

Course No. 1354

Instrumentation & Control Systems Commissioning Training Course

COMMISSIONING, START-UP & SHUTDOWN & OPERATIONAL
READINESS
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Instrumentation & Control Systems Commissioning Training Course is a comprehensive professional program designed to equip engineers, commissioning specialists, maintenance professionals, and technical managers with the knowledge and practical skills required to successfully plan, execute, manage, and validate instrumentation and control systems commissioning activities. As modern industrial facilities become increasingly automated and technology-driven, effective commissioning practices are essential to ensure operational reliability, safety, performance, and compliance throughout the project lifecycle.

Commissioning represents a critical phase between project construction and operational start-up. It serves as the bridge that verifies whether instrumentation devices, control systems, safety systems, communication networks, and process automation solutions function according to design specifications and operational requirements. Organizations that implement structured commissioning methodologies can significantly reduce start-up risks, avoid costly delays, minimize operational disruptions, and improve long-term asset performance.

This training course provides participants with a practical understanding of commissioning frameworks, procedures, testing methodologies, documentation requirements, and performance verification techniques applicable to instrumentation and control systems. Participants will explore the commissioning lifecycle from design review and pre-commissioning activities through loop checking, functional testing, system integration, start-up support, and final handover.

Special attention is given to industrial environments such as oil and gas facilities, power generation plants, manufacturing operations, petrochemical facilities, utilities, infrastructure projects, and process industries where instrumentation and control systems play a vital role in maintaining safe and efficient operations. The course integrates industry best practices, practical case studies, and real-world commissioning challenges to help participants strengthen project execution and operational readiness.

By completing this Instrumentation & Control Systems Commissioning Training Course, participants will gain the capability to improve commissioning effectiveness, coordinate multidisciplinary teams, identify and resolve technical issues, ensure compliance with project specifications, and contribute to successful project delivery while supporting organizational performance, operational excellence, and asset reliability.

Objectives

- Analyze the complete commissioning lifecycle for instrumentation and control systems from project completion through operational handover.
- Develop structured commissioning plans, schedules, procedures, and documentation aligned with project requirements.
- Evaluate instrumentation installation quality and readiness before pre-commissioning and commissioning activities begin.
- Apply industry-recognized commissioning methodologies for field instruments, control systems, and safety systems.
- Design effective loop testing and functional testing strategies to verify system performance and reliability.
- Improve coordination between engineering, construction, commissioning, operations, and maintenance teams.
- Assess instrumentation and control system performance against design specifications and operational objectives.
- Implement commissioning quality assurance and quality control practices throughout project execution.
- Strengthen risk management and safety practices during commissioning and start-up activities.
- Align commissioning activities with operational readiness and plant performance requirements.
- Evaluate common commissioning challenges and develop corrective actions to support successful project delivery.
- Implement structured handover and documentation processes to ensure smooth transition to operations.

Who Should Attend

This course is designed for instrumentation engineers, control systems engineers, automation engineers, commissioning engineers, project engineers, electrical and instrumentation professionals, system integration specialists, and technical personnel responsible for the installation, testing, verification, and commissioning of industrial control systems.

The program is highly valuable for project managers, construction managers, commissioning managers, start-up specialists, operations readiness teams, maintenance engineers, reliability

engineers, plant engineers, technical supervisors, and professionals involved in capital projects and facility start-up activities. Participants working in oil and gas, petrochemical, power generation, manufacturing, utilities, infrastructure, mining, and industrial processing sectors will benefit significantly from the practical commissioning knowledge presented throughout the course.

Senior managers, department heads, technical decision makers, and operational leaders responsible for project delivery, plant readiness, asset integrity, operational performance, and risk management will also gain valuable insights into commissioning governance, performance assurance, and the successful integration of instrumentation and control systems into operational environments.

Learning Outcomes

- By the end of this course, participants will be able to:
- Explain the objectives, phases, and deliverables of instrumentation and control systems commissioning.
- Prepare comprehensive commissioning plans, procedures, checklists, and execution strategies.
- Verify readiness of field instrumentation and control equipment before commissioning activities.
- Conduct loop checks, calibration verification, and functional testing of instrumentation systems.
- Perform commissioning activities for distributed control systems (DCS), programmable logic controllers (PLC), and supervisory control systems.
- Evaluate control loops, interlocks, alarms, and process automation functions for operational performance.
- Assess safety instrumented systems and critical control functions during commissioning activities.
- Identify commissioning risks, technical issues, and operational constraints and implement corrective actions.
- Coordinate effectively with multidisciplinary project teams during commissioning and start-up phases.
- Manage commissioning documentation, punch lists, test records, and system turnover requirements.
- Support operational readiness and facilitate smooth handover to operations and maintenance teams.
- Apply industry best practices to improve commissioning efficiency, reliability, and project

outcomes.

Course Outline

DAY 01

Fundamentals of Instrumentation & Control Systems Commissioning

- Introduction to commissioning principles and objectives
- Project lifecycle and the role of commissioning
- Instrumentation and control system architecture overview
- Commissioning phases, deliverables, and responsibilities

PRACTICAL APPLICATION

Reviewing a commissioning strategy and project execution framework

DAY 02

Pre-Commissioning and Instrument Verification

- Pre-commissioning planning and readiness assessment
- Instrument installation verification and inspection requirements
- Calibration principles and verification procedures
- Loop checking methodologies and documentation practices

PRACTICAL APPLICATION

Performing loop verification and instrument testing exercises

DAY 03

Control Systems Commissioning and Functional Testing

- Commissioning of PLC, DCS, SCADA, and automation systems
- Control logic verification and software validation
- Alarm management and interlock testing

DAY 03 — CONTINUED

- Functional testing of process control systems

PRACTICAL APPLICATION

Functional testing scenarios and troubleshooting exercises

DAY 04

Safety Systems, Integration and Start-Up Readiness

- Safety instrumented systems commissioning principles
- Emergency shutdown systems and critical protection functions
- System integration testing and interface verification
- Operational readiness reviews and start-up preparation

PRACTICAL APPLICATION

Commissioning risk assessment and integrated system testing workshop

DAY 05

Performance Validation, Handover and Best Practices

- Performance testing and operational verification
- Managing punch lists and commissioning closeout activities
- Documentation control and system turnover requirements
- Lessons learned, commissioning excellence, and continuous improvement

FINAL WORKSHOP

Developing a complete instrumentation and control systems commissioning implementation plan for a real-world industrial project



Register or Request More Information

Course page: <https://quest-training.com/courses/instrumentation-control-systems-commissioning-training-course>

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