

Siemens TIA Portal Basics and Troubleshooting is a course designed to prepare a technician or engineer to understand and troubleshoot machines using Siemens S7 family of PLC's. This is a 100% hands on class that is designed to last 40hrs.

Outline:

1. Basic Discrete Input and Output Wiring
2. Understanding the Siemens PLC scan cycle.
3. Search and Cross Reference
 - 3.1. Effective methods to search for tags
 - 3.2. Understanding call structures and assignment list
 - 3.3. Locating duplicate destructive references
4. Working with and understanding Organizational Blocks, Function Blocks and Functions, call priority and scan cycle sequence.
 - 4.1. Understanding scan priority within a program
 - 4.2. Troubleshooting scan time/ priority related issues
5. Associating field wiring with internal PLC addressing and creating tags
6. Overview and practice exercises using PLC (IEC standard) timers
 - 6.1. TON Timer On Delay
 - 6.2. TOF Timer Off Delay
 - 6.3. TP Pulse Timer
 - 6.4. RTO Retentive Timer On
7. Practice exercises in Ladder Logic, Function Block, and Structured Text Languages using all three timer instructions.
8. PLC counter instructions
 - 8.1. CTU Count Up
 - 8.2. CTD Count Down
 - 8.3. CTUD Count Up and Down
9. Understanding Various Data Types
 - 9.1. Int, Dint, Bool String, Byte, Word, DWord, Real, LReal, Time, UDint, UInt,
10. Using and understanding compare instructions
11. Overview of Basic Number Systems
 - 11.1. Binary, Octal, Hexadecimal, Decimal
12. Understanding and practicing with basic Structured Text and Function Block Programming
 - 12.1. "If Then", "For Do", "While Do", "Case of"
 - 12.2. Direct Assignments
 - 12.3. Compare Instructions
13. Performing Math and storing data in Data Blocks
14. Creating and Using arrays in a project
 - 14.1. Writing data to arrays
 - 14.2. Retrieving data stored in arrays

- 14.3. Understanding optimized data blocks
- 15. Retentive vs non-retentive data types and memory bytes
- 16. Troubleshooting Profinet
- 17. Put / Get & TSEND / TRCV, PLC to PLC communication
- 18. Practice toggling and forcing bits
 - 18.1. Creating Watch Tables
 - 18.2. Fully understanding I vs I_:P and Q vs Q_:P
 - 18.3. Understand the difference between forcing an input or output instruction
- 19. Flashing and updating firmware on PLC
- 20. Performing a reset of Work Memory
- 21. Performing a reset of Load Memory
- 22. Setting up a network in the classroom and understanding how to assign a unique IP address to the PLC and PC.
- 23. Wiring a potentiometer to the PLC Analog Input Chanel for 0-10vdc or 4-20ma signal
 - 23.1. Normalizing and Scaling the Analog Input Signal into Standard Engineering Units
 - 23.2. Using the Analog Output Card (AQ) to produce a 0-10vdc and 4-20ma signal
- 24. Online Editing process, considerations and cautions.
 - 24.1. Upload and Download
 - 24.2. Comparing online vs offline projects
- 25. Adding input and output elements to an HMI
 - 25.1. Linking tags between HMI and PLC
 - 25.2. Discrete and Analog data exchange through HMI