

SIMATIC® S7 Totally Integrated Automation Programming Level 1

Course Code: S7TIAP1A

Length: 4½ Days

Target Audience:

This course is for SIMATIC S7-300/400 PLC users who are involved with developing or sustaining automation systems and their application programs.

Prerequisites

MS Windows Expertise

Profile:

This course is the first in a three part series which builds skills with Siemens STEP7 engineering software in project management, program design and application sustaining. This is an aggressively paced curriculum covering key programming tools, structures, libraries and editors. This course takes a systems approach addressing the S7300 / 400 PLCs, plus basic connectivity and functionality of an HMI and PROFIBUS remote I/O. Throughout this course students will build or modify a STEP7 project using proper program structuring, documentation and test tools. Various instructions, memory types, blocks and functions will be introduced to provide the student with solid concepts of structured programming.

The course format consists of instruction and hands-on exercises. The course uses a conveyor model for demonstrations and exercises.

Objectives:

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

- Complete a system hardware configuration.
- Build, document, test and troubleshoot a structured STEP7 program.
- Program using the multiple address types.
- Use symbolic addressing.
- Use core application instructions, functions and blocks.
- Program using the processed analog values.
- Generate data blocks.
- Establish connections to an HMI system.

Topics:

- 1) SIMATIC S7 System Family overview
 - a) Totally Integrated Automation
 - b) S7-200 / 300 / 400 Components
 - c) Programming and Communication Devices
 - d) STEP7 Overview
- 2) Training Units
 - a) Training System Variants
 - b) Conveyor Model
 - c) Symbols
- 3) SIMATIC Manager
 - a) Project Structures
 - b) Creating a Project
 - c) SIMATIC Manager tools
 - d) Using the Help and Tutorial files
 - e) Using the Menus and Toolbars
 - f) Memory Cards
- 4) Hardware Configuration
 - a) CPU Properties and Parameterization
 - b) Hardware Configuration
 - c) Remote I/O Connections
 - d) I/O Addressing
- 5) Symbols
 - a) Symbolic Addressing
 - b) Editor Tools
 - c) Importing & Exporting
- 6) Blocks
 - a) Program Structures & Execution
 - b) Program Blocks
 - c) LAD / STL / FBD Editors
- 7) Binary Operations
 - a) AND / OR
 - b) Contacts
 - c) Sets & Resets
 - d) Result of Logical Operations (RLO)
 - e) Jumps
- 8) Digital Operations
 - a) Data Types - Integer, Real, BCD
 - b) Timers & Counters
 - c) Accumulators
 - d) Data Management & Conversions
- 9) Introduction to HMI
 - a) Downloading projects
 - b) Establishing communications
 - c) Editing tags
 - d) Control & monitoring
- 10) Data Blocks
 - a) Data types and storage
 - b) Data Blocks (DBs)
 - c) Arrays and structures
 - d) Saving, downloading, monitoring
- 11) Functions and Function Blocks
 - a) Variables
 - b) Parameter assignable blocks
 - c) Function Blocks (FB)
 - d) Block calls
- 12) Organization Blocks
 - a) OBs
 - b) Cold, warm, hot restarts
 - c) Interrupts
 - d) Error management
- 13) Analog Values
 - a) Analog module addressing
 - b) Analog signal conversion
 - c) Resolutions and ranges
 - d) Scaling values
- 14) Troubleshooting
 - a) Debug functions
 - b) Error categories
 - c) Diagnostic Tools
 - d) CPU Messages
 - e) Module Information
 - f) Monitor Tool
 - g) Forcing
 - h) Cross References
 - i) Find and Filter
- 15) Documentation
 - a) Tools
 - b) Program Management
 - c) Memory Cards
 - d) Project archiving and retrieval