

## Bridging STEP 7 5.x to TIA Portal Programming

### General Information

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|-------------|--------------|
| Course Code | SCT-PTTIAU2B |
| Global Code | TIA-SYSUP    |
| Length      | 4½ Days      |
| CEUs        | 3.0          |

### Audience

This course “bridges” STEP 7 Version 5.x knowledge over to SIMATIC S7 TIA PORTAL. The fast-paced curriculum is designed for the experienced Version 5.X users who are, or will be, involved with developing or sustaining TIA PORTAL projects. The course is designed for both Engineering and Maintenance personnel with current working knowledge using Ver. 5.x STEP 7 environment, programming tools, and troubleshooting techniques.

### Prerequisites

- SIMATIC S7 Version 5.x Project Experience
- AND
- Ver. 5.x S7 Programming 1
- OR
- S7 Tools and Troubleshooting 2
- OR
- S7 Automation Maintenance 2

### Profile

The goal of this course is to provide experienced users, familiar with the Ver. 5.x STEP 7 environment, programming tools, and troubleshooting techniques with the “Level 2” TIA Portal System knowledge and skills. \*The course begins with a brief overview of the latest SIMATIC S7-1200 and S7-1500 systems followed by in-depth discussions and hands-on exercises covering, Engineering Software Framework, Network configuration, Distributed I/O, PLC Tagging, HMI, Troubleshooting, and Integrating and Commissioning a Drive.

The course will cover using the TIA Portal and Project tools to efficiently build a system project. The key Portal tasks include Devices and Networks, PLC Programming, Visualization, Online Diagnostics, and Drive Commissioning. The key Project tasks include navigating and understanding where to locate the proper tools/editors, working with the editors, and the latest configuration and troubleshooting methods. Throughout this course participants build and utilize STEP7 projects. Software diagnostic tools will be used for debugging.

Program creation will involve using various instruction sets, memory areas, program blocks, SCL, and library functionality. HMI screens for control and display will also be developed. Upon successful completion of this course, participants may enroll in the TIA Portal Programming 2 course.

### Objectives

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

- Configure the components and feature functions of the S7-1500 system.
- Navigate the STEP7 Portal software and utilize the basic and advanced tool set.
- Configure system hardware including basic networking communications, HMI, & Drive.
- 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 employ the diagnostics tools of STEP7.
- Utilize StartDrive to Integrate and Commission a drive.
- Setup and Configure Devices and Networks.
- Utilize the SCL Editor to program and test blocks.

### Topics

1. SIMATIC S7 TIA Portal overview
  - a. S7-1200 & S7-1500 Systems
  - b. Hardware components & features
  - c. HMI options
  - d. StartDrive
2. Range & Depth of Engineering Framework
  - a. Engineering Tools Review
  - b. Navigating Portal View
  - c. Navigating Project View
  - d. Locating windows and toolbars
  - e. Settings: Download, Project paths, etc.
3. Devices and Networks
  - a. Using the Hardware Catalog
  - b. Using Device and Network View
  - c. Hardware Editor: Creating Configurations
  - d. Online Connection and Loading
  - e. Configuring Devices on the Network
  - f. Monitoring the System in Device View
4. PLC Tags

- a. New Designations in Portal
- b. Global and Local Tags
- c. Tags as Variables & Data Types
- d. PLC Tags as Operands
5. Program Blocks and Program Editor
  - a. Adding New Blocks
  - b. Block Attributes for S7-1200 & S7-1500
  - c. Block Programming: Block Calls
6. Connection with HMI
  - a. Adding an HMI Device
  - b. Configuring the HMI Device
  - c. Setting the Download Interface/Downloading
  - d. System Diagnostic View
7. Advanced Programming Topics
  - a. Programming Languages
  - b. S7-1500 Independent Register Usage in STL
  - c. Block Attribute - Optimized Block Access
  - d. Optimized Blocks - Automatic Initialization of Temporary Variables
  - e. S7-1200 & S7-1500 Indexed Array Accesses
8. Troubleshooting
  - a. Overview of Portal Test Functions
  - b. TRACE Analyzer Function
  - c. TRACE Editor, Configuration, CPU Activation
  - d. Test Functions: Errors Detected by System
  - e. Displaying Diagnostic Information
  - f. Using "Online Tools" Task Card
  - g. Functional Errors - Using Test Functions
9. Structured Control Language (SCL)
  - a. Creating Programs with SCL
  - b. Creating SCL Blocks
  - c. Editing SCL Blocks
  - d. Creating Control Instructions
  - e. Direct Addressing
  - f. Indirect Addressing
  - g. Calling an SCL Block
10. Startdrive: Integrating & Commissioning a Drive
  - a. Communication Standard PROFIdrive
  - b. Inserting a Drive in the Project
  - c. Control Panel for Commissioning
  - d. Fast Commissioning Wizard
  - e. Configuration and Parameterization
  - f. Process Data Area (PZD)
  - g. Monitoring
  - h. Modifying Parameters