

The Programmable Logic Controller (PLC) Professional Training Course (2 Weeks)

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Course Overview:

The Programmable Logic Controller PLC Professional Training Course 2 Weeks is a comprehensive and hands-on program designed to equip participants with the essential skills and knowledge required to excel in PLC programming and applications. This course covers a wide range of topics, from the basics of PLC CPU modules and memory devices to advanced concepts such as PID control and industrial automation. Participants will gain practical experience using PLC simulation software, specifically the Rockwell Logix 500 PLC, to design, test, and debug ladder logic programs. The course emphasizes real-world applications, ensuring that learners are well-prepared to implement and maintain PLC systems in various industrial settings. Key areas of focus include PLC I/O systems, discrete and analogue I/O, Allen-Bradley I/O, remote I/O, PLC programming terminals, installation safety, maintenance, and troubleshooting techniques. By the end of the course, participants will have a solid understanding of PLC networking, data highways, Ethernet, and number systems used in PLCs, making them proficient in the latest industry standards and practices.

Target Audience:

- Electrical Engineers
- Automation Engineers
- Maintenance Technicians
- Control Systems Engineers
- Manufacturing Engineers
- Instrumentation Technicians
- PLC Programmers

Targeted Organizational Departments:

- Manufacturing and Production
- Maintenance and Engineering
- Automation and Control Systems
- Electrical and Instrumentation
- Quality Assurance
- Research and Development

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Targeted Industries:

- Automotive
- Pharmaceuticals
- Food and Beverage
- Oil and Gas
- Chemical Processing
- Power Generation
- Water and Wastewater Treatment
- Packaging and Material Handling

Course Offerings:

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

- Understand the fundamentals of PLC CPU modules, memory devices, and data storage
- Utilize PLC multiprocessing and scan functions effectively
- Gain a comprehensive overview of PLC systems, their evolution, and advantages
- Identify and work with key PLC components and ladder logic
- Configure and troubleshoot PLC I/O systems, including discrete and analog I/O
- Implement Allen-Bradley I/O and remote I/O in PLC applications
- Program PLCs using various terminals and software
- Ensure proper installation, grounding, and maintenance of PLC systems
- Implement advanced PLC functions such as timers, counters, sequencers, and data transfer
- Apply math functions, process control techniques, and PID control in PLC programming
- Network PLCs and understand data highways, Ethernet, and number systems
- Utilize digital logic, Boolean algebra, and DeMorgan's theorem in PLC applications
- Differentiate between RTUs, PACs, and PLCs, and understand their uses in automation

Training Methodology:

The training methodology for the Programmable Logic Controller PLC Professional Training Course 2 Weeks is designed to maximize participant engagement and learning. The course includes a blend of theoretical instruction and practical, hands-on exercises. Participants will engage in case studies, group work, and interactive sessions to reinforce their understanding of key concepts. Real-world examples and simulations will be used to illustrate the application of PLCs in industrial settings. Feedback sessions will provide opportunities for learners to discuss their progress and address any challenges they encounter. The use of PLC simulation software allows participants to practice programming and troubleshooting in a controlled environment, ensuring they gain practical experience that can be directly applied in their workplace.

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Course Toolbox:

- Comprehensive course manual
- PLC simulation software PLCLogix 500
- Workbooks and reading materials
- Online resources and tutorials
- Checklists and templates for PLC installation and maintenance
- Access to a dedicated online learning portal for additional practice and resources

Course Agenda:

Day 1: Introduction to PLCs and Central Processing Unit

- **Topic 1:** Introduction to PLCs and Their Evolution
- **Topic 2:** Overview of PLC Systems and Applications
- **Topic 3:** Advantages of PLCs Over Relay Logic Systems
- **Topic 4:** Key Components of PLC Systems
- **Topic 5:** Introduction to the Central Processing Unit CPU
- **Topic 6:** Memory Devices and Storage in PLCs
- **Reflection & Review:** Recap of the day's topics and key takeaways

Day 2: Memory and I/O Systems

- **Topic 1:** Detailed Study of PLC Memory Utilization
- **Topic 2:** Multiprocessing and PLC Scan Functions
- **Topic 3:** Introduction to I/O Systems in PLCs
- **Topic 4:** Discrete Inputs and Outputs
- **Topic 5:** Analog Inputs and Outputs
- **Topic 6:** I/O Addressing and Allen-Bradley I/O Parameters
- **Reflection & Review:** Recap of the day's topics and key takeaways

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Day 3: Programming Terminals and Installation

