Industrial Instrumentation and Control Training Course

Professional Development Training Course Outline

Category	General Training	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Industrial Instrumentation and Control Training Course is designed to equip learners with advanced skills in process control systems, PLC programming, SCADA systems, DCS architecture, industrial sensors, calibration techniques, and real-time monitoring technologies. With the rapid evolution of Industrial Internet of Things (IIoT), AI-driven automation, and predictive maintenance systems, industries now demand highly skilled instrumentation professionals capable of ensuring operational efficiency, safety, and precision in industrial environments.

This course provides a comprehensive foundation and advanced understanding of industrial automation systems, control loops, field instrumentation, and smart sensor integration. Learners will gain hands-on exposure to industrial communication protocols, process optimization, and control system tuning. By combining theoretical knowledge with real-world industrial applications, this training prepares participants for high-demand roles in oil & gas, manufacturing, power plants, pharmaceuticals, and chemical processing industries, where automation and precision control are critical for productivity and safety.

Programme Curriculum

Industrial Instrumentation and Control Training Course

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Course Duration

5 days

Course Objectives

1. Master Industrial Instrumentation Systems & Smart Sensors
2. Understand PLC Programming & Ladder Logic Control Systems
3. Gain expertise in SCADA Systems & Real-Time Monitoring
4. Learn Distributed Control Systems (DCS) Architecture
5. Apply Process Control & Automation Engineering Principles
6. Develop skills in Industrial Communication Protocols (HART, Modbus, Profibus)
7. Perform Calibration & Maintenance of Industrial Instruments
8. Implement IIoT-Based Smart Manufacturing Solutions
9. Understand Control Loop Tuning & PID Controllers
10. Enhance Predictive Maintenance & Fault Detection Techniques
11. Apply Safety Instrumented Systems (SIS) & Industrial Safety Standards
12. Optimize Energy Efficiency in Industrial Processes
13. Build competency in Industry 4.0 Automation Technologies

Target Audience

1. Electrical & Electronics Engineering Students
2. Mechanical Engineering Graduates
3. Instrumentation & Control Technicians
4. Industrial Maintenance Engineers
5. Automation Engineers & PLC Programmers
6. Process Engineers in Manufacturing Industries
7. Technicians in Oil & Gas / Power Plants
8. Professionals transitioning into **Industrial Automation & Smart Factory Roles**

Course Modules

Module 1: Fundamentals of Industrial Instrumentation

- Overview of industrial measurement systems
- Types of sensors and transducers
- Signal conditioning techniques
- Industrial process variables
- Introduction to smart instrumentation
- **Case Study:** Oil refinery pressure monitoring system failure analysis and sensor optimization.

Module 2: PLC Programming & Automation Control

- PLC architecture and components

- Ladder logic programming fundamentals
- Timer, counter, and control instructions
- PLC troubleshooting techniques
- Industrial PLC applications
- **Case Study:** Automated bottling plant controlled using PLC ladder logic system.

Module 3: SCADA Systems & Industrial Monitoring

- SCADA architecture and components
- HMI design and configuration
- Real-time data acquisition systems
- Alarm management systems
- Remote monitoring applications
- **Case Study:** Power plant SCADA system for real-time turbine monitoring.

Module 4: Distributed Control Systems (DCS)

- DCS architecture and operation
- Redundancy and reliability systems
- Process automation strategies
- Integration with field instruments
- Control room operations
- **Case Study:** Chemical plant temperature control using DCS automation.

Module 5: Industrial Communication Protocols

- Modbus RTU/TCP fundamentals
- HART protocol applications
- Profibus & Foundation Fieldbus systems
- Ethernet/IP communication systems
- Network troubleshooting techniques
- **Case Study:** Smart factory communication failure resolved using Modbus diagnostics.

Module 6: Process Control & PID Tuning

- Control loop theory and dynamics
- PID controller structure and tuning methods
- Stability and response analysis
- Feedback and feedforward control
- Industrial control optimization
- **Case Study:** Cement kiln temperature stabilization using PID tuning.

Module 7: Calibration & Maintenance of Instruments

- Calibration principles and standards
- Pressure, flow, and temperature calibration
- Maintenance strategies
- Instrument loop checking procedures
- Fault detection and diagnostics
- **Case Study:** Pharmaceutical plant calibration drift correction improving production accuracy.

Module 8: IIoT & Industry 4.0 Smart Automation

- Introduction to Industrial IoT architecture
- Cloud-based monitoring systems
- Predictive analytics in automation
- AI integration in industrial systems
- Smart factory implementation
- **Case Study:** Smart manufacturing system reducing downtime using predictive maintenance analytics.

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
28 Sep 2026	02 Oct 2026	Online	$1,000
28 Sep 2026	02 Oct 2026	Physical	$1,500
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0

Ready to enroll or request a customized program? Book online or contact us:

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