SIEMENS SIMATIC STEP 7 BASIC TRAINING

TRAINING DESCRIPTION

4-day, instructor-led class designed to provide a fundamental foundation in **Siemens SIMATIC Step 7 programming** for PLC systems. The course introduces the Siemens S7 family, software tools, and programming environment, focusing on system configuration, program development, simulation, and troubleshooting. Participants will learn to create, test, and maintain PLC programs using Step 7 and TIA Portal tools, equipping them with the essential knowledge to handle automation projects effectively.

TRAINING OBJECTIVES

Upon successful completion of the training, participants will be able to:

- Understand the Siemens PLC architecture, hardware components, and system configuration.
- Install and configure Step 7 and TIA Portal software for PLC programming.
- Develop and test basic PLC programs using Ladder, STL, and FBD languages.
- Apply Boolean, Timer, Counter, and Comparison instructions in practical programming exercises.
- Perform simulation, troubleshooting, and monitoring using Step 7 tools.
- Configure and test analog I/O modules and integrate them into control applications.
- Execute a complete automation project simulation (e.g., batching plant) from configuration to commissioning.

AUDIENCE & PREREQUISITES

- Engineers and technicians involved in industrial automation and control systems.
- Maintenance personnel responsible for PLC system operations.
- New users or beginners who wish to gain practical programming experience with Siemens SIMATIC Step 7.

TRAINING SCHEDULE

This training course has been developed based on the following daily schedule:

Daily Session	8 hours	Usually from 9:00 AM to 5:00 PM
Lunch	1 hour	1:00 PM to 2:00 PM
Breaks	2 x 15 minutes	11:00 AM and 3:30 PM

Based on the daily schedule above, the topics for this training course are estimated to break as follows:

Day 1	**Ice-Breaking** **Module 1 – Introduction to Siemens PLC.** Introduction of Siemens PLC Family. Advantages of new S7 Series compared to old S5 Series. Info on the latest PLC Series and software. **Module 2 – Setting up PC for PLC programming.** Preparation of programming PC to setup the TIA Portal software. Installation of the TIA Portal software. Transfer License of the new software. **Module 3 – Introduction of Simatic Manager Step 7 software for Siemens PLC S7-300 and 400 Series.** Start-up of Step 7 software. Familiarize with the software layout of all components within the application Module 4 – Creating a new PLC program (based on a Project Discussion). Project Architecture. Hardware requirement and type of instrument. PLC hardware selection guide. **Module 5 – Introduction to PLC's Programming Communication** Setup of computer communication for programming interface. Introduction of type of communication for Siemens PLC interface. Introduction of Simulation of Siemens PLC hardware. Downloading PLC hardware to PLC. **Module 6 – Introduction to PLC Programming Language** Different types of language available. Introduction to Ladder, STL and FBD.
Day 2	**Module 7 – Creating PLC program.** Introduction to PLC program flow. Types of blocks in Siemens PLC program. PLC scanning structure **Module 8 – Symbolic Editor.** Identify all project requirement and layout all Input/Output. Strategic naming of all Input/Output based on drawing or application. Program's symbolic entering process. **Module 9 – Boolean Instruction set.** Introduction to AND, OR and EQUAL instructions. Download of program to Simulator. Testing of the effectiveness of gate operation. Monitoring Online for live status

	Module 10 – Assignment of BOOLEAN Operation. ON/OFF Light. MULTIPLE Switch Light. MULTIPLE Light – Single Switch. Combination Operation Light. Cross condition Light. **Module 11 – Additional Boolean Instructions.** Introduction to SET and RESET instructions. Testing assignment based on the new instructions Timer Instruction set. Introduction to On-Delay, Off-Delay and Pulse Timer. Timer set point format. Application of different timer **Module 12 – Assignment of Timer operation.** On-Delay Light. Off-Delay Light. Blinking Light. Sequential ON Light. **Day Closing Assignment 1** FORWARD/STOP/REVERSE Button Gate Simulation. DIRECTION TOGGLE Gate Simulation.
Day 3	**Discussion on previous day's assignment.** **Module 13 – Latching Operation.** Introduction to Latching operation using simple EQUAL instruction. Testing on simulation with pump control. Introduction to Latching operation using SET/RESET instructions. Testing on simulation with pump control. Identify the different of the reviewed operation. **Module 14 – Assignment of Pump Control.** On-Delay Pump. Off-Delay Pump. Delay Start Multiple Pump. Delay Start/Stop Multiple Pump **Module 15 – Counter Instruction.** Introduction to Count UP, DOWN and UP/DOWN counter. Testing of Counter instruction in Simulation. **Module 16 – Mathematic Instruction.** Introduction to ADD, SUBTRACT, DIVISION and MULTIPLICATION instructions. Testing of Mathematic instruction in Simulation. **Module 17 – Comparison Instruction.** Introduction to LESS THAN, MORE THAN and EQUAL Instructions. Testing of Comparison instruction in Simulation. **Module 18 – Analog Input/Output.** Introduction different type of analog data.

	Scaling of analog data using d blocks. Testing of analog data processing in Simulation **Day Closing Assignment 2** Running Light using different tactic in programming
Day 4	**Discussion on previous day's assignment** **Assignment 3 Requirement Discussion.** Batching Plant Project discussion of hardware requirement Hardware Configuration. Project execution Guide. Downloading Project. **Module 19 – Batching Plant Simulation** Testing with Simulation. Programming Review **Module 20 – Discussion on other functions of the Simatic Manager software.** Variable Table Monitoring Function. Cross Reference Function. Backup Function. Upload Function. Rewiring Function.