

Automation - SIMATIC S7 with TIA Portal S7-1200 TIA System

General Information

Course Code: SCT-S712TP1A

Length: 4½ Days

Audience

This system course is for SIMATIC S7-1200 PLC users who are involved with developing or sustaining automation systems and their application programs. This course is for users needing advanced programming and configuration skills and who may use the extended system functions.

Prerequisites

- MS Windows Expertise

Profile

Additional Prerequisite: Solid industrial technology skills.

The goal of this course is to help the student build skills utilizing in programming and extended system functionality of the S7-1200 system, STEP7 engineering tool and WinCC Basic, Human Machine Interface (HMI).

This course begins with a brief review of the SIMATIC S7-1200 system, its components and the HMI Basic Panels. It then follows with discussions on the integrated engineering system SIMATIC STEP 7 Basic for the controller and WinCC Basic for the HMI.

The course will cover using the Portal and Project tools to efficiently build a system project. The key Portal tasks include: Device and Networks, PLC Programming, Visualization, and Online and Diagnostics. The key Project tasks includes: working with editors and their elements.

This course also covers a primary set of extended functions including process loop control, pulse functions, networking and basic motion control.

Throughout this course students will build a STEP7 project from the beginning. Software diagnostic tools will be used for debugging. Program creation will involve using various instruction sets, memory areas, program blocks, and libraries. HMI screens for control and display will also be developed.

Objectives

Upon completion of this course, the student shall be able to:

- Identify the components and features of the S7-1200 system.

- Navigate the STEP7 Portal software and identify the basic tool set.
- Complete a system hardware configuration including basic PC - PLC communications.
- Use the STEP7 tools to monitor and troubleshoot the system.
- Build, document, test and troubleshoot a structured STEP7 Basic program using the multiple address types and data blocks.
- Build a basic HMI project and integrate into the STEP7 program.
- Use core application instructions, functions and blocks to build and test a basic control program.
- Efficiently used the diagnostics tools of STEP7.
- Program using processed analog values, scale and tune using the STEP7 PID Loop and tracking tools.
- Build a project using the high speed and pulse functions of STEP7.
- Use the STEP7 technological functions for basics speed and position control.
- Configure peer and device network communications.

Topics

1. SIMATIC S7-1200 family overview
 - a. Hardware components & features
 - b. HMI options
2. Introduction to STEP7 Basic
 - a. Portal View
 - b. Project View
 - c. Navigation, windows and toolbars
3. Device and Networks Portal
 - a. Device and Network View
 - b. Hardware configuration and addressing
 - c. Online Connection and Loading
4. Monitoring
 - a. Monitoring inputs in Device View
 - b. Monitoring using a Watch Table
5. Programming with STEP 7 Basics
 - a. Program and Tag Editors
 - b. Structured programming
 - c. Memory and Data Blocks
 - d. Ladder Logic and Function Block Diagram
6. HMI for Process Control
 - a. Networking the HMI
 - b. Visualization Portal
 - c. Screen and control creation
7. Instruction catalog elements
 - a. IEC Timers
 - b. IEC Counters
 - c. Working with Numbers
8. System diagnostics
 - a. Online & Diagnostic Portal

- b. Reference tool
- c. Troubleshooting tools
- 9. Analog value processing
 - a. Analog signal access
 - b. Scaling
 - c. PID tuning and tracking tool
 - d. Analog module configuration options
- 10. Pulse Functions
 - a. Pulse Width Modulation
 - b. Pulse Train Outputs
- 11. Speed and Position Control
 - a. PLCopen functions
 - b. Absolute, relative & velocity
 - c. Home, seek & jog functions
 - d. High Speed inputs
- 12. Communications
 - a. Ethernet / PROFINET connections
 - b. T-Send / T-Receive
 - c. Peer communications
 - d. Serial Communication Options