

PLC TRAINING FOR MANUFACTURING PROCESSES

Course Description

This training is designed for engineers who want to develop practical skills in **PLC programming and industrial automation for manufacturing processes**. The course focuses on understanding PLC fundamentals, developing machine sequences, interpreting electrical drawings, troubleshooting PLC-controlled machines, and managing PLC programs for industrial applications.

The training will use **practical manufacturing-process examples and programming exercises** to bridge the gap between PLC theory and real-world machine automation.

Target Audience

This course is suitable for:

- Engineers working with manufacturing and production machinery
 - Maintenance and automation engineers
 - Electrical/control engineers
 - Engineers responsible for PLC-based machine troubleshooting
 - Professionals with basic electrical/industrial automation exposure
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Prerequisites

Participants should ideally have:

- Basic knowledge of electrical and control systems
 - Understanding of basic electrical components such as sensors, relays, contactors and motors
 - Basic understanding of industrial machines/processes
 - Prior PLC experience is **not mandatory**
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Learning Outcomes

By the end of the training, participants will be able to:

1. Understand PLC architecture and its role in manufacturing automation.
 2. Develop basic-to-intermediate PLC programs using Ladder Logic.
 3. Translate machine sequences into PLC control logic.
 4. Read PLC electrical drawings and identify field I/O.
 5. Troubleshoot PLC-controlled machines systematically.
 6. Perform PLC program upload, download, backup and restoration.
 7. Develop and troubleshoot a basic manufacturing machine sequence.
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MODULES

Module 1: PLC Fundamentals & Industrial Automation

- PLC architecture, CPU, memory and I/O
- PLC scan cycle and operating modes
- Digital and Analog I/O fundamentals
- PLCs in manufacturing automation
- Basic industrial automation architecture

Module 2: PLC Hardware & I/O Configuration

- PLC CPU, power supply and I/O modules
- Digital inputs and outputs
- Sensors, actuators and field devices
- I/O addressing and signal identification
- Basic hardware configuration

Module 3: PLC Programming Fundamentals

- PLC programming concepts and programming environment
- Ladder Logic fundamentals
- NO/NC contacts, coils and bit logic operations
- Timers, counters and comparator functions
- Practical programming exercises

Module 4: Manufacturing Process Programming

- Understanding machine operating sequences

- Start/stop and automatic/manual modes
- Interlocks and permissive logic
- Sequence control using timers, counters and conditions
- Developing PLC logic for manufacturing applications

Module 5: Machine Sequence Development

- Breaking a machine operation into sequences
- Step-by-step sequence development
- Sequential control and state-based logic
- Sensor-based sequence transitions
- Practical machine sequence programming

Module 6: PLC Electrical Drawings & Signal Interpretation

- Reading PLC electrical schematics
- Understanding control circuit drawings
- Identifying sensors, actuators and I/O
- Tracing field signals to PLC I/O
- Converting electrical drawings into PLC logic

Module 7: Troubleshooting PLC-Controlled Machines

- Systematic PLC troubleshooting methodology
- Online monitoring and diagnostic tools
- Troubleshooting sensors and actuators
- Identifying logic, I/O and communication faults
- Practical machine fault scenarios

Module 8: PLC Program Backup & Program Management

- PLC program upload and download
- Program backup and restoration
- Online/offline program management
- Version and change management
- Basic PLC program documentation

Module 9: Integrated Manufacturing Application

- Analyse a manufacturing machine/process
 - Develop I/O list and sequence of operation
 - Develop PLC control logic
 - Test and troubleshoot the application
 - Review and optimize the final program
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