



INSTRUMENTATION SYSTEMS MAINTENANCE AND TROUBLESHOOTING



COURSE OVERVIEW

This comprehensive 5-day training program provides a practical and in-depth understanding of industrial instrumentation systems, focusing on maintenance, calibration, troubleshooting, and operational reliability. Participants will explore the roles of sensors, transmitters, controllers, and actuators in modern process control systems, and gain hands-on skills for proper installation, loop checking, and fault diagnosis. The course emphasizes real-world troubleshooting, preventive maintenance planning, documentation practices, and adherence to industry standards (ISA, IEC, ISO). By the end of the course, attendees will be equipped to ensure system integrity, reduce downtime, and contribute to plant safety and efficiency.

DATES, VENUES AND FEES



12 – 16 October 2025 – Doha

(5 Days)

Fees

US\$ 4500

Note: Fee is per participant.

Groups from the same company can enjoy a **discounted** price.

WHO SHOULD ATTEND?

This course is appropriate for a wide range of professionals but not limited to:

- Instrumentation Technicians
- Maintenance Engineers
- Plant Operators,
- Control Systems Personnel

CONTACT US NOW

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ACCREDITATION



This training course is certified by CPD.

The CPD Certification Service is the leading independent CPD accreditation institution operating across industry sectors to complement the Continuing Professional Development policies of professional institutes and academic bodies. The CPD Certification Service provides support, advice, and recognised independent CPD accreditation compatible with global CPD principles. CPD is the term used to describe the learning activities professionals engage in to develop and enhance their abilities and keep skills and knowledge up to date. CPD Units are only awarded to programmes after each programme is scrutinised to ensure integrity and quality according to CPD standards and benchmarks.

COURSE CERTIFICATE

MSTC certificate will be issued to all attendees completing a minimum of 80% of the total tuition hours of the course.

CPD internationally recognized certificate will be issued for all participants who will meet the course requirements. CPD certificates will be issued within a month of the successful completion of the course.

TRAINING METHODOLOGY

- Expert instructor lecture, input using numerous visual aids
- Supportive comprehensive course manual enabling practical application and reinforcement
- Participant discussion and involvement regarding their specific projects and challenges
- Real-world case studies and best practices

LEARNING OBJECTIVES

- Understand the purpose and role of instrumentation in process control
- Learn about basic components, signal types, and system architecture
- Recognize the function of sensors, transmitters, controllers, and actuators
- Master techniques for installing and calibrating instrumentation devices
- Understand the importance of standards and documentation
- Use tools for proper calibration and record-keeping
- Learn how to isolate and resolve instrumentation issues
- Identify common failure causes and symptoms
- Use diagnostic tools effectively
- Understand different maintenance philosophies
- Design and implement preventive maintenance programs
- Analyze and minimize downtime
- Apply relevant industry standards (ISA, IEC)
- Ensure safe work practices during instrumentation tasks
- Collaborate on solving real-world instrumentation problems

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COURSE OUTLINE

DAY 1

Introduction to Instrumentation Systems and Components

- Pre test
- **Overview of Industrial Instrumentation**
 - Role in automation and process control
 - Safety and reliability considerations
- **Key Components and Signal Types**
 - Sensors, transducers, transmitters, control valves, actuators
 - Analog vs. digital signals, 4–20 mA, HART, FOUNDATION Fieldbus
- **Basic Measurement Principles**
 - Pressure, temperature, flow, level, analytical
- **Introduction to Control Systems**
 - PLC, DCS, SCADA basics
- Case Study

DAY 2

Installation, Calibration, and Documentation

- **Instrumentation Installation Best Practices**
 - Cabling, grounding, shielding, sensor placement
- **Calibration Procedures and Tools**
 - Zero/span, as-found/as-left values
 - Calibration equipment and reference standards
- **Loop Checking and Commissioning**
- **Instrument Documentation and Drawings**
 - Loop diagrams, hook-up diagrams, datasheets
- Case Study

DAY 3

Troubleshooting Techniques and Common Instrumentation Failures

- **Systematic Troubleshooting Approach**
 - Symptoms → Root cause analysis
 - 5 Whys, fault tree analysis
- **Common Instrumentation Problems**
 - Signal loss, drift, grounding issues, noise

- **Using Multimeters, Calibrators, Loop Testers**
- **Working with Smart Instruments (HART/Fieldbus)**
 - Using handheld communicators and asset management software
- Case Study

DAY 4

Maintenance Strategies and Preventive Programs

- **Types of Maintenance**
 - Preventive, predictive, corrective, condition-based
- **Developing a Preventive Maintenance (PM) Program**
 - PM checklists, schedules, documentation
- **Condition Monitoring Techniques**
 - Diagnostics, self-checking instruments, signal trend analysis
- **Spares Management and CMMS Integration**
- Case Study

DAY 5

Safety, Standards, and Case-Based Troubleshooting

- **Instrumentation Safety and Best Practices**
 - Lockout-tagout (LOTO), hazardous areas (Ex-proof), grounding
- **Applicable Codes and Standards**
 - ISA, IEC, ISO for instrumentation and calibration
- **Case Studies**
- **Final Review and Group Exercise**
- Post test
- Certification ceremony

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