



Instrumentation & Controls

S7 Control System

Course Introduction

This training course is designed to equip TAPCO participants with in-depth knowledge and practical skills in using Siemens S7 PLCs and the TIA Portal environment. Over five intensive days, attendees will learn to configure, program, and troubleshoot S7-1200 and S7-1500 PLCs, with a focus on advanced programming techniques and data handling. The course also covers HMI integration, providing hands-on experience in creating user interfaces and visualizations for enhanced control. Participants will develop essential diagnostic and maintenance skills to ensure the efficient operation of S7 control systems. Additionally, the course explores advanced topics such as distributed I/O, networking, and SCADA system integration, preparing participants to implement and manage comprehensive control solutions in real-world industrial settings.

Target Audience

- Group discussions and exercises
- Facilitated discussions
- Table-top exercises
- Manuals, workbooks and references
- Assessing competencies
- References and further reading

Learning Objectives

- ✓ Develop a thorough understanding of Siemens S7 control systems, including S7-1200 and S7-1500 PLCs, and their configuration using the TIA Portal environment.
- ✓ Master advanced PLC programming techniques, including the use of function blocks, data handling, and analog signal processing.
- ✓ Learn to effectively integrate and configure Human-Machine Interfaces (HMIs) for enhanced system control and visualization.
- ✓ Acquire diagnostic and troubleshooting skills to maintain and resolve issues in S7 control systems efficiently.
- ✓ Gain knowledge in advanced topics such as distributed I/O systems, networking with PROFINET and PROFIBUS, and integration with SCADA systems for comprehensive control solutions.

Course Outline

• 01 Day One

Introduction to S7 Control Systems and Basic Configuration

Overview of S7 Control Systems

Introduction to S7-1200 and S7-1500 PLCs

Understanding the TIA Portal Environment

Setting Up a New Project in TIA Portal

Hardware Configuration and PLC Setup

Basic PLC Programming Concepts

Creating and Downloading a Simple Program

Hands-On Exercises: Basic Configuration and Programming

• 02 Day Two

Advanced PLC Programming and Data Handling

Structured Programming Techniques

Using Function Blocks and Data Blocks

Advanced Logic Operations

Analog Signal Processing

Timers and Counters

Data Handling and Memory Management

Introduction to S7 Communication Protocols

Practical Exercises: Advanced Programming and Data Handling

• 03 Day Three

HMI Integration and Configuration

Introduction to HMI Devices and Interfaces

Configuring HMIs in TIA Portal

Creating HMI Screens and User Interfaces

Connecting HMI to S7 PLCs

HMI Programming and Visualization Techniques

Alarms and Event Handling in HMI

Data Logging and Trend Analysis

Hands-On Exercises: HMI Configuration and Integration

• 04 Day Four

Diagnostics, Troubleshooting, and Maintenance

Diagnostic Tools in TIA Portal PLC System Diagnostics and Error Handling

Using the Online Tools for Troubleshooting

Maintenance Best Practices for S7 Systems

Backup and Restore Procedures

Firmware Updates and System Upgrades

Practical Exercises: Diagnostics and Troubleshooting

Case Studies and Real-World Problem Solving

• 05 Day Five

Advanced Topics and Real-World Applications

Introduction to Distributed I/O Systems

Networking and Communication with S7 PLCs

Configuring PROFINET and PROFIBUS Networks

Integration with SCADA Systems

Safety and Redundancy in S7 Systems

Energy Management and Optimization Techniques

Confirmed Sessions

| FROM | TO | DURATION | FEES | LOCATION |
|----------------|----------------|----------|------------|------------------|
| June 16, 2025 | June 20, 2025 | 5 days | 4950.00 \$ | England - London |
| Sept. 22, 2025 | Sept. 26, 2025 | 5 days | 4250.00 \$ | UAE - Abu Dhabi |
| Nov. 17, 2025 | Nov. 21, 2025 | 5 days | 4250.00 \$ | UAE - Dubai |
| Jan. 20, 2025 | Jan. 24, 2025 | 5 days | 4250.00 \$ | UAE - Dubai |