



## SIEMENS Certified HMI Technician/ PLC Programming

(ST-PRO1 + HMI) 5 days

### Course Contents

### Requirements

This course is for SIMATIC S7-300 PLC users who are involved with developing or sustaining automation systems and their application programs. This course is primarily aimed at personnel who program other vendors PLCs and are looking to migrate their skills onto the S7 CPU. It is also particularly suitable for service staff, with a firm foundation of existing PLC skills and practical experience, whose role requires them to carry out programming related tasks.

### Objectives

SIMATIC S7-300 is primarily aimed at personnel who program other vendors PLCs and are looking to migrate their skills onto the S7 CPU. It is also particularly suitable for service staff, with a firm foundation of existing PLC skills and practical experience, whose role requires them to carry out programming related tasks. In addition, the course helps those who want a greater appreciation in program design, editing and configuration changes in an Integrated Automation environment including remote I/O, HMI and drives equipment over a Profibus network.

WinCC Flexible provides a comprehensive review of the features and capabilities of Siemens WinCC Flexible software that used to configure different Operator Panel / Touch Panel / Multi Panel and Panel PCs. Participants will perform a complete system configuration including panel project configuration, graphics design and system integration. Participants will also build skills with the user management tools including security, access, alarms and messaging in the HMI panel. Advanced functionality such as recipe creation is briefly introduced through a typical application.

### Topics

Upon completion of this course, the participant 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.
- Creating and managing a WinCC Flex project.
- Integrating components between WinCC Flex and STEP 7.
- Creating tags from the STEP7 symbol table.
- Designing graphic screens and tools.
- Configuring internal and external tags.
- Defining & administering user security.
- Setting and testing the Alarms and Messages.
- Configuring, archiving and displaying trends.



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### **Course Certificate**

Certificate of participation will be awarded after the training.

### **Course Outline**

The major topics to be covered are:

- Introduction to the S7 family of controllers and concepts of TIA
- Project creation and operation using Simatic Manager
- Hardware configuration of S7 300 systems
- Application and use of the Symbol Editor
- Programming using the LAD/STL/FBD Editor
- Binary operations - N/O, N/C, Set, Reset, edge detection
- Digital operations - Accumulators, timers, counters, comparators
- Tools for troubleshooting and debugging
- Introduction to Profibus/ Profinet
- WinCC Flexible System Overview
- Project components & configuration
- Basic Graphics Design
- Advanced Graphics Design
- Network configuration
- Message archiving
- User Management



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### Daywise Schedule

#### Day 1

1. SIMATIC S7 System Family overview
  - Totally Integrated Automation
  - S7-200 / 300 / 400 Components
  - Programming and Commn. Devices
  - STEP7 Overview
2. Training Units
  - Training System Variants
  - Conveyor Model
  - Symbols
3. SIMATIC Manager
  - Project Structures
  - Creating a Project
  - SIMATIC Manager tools
  - Using the Help and Tutorial files
  - Using the Menus and Toolbars
  - Memory Cards
4. Symbols
  - Symbolic Addressing
  - Editor Tools
  - Importing & Exporting
5. Hardware Configuration
  - CPU Properties and Parameterization
  - Hardware Configuration
  - Remote I/O Connections
  - I/O Addressing
6. Blocks
  - Program Structures & Execution
  - Program Blocks
  - LAD / STL / FBD Editors

#### Day 2

7. Binary Operations
  - AND / OR
  - Contacts
  - Sets & Resets
  - Result of Logical Operations (RLO)
  - Jumps
8. Digital Operations
  - Data Types - Integer, Real, BCD
  - Timers & Counters
  - Accumulators
  - Data Management & Conversions

#### Day 3

9. Introduction to Profibus DP and HMI
  - Downloading projects
  - Establishing communications
  - Editing tags
  - Control & monitoring
10. Data Blocks
  - Data types and storage
  - Data Blocks (DBs)
  - Arrays and structures
  - Saving, downloading, monitoring

#### Day 4

11. Functions and Function Blocks
  - Variables
  - Parameter assignable blocks
  - Function Blocks (FB)
  - Block calls
12. Organization Blocks
  - OBs
  - Cold, warm, hot restarts
  - Interrupts
  - Error management
13. Analog Value Processing
  - Analog module addressing
  - Analog signal conversion
  - Resolutions and ranges
  - Scaling values

#### Day 5

14. Troubleshooting
  - Debug functions & Error categories
  - Diagnostic Tools & CPU Messages
  - Module Information & Monitor Tool
  - Forcing & Cross References
  - Find and Filter
15. Documentation
  - Tools
  - Program Management
  - Memory Cards
  - Project archiving & retrieving



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### Time-wise Schedule

Day	Time	Topics
Day – 1	09:00 Hrs – 09:20 Hrs 09:20 Hrs – 10:00 Hrs 10:15 Hrs – 12:00 Hrs 13:00 Hrs – 15:00 Hrs 15:15 Hrs – 17:00 Hrs	SIMATIC S7 System Family overview Training Units & SIMATIC Manager Symbols & Hardware Configuration Step7 Blocks Practical on the above
Day – 2	09:00 Hrs – 10:00 Hrs 10:15 Hrs – 12:00 Hrs 13:00 Hrs – 15:00 Hrs 15:15 Hrs – 17:00 Hrs	Binary Operations Practical on the above Digital Operations Practical on the above
Day – 3	09:00 Hrs – 10:00 Hrs 10:15 Hrs – 12:00 Hrs 13:00 Hrs – 17:00 Hrs	Introduction to Profibus DP and HMI Data Blocks Practical on the above
Day – 4	09:00 Hrs – 10:00 Hrs 10:15 Hrs – 12:00 Hrs 13:00 Hrs – 15:00 Hrs 15:15 Hrs – 17:00 Hrs	Functions and Function Blocks Organization Blocks Analog Value Processing Practical on the above
Day – 5	09:00 Hrs – 10:00 Hrs 10:15 Hrs – 12:00 Hrs 13:00 Hrs – 15:00 Hrs 15:15 Hrs – 15:30 Hrs	Troubleshooting Documentation Practical on the above Feedback & Valedictory session

### **Break Timings:**

10:00 Hrs – 10:15 Hrs	Morning Tea Break
12:00 Hrs – 13:00 Hrs	Lunch Break
15:00 Hrs – 15:15 Hrs	Afternoon Tea Break
17:00 Hrs – 17:15 Hrs	Recess & End of Day