



CNC Technical Solutions - Phase 3 Training Outline

Phase 3 Training Outline

Advanced Industrial Controls & Practical Applications Class *136 hours*

This will be an instructor-led class building on the concepts of our Phase 2 Industrial Controls & PLC Class, which is a prerequisite to this program. The key areas covered in this Phase 3 training program are as follows:

1. Advanced PLC Applications & Controls Theory which is demonstrated on a fully functional but scaled Factory Automation Simulator. The system is broken down into four main areas of the factory and they are as follows:
 - Automated Warehousing stacking and storage system.
 - Heat treat and processing system complete with turn table & post process milling station.
 - Laser color sorting and batching system.
 - Three-Axis Robotic load and unload station with a vacuum end effector for part handling.
2. The main control system features four separate Micro Logic 850 Allen Bradley Tag Based PLC Controls and Panel Views which are all communicating over an Ethernet ring to the multiple PLC Controls, Panel Views and laptops.
3. Additional key areas that are focused on and in use with the factory simulator are ball screws, gearing and gear reductions, conveyor belts, turn tables, worms and wheels, as well as pneumatics including air compressors, vacuum pumps, pneumatic cylinders and vacuum part lifts. There is also a fully integrated analog laser color recognition system.

** The primary learning objective of this Phase 3 Program is the Theory, Implementation and Practical understanding of Programmable Logic Controls (PLCs) and their associated electrical devices and how they function and interact with the mechanical hardware listed above.



CNC Technical Solutions - Phase 3 Training Outline

PLC Practical Application and Troubleshooting Class

As outlined above, this is a highly interactive instructor-led class that has been designed to maximize the student's PLC & Machinery Troubleshooting Skills. The centerpiece for this training is our proprietary CNCTS-designed Factory Automation System Simulator. This simulator uses the latest Allen Bradley Ethernet Based Controls and features AB Panel Views for the HMI. The system is a scale model of a working factory. This technology has been painstakingly designed and miniaturized by CNCTS to replicate this widely used factory technology all in a 4' by 4' area.

Key areas the student will be exposed to with the Factory Automation Simulator are:

- Allen Bradley Micro-logic 850 PLC Controls
- Relay Logic
- Motor Controls
- Laptop/cabling - PC to PLC communications using RS Logic and CCW for PLC code debug and development
- Electrical drawing set for the Factory Automation Simulator
- Sequence of operations theory, two dimensional arrays, sequencer control
- All associated test eq. including DVMs, Scope etc.
- Allen Bradley Micro logic 850 and Panel View System
- Numbering Systems
- Logic Concepts
- The processor, power supply & programming software
- The memory system & I/O Interaction
- The Discrete I/O System
- The Analog I/O System
- Tag Based Programming
- Structured Text & Function Block Programming
- Relay Logic
- Motor Controls with Encoder Feedback
- Laptop/cabling - PC to PLC communications using RS Logic and CCW for PLC code debug and development
- Electrical drawing set for the Factory Automation Simulator
- Sequence of operations theory
- Machine Control Programming design will focus on a two dimensional array, 14 & 17 step sequencer, the use of High Speed counters using encoder feedback from axis motor encoders and Ethernet data communication from control to control.
- Student will debug using all associated test equipment including, but not limited to, DVMs, Oscilloscopes, Amp Meters, Megger and High Potential Testing.

****A text book and study guide will be used for this class.**