

PCI-200

Understanding Industrial Process Control / Level Two Advanced Process Measurement & Control

Course Description

This 36-hour training program uses a hands-on approach providing students an in-depth understanding of industrial process measurement & control systems. Participants will learn to apply more comprehensive measurement & control principles, terminology, symbols & documentation standards. In addition students will perform hands-on exercises in which they will build, test, tune & troubleshoot temperature, pressure, flow & level control systems.

Topical Outline

- Application of ISA documentation standards
- Elements of a Process Control Loop
 - PV-Process Variable
 - MV-Manipulated Variable
 - C-Controller
- Other Process Measurements
 - Weight
 - pH
 - Density
 - Viscosity
 - Moisture
 - Others
- Process Dynamics
 - Open Loop Response
 - Process Gain
 - Process Time Constant
 - Process Dead Time
- Control Methods
 - Open Loop control (Self-regulating)
 - Manual control
 - ON/OFF control
 - Feedback control
 - Feedforward control
 - Cascade control
- Control Tuning
 - Open vs. Closed loop methods
 - Stability vs. responsiveness
 - ¼ decay ratio
 - Simplex tuning method
 - Zeigler-Nichols tuning method
 - Auto-tuning
- Special Cases
 - pH control
 - Nonlinear systems
- Control Valve Selection & Sizing
 - Valve types (Globe, Ball, Butterfly & Gate)
 - Valve Characteristic (Quick opening, Linear, Equal Percentage)
 - Other Control Valve Topics (Positioners, Materials, Configuration, Actuators & Accessories)
- Installation Best Practices
 - Wiring
 - Shielding
 - Isolation
- Control System Troubleshooting
 - Experience Based
 - Trial & Error

Prerequisite

PCI-100: Understanding Industrial Process Control/Level One Process Measurement & Control Fundamentals or a fundamental understanding of industrial process measurement & control system design & operation.

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Course Length

36 hours

CEU's

3.3

Objectives

Persons successfully completing this course will be able to:

- Create the documents used to define instruments & control systems.
- Apply the principles, equipment & techniques for the primary industrial process measurements of temperature, pressure, level & flow.
- Understand & process response & how it affects controller operation.
- Know & apply the proper controller tuning method.
- Select & size the proper control valve.
- Build, test, operate tune & troubleshoot a various feedback control loops.