2: RSLogix500 and the SLC-500 basic instruction set: Hands-On Assessment Tasks:

1. Create a new project in RSLogix500, and download to the processor
2. Go online to the processor and change the mode of the processor (run or program)
3. Explain the operation of the basic relay instructions
4. Interpret and explain the I/O addressing of the SLC-500 system
5. Toggle the instruction descriptions and symbols on/off in RSLogix500
6. Setup the Emulator in the Virtual Machine and run the same program as done with hardware in the PLC lab

Module 3: Allen Bradley SLC-500 timer & counter instructions: Hands-On Assessment Tasks:

1. Create multiple program files and enter ladder logic into each with RSLogix500
2. Interpret the operation of the AB timer instruction, and their status bits
3. Interpret the operation of the AB timer instruction, and their status bits

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4. Create PLC programs with timer & counter instructions and load into the PLC processor
5. Navigate through the RSLogix500 project with search cross reference commands
6. Explain to the instructor how a PLC program operates that contains timers, counters and relay instructions

Module 4: Allen Bradley SLC-500 intermediate instruction set: Hands-On Assessment Tasks:

1. Interpret the operation of the AB basic compare instructions (LES, GRT, EQU, LEQ, GEQ, NEQ)
2. Interpret the operation of the AB limit test instruction (LIM), including circular & non-circular
3. Interpret the operation of the AB MOV and MVM instruction, with students setting up masking data
4. Interpret the hardware electrical prints of an AB SLC-500 based system
5. Predict the operation of a program that includes compare and move instructions

Module 5: Maintain & Troubleshoot an AB SLC-500 system: Hands-On Assessment Tasks:

1. Wire a PLC systems with at least 5 inputs and 3 outputs. Create the program to run a specific operation
2. Manipulate I/O with force commands (On, Off, Remove), as well as interpreting the Force indicator light
3. Modify a ladder program while online to the SLC-500 (online programming)
4. Utilize search commands to find instructions throughout a large program using RSLogix500
5. Troubleshoot a PLC system with an injected fault, using the software and hardware print
6. Upload a modified online program, back to the default directory
7. Determine why the user does not have address descriptions when going online to a PLC with RSLogix500

Module 6: Basic Allen Bradley CompactLogix operation : Hands-On Assessment Tasks:

1. Create an ethernet driver, and an Ethernet IP driver in RSLinx for communication with a CompactLogix processor
2. Identify and explain all communication ports on the CompactLogix processor
3. Create a new project in RSLogix5000, by configuring the I/O, and creating the alias tags in the Controller Tags settings.
4. Create a 4 rung program in a new project with the relay and timer instructions, using RSLogix5000
5. Use RSLogix5000 to do basic program functions (Download, go online, go offline, upload)
6. Interpret the diagnostic indicators on the CompactLogix processor

Module 7: AB CompactLogix: Data Types, Timer & Counter Instructions: Hands-On Assessment Tasks:

1. Explain the difference between timer and counter data types, as well as Integer, Signed Integer and Double Integer
2. Interpret the operation of the AB timer instruction, and their status bits on a CompactLogix system
3. Interpret the operation of the AB timer instruction, and their status bits on a CompactLogix system
4. Create PLC programs with timer & counter instructions and load into the PLC processor
5. Navigate through the RSLogix5000 project with search cross reference commands
6. Explain to the instructor how a PLC program operates that contains timers, counters and relay instructions

Module 8: Specialized Allen Bradley instructions & equipment: Hands-On Assessment Tasks:

(This module satisfies the Ohio CTag requirement for University Transfer of this course)

1. Create a project in RSLogix500, with a Sequencer Output instruction to control the outputs on an SLC-500 simulator
2. Configure the Mask word in the Sequencer Output instruction
3. Load the file Integer file with data for the status of the output in the sequence
4. Create a PDF report of the ladder program and the cross reference report.
5. Interpret octal addressing on a PLC-5 PLC
6. Explain the purpose of a block transfer instruction on a PLC-5 system