Faysal Aziz

PLC Dev Fundamentals

with CODESYS - 2 days

FA-0349 · 2 days

Software Development · Automation, RPA & Power Platform

Introduction

Programmable Logic Controllers (PLCs) remain the backbone of industrial automation, controlling everything from conveyor systems and packaging lines to water treatment plants and manufacturing facilities.

While PLC platforms differ between vendors, the fundamental principles of automation and the IEC 61131-3 programming standard remain consistent across the industry. This course provides a practical introduction to PLC programming using the free CODESYS Development System and its built-in simulator, allowing participants to learn real-world automation concepts without requiring physical PLC hardware. Emphasis is placed on developing logical thinking, understanding industrial control sequences, and writing maintainable PLC programs through extensive hands-on exercises. T

he content reflects current industry practices and the modern CODESYS ecosystem while remaining vendor-neutral, making it an excellent starting point for anyone entering industrial automation. The course is delivered by an instructor with over 30 years of industry experience, focusing on practical, industry-demanded skills rather than purely academic concepts.

Learning outcomes

Upon completion of this course, participants will be able to:

- Understand the role of PLCs in industrial automation systems.
- Navigate the CODESYS development environment.
- Create and organize PLC projects.
- Develop basic Ladder Logic applications.
- Use variables, timers, counters, and memory bits effectively.
- Test and debug PLC programs using the integrated simulator.
- Develop simple machine control sequences.

- Apply basic PLC programming best practices.

Prerequisites

- Basic computer literacy
- Familiarity with Windows operating systems
- No prior PLC or programming experience required

Training outline

1. Introduction to Industrial Automation

1. What is a PLC?
2. PLC applications in industry
3. PLC hardware overview
4. PLC scan cycle
5. Digital inputs and outputs

2. Getting Started with CODESYS

1. Installing CODESYS
2. Creating a new project
3. Development environment overview
4. Device selection
5. Using the built-in simulator

3. PLC Programming Fundamentals

1. IEC 61131-3 overview
2. Ladder Diagram (LD) basics
3. Contacts and coils
4. Variables and data types
5. Program execution flow

4. Basic PLC Instructions

1. Normally Open and Normally Closed contacts

2. Set and Reset logic
3. Internal memory bits
4. Timers
5. Counters
6. Comparison instructions

5. Building Simple PLC Programs

1. Start/Stop motor control
2. Seal-in circuits
3. Alarm indication
4. Traffic light sequence
5. Simple machine sequencing

6. Simulation and Debugging

1. Downloading to the simulator
2. Monitoring variables
3. Forcing inputs
4. Online troubleshooting
5. Program testing techniques

7. PLC Program Organization

1. Programs
2. Functions
3. Function Blocks
4. Code organization
5. Naming conventions

8. Best Practices

1. Writing readable ladder logic
2. Documentation and comments
3. Common programming mistakes
4. Troubleshooting methodology
5. Preparing programs for real PLC deployment

Disclaimer

This training outline serves as a general framework for course delivery and is intended as a guide to the topics that may be covered. The instructor may revise, expand, reorder, or omit topics during the course to accommodate participant backgrounds, learning pace, emerging industry practices, or specific organizational requirements. Such adjustments may be made at the instructor's professional discretion without prior notice to ensure the most effective learning experience.

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