QUEST
Professional Center

PROFESSIONAL TRAINING COURSE

Course No. 1155

Industrial Instrumentation Training Course

INSTRUMENTATION & CONTROL
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION
5 Days

DELIVERY
Classroom

Course Overview

Industrial Instrumentation Training Course is a comprehensive professional development program designed to enhance the knowledge and practical capabilities of engineers, technicians, supervisors, and industrial professionals responsible for the installation, operation, maintenance, calibration, and optimization of industrial instrumentation systems. As modern industries continue to adopt advanced automation technologies, accurate measurement and reliable instrumentation have become essential for ensuring operational efficiency, process stability, product quality, regulatory compliance, and workplace safety.

This course provides participants with a thorough understanding of industrial measurement principles, instrumentation technologies, control devices, signal transmission systems, calibration techniques, and troubleshooting methodologies used across process industries. Participants will explore the functions of pressure, temperature, flow, level, and analytical instruments while gaining practical insights into instrumentation selection, installation standards, maintenance planning, and performance improvement. The program bridges theoretical knowledge with practical applications to support effective decision-making in industrial environments.

Organizations operating in sectors such as oil and gas, petrochemicals, manufacturing, utilities, energy, water treatment, mining, pharmaceuticals, food processing, and public infrastructure rely heavily on dependable instrumentation systems to maintain operational continuity and optimize production processes. This Industrial Instrumentation Training Course equips professionals with internationally recognized best practices for maintaining measurement accuracy, minimizing equipment failures, reducing downtime, and improving asset reliability throughout the operational lifecycle.

By integrating engineering principles with practical case studies, diagnostic techniques, and real-world industrial scenarios, this course enables participants to strengthen their technical competencies while supporting organizational objectives related to operational excellence, process optimization, equipment reliability, maintenance efficiency, and continuous improvement. The knowledge gained can be directly applied to both new installations and existing industrial facilities seeking to improve instrumentation performance and overall operational effectiveness.

Objectives

- Analyze the principles of industrial instrumentation systems and their role in modern process industries throughout the duration of the course.
- Develop the ability to identify and select appropriate industrial instruments for various measurement applications.
- Evaluate pressure, temperature, flow, level, and analytical measurement technologies based on operational requirements.
- Apply internationally accepted practices for instrument installation, commissioning, and verification.
- Design effective calibration procedures that improve measurement accuracy and equipment reliability.
- Improve troubleshooting techniques for identifying instrumentation faults and minimizing production interruptions.
- Strengthen preventive and predictive maintenance strategies for industrial instrumentation assets.
- Implement effective signal transmission and communication methods used in modern industrial control systems.
- Assess instrumentation performance using diagnostic tools, testing procedures, and maintenance records.
- Align instrumentation management practices with operational safety, quality, reliability, and organizational performance objectives.

Who Should Attend

This Industrial Instrumentation Training Course is designed for instrumentation engineers, maintenance engineers, electrical engineers, automation engineers, process engineers, control engineers, mechanical engineers involved in instrumentation systems, reliability engineers, commissioning engineers, inspection engineers, and technical specialists responsible for industrial process measurement and control. It is equally valuable for instrumentation technicians, calibration technicians, maintenance technicians, field service personnel, and operations professionals seeking to enhance their technical expertise in industrial instrumentation.

The course is also highly beneficial for engineering supervisors, maintenance managers, plant managers, production managers, operations managers, technical managers, reliability managers,

asset management professionals, quality specialists, HSE personnel, and project engineers responsible for ensuring reliable process control and equipment performance across industrial facilities. Organizations involved in capital projects, plant modernization, automation initiatives, and operational improvement programs will benefit from developing internal expertise in instrumentation technologies.

Professionals working within government entities, ministries, public utilities, oil and gas companies, petrochemical facilities, power generation plants, manufacturing organizations, water and wastewater treatment facilities, mining operations, pharmaceutical manufacturers, food processing companies, chemical plants, engineering contractors, and industrial service providers will gain practical knowledge that supports safer operations, improved process efficiency, and enhanced equipment reliability.

Learning Outcomes

- By the end of this Industrial Instrumentation Training Course, participants will be able to:
- Identify the operating principles and industrial applications of major instrumentation devices.
- Select suitable instruments based on process conditions, measurement accuracy, environmental factors, and operational requirements.
- Perform systematic calibration procedures using recognized industrial practices.
- Diagnose instrumentation failures using structured troubleshooting methodologies.
- Interpret process measurement signals and instrumentation documentation with confidence.
- Evaluate the performance of sensors, transmitters, control valves, and field instruments.
- Apply maintenance strategies that reduce equipment downtime and improve system reliability.
- Implement safe installation and commissioning procedures for industrial instrumentation systems.
- Improve communication between instrumentation, operations, maintenance, and engineering teams during troubleshooting and maintenance activities.
- Develop practical action plans for improving instrumentation reliability, measurement accuracy, and operational performance within their organizations.

Course Outline

DAY 01

Fundamentals of Industrial Instrumentation and Process Measurement

- Introduction to industrial instrumentation and process control systems
- Principles of measurement accuracy, precision, repeatability, and uncertainty
- Industrial process variables including pressure, temperature, flow, level, and analytical measurements
- Instrument classification, standards, symbols, tags, and P&ID interpretation

> PRACTICAL APPLICATION
> Identifying instrumentation systems and interpreting industrial process documentation

DAY 02

Industrial Sensors, Transmitters, and Field Instruments

- Pressure measurement technologies and pressure transmitters
- Temperature measurement using thermocouples, RTDs, infrared devices, and temperature transmitters
- Flow measurement technologies including differential pressure, magnetic, ultrasonic, turbine, vortex, and Coriolis flowmeters
- Level measurement technologies including radar, ultrasonic, capacitance, hydrostatic, and guided wave radar instruments

> PRACTICAL APPLICATION
> Selecting appropriate instrumentation for different industrial process applications

DAY 03

Instrument Installation, Calibration, and Maintenance

- Instrument installation requirements and best engineering practices
- Calibration principles, calibration intervals, traceability, and documentation

DAY 03 — CONTINUED

- Signal transmission including 4–20 mA, HART, Foundation Fieldbus, Profibus, and digital communication systems
- Preventive, predictive, and corrective maintenance strategies for instrumentation systems

PRACTICAL APPLICATION

Performing calibration exercises and developing maintenance procedures for critical instrumentation assets

DAY 04

Instrumentation Troubleshooting and Control System Integration

- Systematic troubleshooting techniques for industrial instrumentation
- Diagnosing sensor failures, transmitter faults, communication issues, and signal errors
- Control valves, actuators, positioners, and final control elements
- Integration of instrumentation with PLC, DCS, SCADA, and industrial automation systems

PRACTICAL APPLICATION

Troubleshooting real industrial instrumentation scenarios using structured diagnostic methods

DAY 05

Instrument Reliability, Safety, and Performance Optimization

- Instrument reliability improvement and lifecycle management
- Functional testing, performance verification, and condition monitoring
- Instrumentation considerations for process safety, operational risk reduction, and regulatory compliance
- Asset management strategies for instrumentation systems and continuous performance improvement

DAY 05 — CONTINUED

FINAL WORKSHOP

Developing an instrumentation improvement action plan incorporating instrument selection, maintenance optimization, calibration management, troubleshooting techniques, reliability enhancement, and implementation priorities for participants' industrial facilities

Register or Request More Information

Course page: https://quest-training.com/courses/industrial-instrumentation-training-course
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