



The Programmable Logic Controller (PLC) Professional Training Course (10 Days)

16 - 27 Dec 2024
Barcelona



AGILE LEADERS
Training Center



The Programmable Logic Controller (PLC) Professional Training Course (10 Days)

Ref.: 36253_257542 **Date:** 16 - 27 Dec 2024 **Location:** Barcelona **Fees:** 8000 Euro

Course Overview:

The Programmable Logic Controller PLC Professional Training Course 10 Days 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

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 10 Days 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.

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

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

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

How This Course is Different from Other PLC Training Courses:

The Programmable Logic Controller PLC Professional Training Course 10 Days 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.

WHO WE ARE

Agile Leaders is a renowned training center with a team of experienced experts in vocational training and development. With 20 years of industry experience, we are committed to helping executives and managers replace traditional practices with more effective and agile approaches.

OUR VISION

We aspire to be the top choice training provider for organizations seeking to embrace agile business practices. As we progress towards our vision, our focus becomes increasingly customer-centric and agile.

OUR MISSION

We are dedicated to developing value-adding, customer-centric agile training courses that deliver a clear return on investment. Guided by our core agile values, we ensure our training is actionable and impactful.

WHAT DO WE OFFER

At Agile Leaders, we offer agile, bite-sized training courses that provide a real-life return on investment. Our courses focus on enhancing knowledge, improving skills, and changing attitudes. We achieve this through engaging and interactive training techniques, including Q&As, live discussions, games, and puzzles.



AGILE LEADERS
Training Center

CONTACT US

 UAE, Dubai Investment Park First

 +971585964727
 +447700176600

 sales@agile4training.com



Gamified and Interactive Training

We understand that training delivery can be challenging, both online and offline. To ensure engagement and achieve learning objectives, we have developed our own activities and collaborated with industry-leading solutions to gamify our training sessions. This approach increases interaction levels and guarantees effective learning outcomes.



Our Training Categories

We cover a wide range of training categories to cater to different needs and interests

- Branding, Marketing, Customer Relations, & Sales Programs
- Finance and Accounting Programs
- Human Resources Management Programs
- Management & Leadership Programs
- Political & Public Relations Programs
- Project Management Programs
- Quality & Process Management
- Self-Development Programs

Join Agile Leaders today and embark on a transformative journey towards becoming a more agile and effective leader. Experience our customer-centric approach, actionable training, and guaranteed return on investment. Let us help you unleash your full potential in the dynamic business landscape.



Where to Find Us

You can join our training programs at our centers located in



We also offer online training sessions through the Zoom platform.

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- Morocco** Casablanca
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- France** Paris
- UK** London
- Italy** Rome
- Egypt** Cairo, Sharm El-Sheikh
- Turkey** Istanbul
- Georgia** Tbilisi
- Azerbaijan** Baku
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UAE, Dubai Investment Park First



+971585964727
+447700176600



sales@agile4training.com