SIEMENS

Introduction to SIMATIC PLCs & Languages with Diagnostics

General Information

Course Code	SCT-S7BADIA
Global Code	NA
Length	1.5
CEUs	1.0

Audience

This course is for engineers and maintenance personnel who are new to PLC programming - who will be creating, modifying, or diagnosing hardware issues in S7 PLC systems with SIMATIC STEP 7 software.

Profile

This course is designed to provide the student with core SIMATIC PLC program fundamentals. For learners new to PLC applications, this course is an ideal preparation to the S7 Programming 1 or S7 Automation Maintenance 1 courses. Whether designing a PLC program or Diagnosing hardware issues in a control system, this course builds fundamental skills and confidence in key concepts, navigation, tools, and procedures for a successful continuous learning path. Students needing a solid introduction to the core PLC programming languages will find this a great fit. Three program editors, LAD, FBD and STL are introduced with the primary development and troubleshooting tools. Basic logic development and data memory management complete the curriculum and help the student build skills in PLC program basics. This is a face to face, instructor lead course consisting of in class instruction and exercises.

Objectives

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

- Apply and convert various numbering system concepts within a typical PLC application.
- Identify the IEC language set and perform essential program analysis and organization.
- Build a fundamental program flow chart and structogram for efficient program development.
- Navigate the SIMATIC Manager tools for efficient program development, documentation, and testing.
- Configure various input and output (I/O) addressing, Data Block and internal memory allocations.
- Build simple S7 PLC programs using the Function Block Diagram (FBD) editor.
- Manage program data through proper data storage and retrieval.
- Build a simple function using the Statement List program editor.
- Diagnose hardware errors.

Topics

1. Number Systems & IEC61131 Standard
   a. Review of the decimal number system
   b. The binary number system in computing
   c. The hexadecimal number system in computing
   d. Intro to IEC 61131-3 PLC Programming Standards
   e. Programming languages
   f. Analyzing programming tasks
   g. Subdividing programming tasks
   h. Flowchart/Structogram development
2. SIMATIC Development Tools
   a. SIMATIC Project structure
   b. Program Blocks
   c. The SIMATIC program editor
   d. Introduction to the Diagnostic Buffer tool
   e. Introduction to the Assignment tool
3. PLC Inputs and Outputs
   a. Overview of discrete I/O signals
   b. Types of discrete I/O
   c. Instructions for discrete I/O
   d. Overview of analog I/O signals
   e. Analog signal representation
4. PLC I/O Addressing
   a. S7 Memory Mapping
   b. CPU communication with I/O modules
   c. Introduction to SIMATIC data types
   d. Addressing process image tables
   e. Addressing marker memory
   f. Addressing peripheral I/O
   g. Addressing data blocks
5. Ladder Logic & FBD Instructions
   a. "Normally Open" and "Normally Closed" contacts
   b. AND and OR structures
   c. The Assignment, Set and Reset outputs
   d. "Flip Flop" instructions
   e. The NOT instruction
   f. AND and OR instructions
6. CPU Diagnostics

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