

➤ Brief Description

This workshop and accompanying manual is intended for engineers and technicians who need to have a practical knowledge for configuration and programming of Programmable Logic Controllers. It can be argued that a clear understanding and application of the PLCs and its modules is the most important factor in an efficient and successful control system

The objectives of the workshop and manual are for you to be able to:

- ✚ Be able to recognize SIMATIC S7, AB and Omron hardware and be able to replace modules when a fault occurs.
- ✚ Be able to design optimum hardware selection for a specific project
- ✚ Be able to develop programming in Ladder Logic, FBD and Structure Control language for SIMATIC S7, AB and Omron PLCs.
- ✚ Be able to design, Develop and trouble shoot SIEMENS PLCs (Logo, 200, 1200, 1500 and 300/400), ALLEN BRADLEY PLC (1747 SLC-500) and Omron CPM1A PLCs.
- ✚ Be able to acquire data from voltage sensor, current sensor temperature and pressure sensors
- ✚ Be able to design control tasks using SIMATIC Manager 5.5, RS Logix 500, Logix Pro and CX-One programmer.
- ✚ Understand instructions set and software/Hardware configurations.
- ✚ Be able to backup and restore a PLC program when required.
- ✚ Be able to perform technology functions for stepper motors, encoders and high speed counters

➤ Course Documentation

- ✚ Training material documents (Hard form at the time of registration)

- ✚ Course Exercises

- ✚ Post Course open Book test

➤ Software installation and Setup

- ✚ Simatic STEP-7 Manager 5.5
- ✚ Simatic STEP-7 TIA Portal 11
- ✚ Simatic STEP-7 MicroWin v4.0 SP9
- ✚ RS Logix 500 and RSLogixPro Simulator

➤ Course Equipment

- ✚ S7 300 or 400 PLC and Analog Module
- ✚ S7 200 highest specs PLC 226 and analog Module
- ✚ S7 1200 or 1500 PLC
- ✚ ALLEN BRADLEY PLC (1747 SLC-500), Omron CPM1A and Mitsubishi FX1n PLCs

Course Contents

➤ Introduction

- ✚ Brand and Types of PLCs
- ✚ PLC Architecture
- ✚ Components of PLC based control Sys.
- ✚ Memory Area Allocations of different PLCs i.e. Siemens, AB, Omron, Fatek
- ✚ I/O Addressing of Modules
- ✚ Scan Time of PLC
- ✚ Factors Influencing Scan Time
- ✚ Exercises- Section 1: Using S7-200 Simulator
- ✚ Simple I/O example of a PLC

➤ Instructions used in exercises

- ✚ Contacts and coils
- ✚ Timers and Counters
- ✚ Comparator operations
- ✚ Math Functions
- ✚ Move operations
- ✚ Conversion Operations

- ✚ Program control operations
- ✚ Word logic Operations
- ✚ Shift and Rotate
- ✚ Functions (FCs), Functions Blocks (FBs) and interrupts
- ✚ System Function Blocks (SFBs)
- **PLCs Programming Languages**
 - ✚ Ladder Logic (LAD), Function block (FB), Statement List (ST)
 - ✚ Structure Control Language (SCL) like C/C++.
 - ✚ Continuous function charts (CFC)
- **Technology functions used in exercises**
 - ✚ Stepper motor: PWM and PTO
 - ✚ Encoders: High speed counters
 - ✚ Frequency measurement
- **S7-200 PLC**
 - ✚ Wiring, Programming, Applications
 - ✚ Exercises- Section-2 and 3 (12 exercises)
- **S7-300 and S7-400 OR AB 1747 SLC-500**
 - ✚ **Hardware:** CPU, Power Supply, DI Modules, DO Modules, DI/DO modules, AI Modules, AO Modules, AI/AO Modules, Communication Modules, Function Modules and all other modules.
- **Simatic Manager 5.5 and RS Logic 500 software's:**
 - ✚ Detail working Environment.
 - ✚ How to create a Project
 - ✚ Configure Hardware
 - ✚ Ladder logic Programing
 - ✚ Simulate the program
 - ✚ Communication Protocols
 - ✚ Configure Multiple Racks for large system in Simatic STEP-7
- ✚ Configure RTU connected to PLC through Profibus.
- ✚ Designing and configuring S7-300 based projects.
- ✚ How to assemble power Supply, CPU, and I/O modules.
- ✚ Wiring
- ✚ Trouble shooting
- ✚ Exercises- Section-4 (20 exercises)
- ✚ Designing and configuring AB 1747 SLC-500 based projects.
- ✚ RS Logic Simulator for Allen Bradley PLCs
- **S7-1200 and S7-1500 PLCs**
 - ✚ **Hardware:** CPU, DI Modules, DO Modules, DI/DO modules, AI modules, AO Modules, AI/AO Modules, Communication Modules.
- **TIA (Totally Integrated Automation) Portal software.**
 - ✚ Detail working Environment.
 - ✚ How to create a Project
 - ✚ Configure Hardware
 - ✚ Write Program
 - ✚ Simulate the program
 - ✚ Communication Of S7-1200 with PC
 - ✚ How to design a Control system based S7-1200 PLCs.
 - ✚ How to assemble power Supply, CPU, and I/O modules.
 - ✚ Wiring
 - ✚ Trouble shooting
 - ✚ Practice on S-7-1214
- **Complete Projects Exercises for SCADA/HMI Applications:**