

**PLC475:**  
**PLC Hardware, Programming and Design**

<b>Duration:</b>	<b>5 Day (Classroom) or 24 hours Online</b>
<b>Audience:</b>	<b>Process Control Engineers, PLC Engineers and Technicians, Instrument Engineers</b>
<b>Prerequisites:</b>	<b>Some control room exposure is desirable, but not required.</b>
<b>Course Material:</b>	<b>PowerPoint Slides, PLC slides, PLC Simulation Software and Industrial Examples</b>

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**Course Description and Objectives:**

This course teaches you software, hardware and programming skills in using PLCs (programmable logic controllers). The course is designed to build skills in such a manner that upon completion, the student will have the skills needed to work with any PLC. This course like other PiControl courses is not vendor specific. The course starts with basics of PLC, covering both hardware, software and architecture. It teaches ladder logic, function blocks, input/output cards. It explains all basic, standard and custom functions and capabilities of a PLC. With this knowledge, a student will have the skills to design ladder logic, function blocks and safe habits to work in any manufacturing unit. Various real industrial examples are used to illustrate the concepts and with the incorporation and usage of all commonly used PLC functions.

**Learning Outcomes:**

At the end of this course, students will have strong skills on PLCs. They will be exposed to hardware, software, ladder logic and function blocks. They will have learnt all common PLC blocks and schemes. The course is hands-on and allows students to design and build PLC schemes on their personal computers. With this knowledge, it is possible to design and build PLC logic and control schemes in an industrial environment. The course places significant emphasis on safety, reliability and maintenance for the safe and improved operation of any process. The course covers discrete control, continuous control, adaptive control, safety shutdowns and also the design and implementation of APC inside the PLC. The following topics are covered in this course:

- Programmable Logic Controller (PLC) Overview
- PLC Hardware and Components
- PLC Communication
- Number Systems – Binary, Decimal and Hexadecimal
- PLC Input and Output Cards
- How to read P&IDs and design control schemes
- Relays
- Relay Logic Diagrams
- PLC Programming
- Logic Gate Functions
- Motor Starter Logic
- Timers
- Counters
- Setting up PLC software on personal computers
- PLC Lab Hands-On Project 1-3
- PLC Math Blocks and Functions
- Compare and Jump Instructions
- PLC Lab Hands-On Project 4-6
- Subroutines for Repetitious Calculations and Logic
- Bit Shift Instructions

- Data Handling Instructions
- Sequence Design and Implementation
- Sequence Instructions
- PLC Lab Hands-On Project 7-10
- Troubleshooting and Maintenance of PLC systems
- PLC Networks in Industry
- Safety Procedures
- PID and cascade control design inside the PLC
- Developing APC inside the PLC
- Starting up APC schemes
- Safe operating practices and design to avoid making mistakes and process upsets
- Procedures and practices for improved user interface
- Designing PLC schemes for improved GUI and assisting the job of the operator