

INDUSTRIAL AUTOMATION USING PLC PROGRAMMING TRAINING

“Mastering PLC Systems to Drive Efficiency, Accuracy, and Control in Industrial Automation”

Schedule

Date	Venue	Fees (Face-to-Face)
21 - 25 Jun 2026	Muscat, Oman	USD 3,495 per delegate
21 - 25 Sep 2026	Dubai, UAE	USD 3,495 per delegate

► Available delivery methods: Face-to-Face & Online Training

Introduction

In today's fast-paced industrial landscape, automation is the backbone of operational efficiency, quality control, and scalability. Programmable Logic Controllers (PLCs) are the core components driving automated systems across manufacturing, oil and gas, utilities, and logistics sectors.

This comprehensive five-day course equips engineers and technical professionals with the knowledge and skills required to program, troubleshoot, and optimize PLCs used in industrial automation. Participants will gain hands-on experience using industry-standard PLC hardware and software, allowing them to build, simulate, and deploy control systems effectively.

Objectives

By the end of this course, participants will be able to:

- Understand the architecture and operation of PLC-based control systems.
- Develop, simulate, and troubleshoot PLC programs using ladder logic.
- Integrate sensors, actuators, and field devices with PLC systems.
- Apply structured programming techniques for automation sequences.
- Interface PLCs with SCADA/HMI systems for real-time monitoring.
- Conduct testing and commissioning of automation projects.

Why Attend

- Gain practical skills in PLC hardware and software configuration.
- Learn industry-standard programming methods and logic diagrams.
- Enhance your ability to maintain, upgrade, or troubleshoot control systems.
- Bridge the gap between electrical systems and programmable automation.
- Improve project efficiency, safety, and process reliability.

Target Audience

This program is designed for:

- Automation engineers and maintenance technicians
- Electrical and control systems engineers
- Plant operators and instrumentation specialists
- Engineering graduates entering industrial automation fields
- Technical supervisors overseeing automation projects

Individual Benefits

Key competencies that will be developed include:

- PLC programming using ladder logic and structured formats
- Input/output (I/O) interfacing and logic design
- Fault diagnosis and error handling
- Programming best practices and safety compliance
- Integration of PLCs into wider automation networks

Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Increased plant uptime through efficient troubleshooting
- Reduced maintenance response time via system diagnostics
- Improved process consistency and product quality
- Lower operational risk and improved system integrity
- In-house PLC programming capability for new projects

Instructional Methodology

The course follows a blended learning approach combining theory with practice:

- Technical Lectures – Automation theory and PLC architecture
- Practical Labs – Writing and simulating PLC programs
- System Walkthroughs – From wiring to software setup
- Case Studies – Common industrial automation use cases
- Templates – Wiring diagrams, logic flowcharts, and fault logs
- Peer Learning – Group exercises and project simulations

MAWA EVENTS

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Course Outline

Detailed 4-Day Course Outline

Training Hours: 7:30 AM – 3:30 PM Daily Format: 3–4 Modules | Coffee breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 – 02:00

Day 1: Introduction to Industrial Automation and PLC Architecture

• **Module 1: Fundamentals of Industrial Automation (07:30 – 09:30)**

- Automation evolution and industry applications
- Benefits and components of control systems
- Overview of discrete vs. process control

• **Module 2: PLC Hardware and System Architecture (09:45 – 11:15)**

- PLC components: CPU, I/O modules, power supplies
- PLC selection criteria and manufacturer overview
- PLC installation and wiring fundamentals

• **Module 3: Programming Concepts and Logic Structures (11:30 – 01:00)**

- Boolean logic, timers, counters, and sequencing
- Program scan cycle and memory management
- Safety and redundancy in control systems

• **Module 4: Lab Setup and Software Familiarization (02:00 – 03:30)**

- Using PLC simulation software (e.g., Siemens, Allen Bradley)
- Creating, saving, and organizing project files

Day 2: Ladder Logic Programming and Testing

• **Module 5: Writing Ladder Logic Programs (07:30 – 09:30)**

- Contacts, coils, latching, and interlocks
- Basic control logic for start/stop motor sequences
- Live demo of program creation

• **Module 6: Practical Programming Techniques (09:45 – 11:15)**

- Use of subroutines, labels, and function blocks
- Handling timers, delays, and edge detection
- Modular programming practices

• **Module 7: PLC Simulation and Validation (11:30 – 01:00)**

- Upload/download programs to simulator
- Testing ladder logic with I/O simulation
- Troubleshooting and verifying logical outputs

• **Module 8: Hands-On Lab – Motor Starter Control (02:00 – 03:30)**

- Programming and testing a virtual motor control panel
- Diagnosing faults and observing program execution

Day 3: Intermediate PLC Operations and Field Integration

• **Module 9: Interfacing Field Devices (07:30 – 09:30)**

- Sensor types: proximity, photoelectric, pressure, temperature
- Actuators: relays, solenoids, contactors
- Wiring and signal conditioning

• **Module 10: Analog Signals and Scaling (09:45 – 11:15)**

- Working with 4-20 mA, 0-10V analog I/Os
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Analog value processing and engineering unit conversion

- PID control basics

• **Module 11: HMI/SCADA System Integration (11:30 - 01:00)**

- Data transfer and visualization techniques
- Mapping tags to HMI
- Creating basic monitoring screens

• **Module 12: Simulation - Building a Monitoring Interface (02:00 - 03:30)**

- Interfacing a program with a virtual HMI
- Displaying process status and alarms

Day 4: Advanced Applications and Troubleshooting

• **Module 13: Sequential and Batch Process Control (07:30 - 09:30)**

- Multi-step programming with decision logic
- Using shift registers and flags for sequence control
- Integrating process interlocks

• **Module 14: PLC Communication Protocols (09:45 - 11:15)**

- Modbus, Profibus, Ethernet/IP basics
- Troubleshooting data communication
- Addressing communication failures

• **Module 15: Error Handling and Diagnostics (11:30 - 01:00)**

- PLC system diagnostics and fault logs
- Handling loss of signal and communication failure
- Preventive maintenance alerts

• **Module 16: Troubleshooting Lab - Fault Simulation Challenge (02:00 - 03:30)**

- Simulating real-world faults
- Debugging, recovery, and report generation

Day 5: Project Execution, Documentation, and Wrap-Up

• **Module 17: Designing a PLC-Based Control System (07:30 - 09:30)**

- Gathering requirements and selecting architecture
- Designing logic and system layout
- Safety and fail-safe programming

• **Module 18: Documentation and Standardization (09:45 - 11:15)**

- Creating functional design specifications
- Tag naming conventions and version control
- SOPs for programming and commissioning

• **Module 19: Final Project - Industrial Application Simulation (11:30 - 01:00)**

- Group challenge to design and simulate a complete control loop
- Team presentations and technical review

• **Module 20: Wrap-Up and Certification (02:00 - 03:30)**

- Participant feedback and lessons learned
- Certification briefing and course closure

Certification

Participants who complete the program will receive a **Certificate of Completion in Industrial Automation Using PLC Programming**, recognizing their technical capability to configure, program, and troubleshoot PLC-based automation systems in industrial environments.

Why Choose MAWA Events

- **Global Expertise:** More than 17 years of experience in professional training and consulting.
- **Industry-Leading Faculty:** Courses delivered by seasoned professionals with hands-on experience.
- **Practical Insights:** Learn to turn theory into actionable strategies for real-world business impact.
- **Client-Focused Solutions:** Customized programs designed to achieve your organisation's unique goals.

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