- **Topic 1:** Overview of Programming Terminals
- **Topic 2:** Hand-Held Programming Terminals
- **Topic 3:** Computer-Based Programming Terminals
- **Topic 4:** Application of Peripheral Devices in PLC Networks
- **Topic 5:** Safety Precautions in PLC Installation
- **Topic 6:** Grounding Techniques for PLCs
- **Reflection & Review:** Recap of the day's topics and key takeaways

Day 4: Maintenance and Relay Logic

- **Topic 1:** Preventative Maintenance for PLC Systems
- **Topic 2:** Troubleshooting Techniques for PLCs
- **Topic 3:** Introduction to Relay Logic
- **Topic 4:** Relay Logic Diagrams and Principles
- **Topic 5:** Sizing and Rating of Electromagnetic Contactors
- **Topic 6:** Timing Circuits and Their Applications
- **Reflection & Review:** Recap of the day's topics and key takeaways

Day 5: Ladder Logic Programming

- **Topic 1:** Basics of Ladder Logic Programming
- **Topic 2:** Writing Ladder Logic Programs
- **Topic 3:** Running and Testing Ladder Logic Programs
- **Topic 4:** Safety Circuitry in Ladder Logic Systems
- **Topic 5:** I/O Addressing in Ladder Logic
- **Topic 6:** Programming Restrictions and Best Practices
- **Reflection & Review:** Recap of the day's topics and key takeaways

Day 6: Advanced Timing and Counting Functions

- **Topic 1:** Introduction to PLC Timers
- **Topic 2:** Allen-Bradley Timing Functions
- **Topic 3:** Cascading and Reciprocating Timing Circuits
- **Topic 4:** Overview of PLC Counters
- **Topic 5:** Allen-Bradley Counting Functions
- **Topic 6:** Combining Timers and Counters
- **Reflection & Review:** Recap of the day's topics and key takeaways

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Day 7: Program Flow and Sequencers

- **Topic 1:** Program Flow Instructions in PLCs
- **Topic 2:** Master Control Relays and Zone Control
- **Topic 3:** Writing Subroutines in Ladder Logic
- **Topic 4:** Introduction to Sequencers in PLCs
- **Topic 5:** Event-Driven Sequencers
- **Topic 6:** Sequencer Charts and Their Maintenance
- **Reflection & Review:** Recap of the day's topics and key takeaways

Day 8: Data Transfer and Math Functions

- **Topic 1:** Principles of Data Transfer in PLCs
- **Topic 2:** Move Instructions and Shift Registers
- **Topic 3:** Data Comparison Functions
- **Topic 4:** Introduction to Math Functions in PLCs
- **Topic 5:** Scaling and Ramping Techniques
- **Topic 6:** Combining Math Functions in Ladder Logic
- **Reflection & Review:** Recap of the day's topics and key takeaways

Day 9: Process Control and Digital Logic

- **Topic 1:** Basics of Process Control in PLCs
- **Topic 2:** Open-Loop vs Closed-Loop Control Systems
- **Topic 3:** PID Control and Tuning Parameters
- **Topic 4:** Introduction to Digital Logic
- **Topic 5:** Boolean Algebra and Theorems
- **Topic 6:** Applying Digital Logic in Ladder Logic
- **Reflection & Review:** Recap of the day's topics and key takeaways

Day 10: Advanced Topics and Integration

- **Topic 1:** Introduction to RTUs and PACs
- **Topic 2:** RTU and PAC Connections and Communications
- **Topic 3:** DNP3 Protocol and Alarm Management
- **Topic 4:** Industrial Automation and Flexible Manufacturing Systems
- **Topic 5:** Networking and Data Highways in PLCs
- **Topic 6:** Number Systems and Codes in PLCs
- **Reflection & Review:** Final review of the course, key takeaways, and Q&A session

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How This Course is Different from Other PLC Training Courses:

The Programmable Logic Controller PLC Professional Training Course 2 Weeks stands out due to its comprehensive and practical approach to PLC training. Unlike other courses, this program provides an in-depth understanding of both fundamental and advanced PLC concepts, including the use of PLCLogix 500 simulation software for hands-on practice. The course covers a wide range of topics, from basic CPU modules and memory devices to complex process control and networking. Participants will benefit from interactive sessions, real-world case studies, and practical exercises that reinforce their learning and ensure they are well-prepared to apply their skills in industrial settings. The course's focus on safety, maintenance, and troubleshooting further distinguishes it from other programs, making it an essential training for anyone looking to excel in PLC programming and applications.

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- Data Analytics Training and Data Science Courses
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