QUEST
Professional Center

PROFESSIONAL TRAINING COURSE

Course No. 1357

Process Plant Commissioning & Start-up Training Course

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

DURATION
5 Days

DELIVERY
Classroom

Course Overview

The Process Plant Commissioning & Start-up Training Course is a specialized professional program designed to develop the technical, operational, and managerial capabilities required to plan, coordinate, and execute pre-commissioning, commissioning, start-up, and operational readiness activities within process plants and industrial facilities. The program provides a structured approach to transitioning a facility from construction and mechanical completion into safe, controlled, reliable, and stable operation.

Commissioning and start-up are critical stages in the lifecycle of any process plant because multiple mechanical, electrical, instrumentation, control, utility, and safety systems must operate together under controlled conditions. Effective commissioning practices help identify technical deficiencies before full operation, reduce start-up risks, improve equipment reliability, strengthen process safety, and support a more efficient transition from project execution to routine operations.

The course covers the complete process plant commissioning and start-up lifecycle, including commissioning strategy, readiness planning, system turnover, equipment inspection, pre-commissioning activities, functional testing, utility commissioning, equipment start-up, process introduction, operational stabilization, and final handover. Participants will examine the relationship between process systems, rotating and static equipment, electrical systems, instrumentation and control, utilities, alarms, interlocks, and protective systems.

The program also focuses on effective coordination between engineering, construction, commissioning, operations, maintenance, quality, inspection, and health and safety teams. Participants will explore practical approaches to managing outstanding work, technical observations, non-conformities, permit-to-work requirements, energy isolation, management of change, operational risks, and abnormal conditions during plant start-up.

Through practical exercises, case studies, workshops, and realistic operating scenarios, the Process Plant Commissioning & Start-up Training Course enables participants to evaluate plant readiness, develop structured commissioning plans, analyze testing and start-up results, troubleshoot operational problems, and manage the transition toward stable operation. The program supports organizations in improving commissioning quality, operational readiness, safety, reliability, asset performance, and overall project delivery.

Objectives

- Analyze the major stages of process plant pre-commissioning, commissioning, and start-up and identify the required activities, deliverables, and decision points throughout the training program.
- Develop integrated commissioning and start-up plans covering system readiness, responsibilities, testing requirements, sequencing, and operational interfaces.
- Evaluate the readiness of process equipment, utilities, mechanical systems, electrical systems, instrumentation, and control systems before start-up.
- Apply structured inspection, testing, functional verification, and commissioning methods to process plant systems and equipment.
- Design practical commissioning checklists, readiness reviews, system turnover procedures, and verification records to support controlled start-up.
- Improve coordination between engineering, construction, commissioning, operations, maintenance, inspection, quality, and safety teams during project handover and start-up.
- Strengthen the application of process safety, permit-to-work, energy isolation, risk assessment, and safe operating practices throughout commissioning activities.
- Assess test results, technical deviations, incomplete work, and operational problems and determine appropriate corrective actions.
- Implement systematic troubleshooting and root cause analysis methods for equipment and process issues encountered during initial operation.
- Align commissioning and start-up activities with maintenance, reliability, asset management, and long-term operational performance requirements.
- Develop effective documentation and handover processes covering commissioning records, operating procedures, outstanding work, and final acceptance requirements.
- Apply structured methods to achieve a safe and controlled transition from start-up to stable routine plant operation.

Who Should Attend

This course is designed for process engineers, commissioning engineers, operations engineers, project engineers, production engineers, maintenance and reliability engineers, mechanical engineers, electrical engineers, instrumentation and control engineers, field engineers, and technical specialists involved in the commissioning, start-up, testing, and operational readiness of process plants. It is particularly relevant to professionals working in industrial plants, manufacturing facilities, petrochemical plants, oil and gas facilities, utilities, energy projects, chemical plants, and

other process-based operations.

The program is also suitable for project managers, commissioning managers, operations managers, engineering managers, maintenance managers, production managers, reliability and asset managers, quality professionals, inspection specialists, health and safety professionals, start-up leaders, and technical authorities. It provides particular value to professionals responsible for system readiness, project handover, start-up decision-making, operational risk management, and the transition from construction to plant operations.

Government entities, ministries, public sector organizations, industrial corporations, energy companies, oil and gas organizations, petrochemical companies, utilities, and large-scale manufacturing organizations can benefit from this training when implementing new facilities, plant expansions, modernization projects, or major shutdown and restart programs.

Learning Outcomes

- By the end of the course, participants will be able to:
- Explain the principles, phases, and key activities involved in process plant pre-commissioning, commissioning, and start-up.
- Develop a structured commissioning and start-up plan covering activities, responsibilities, readiness requirements, testing, and decision points.
- Evaluate the readiness of plant equipment, systems, utilities, and supporting infrastructure before start-up.
- Apply appropriate inspection and testing methods to mechanical, electrical, instrumentation, control, and process systems.
- Identify start-up requirements for rotating equipment, static equipment, utilities, and critical process systems.
- Apply controlled procedures for system energization, utility start-up, equipment operation, and initial process introduction.
- Analyze commissioning and start-up data to identify deviations, abnormal conditions, and technical problems.
- Use checklists, commissioning records, turnover documents, and readiness reviews to monitor system status and project progress.
- Coordinate commissioning and start-up activities across engineering, construction, operations,

maintenance, quality, inspection, and safety functions.

- Assess operational and process safety risks and establish appropriate controls before and during start-up.
- Manage outstanding work, technical observations, non-conformities, and corrective actions through structured close-out processes.
- Support operational stabilization and final handover by integrating commissioning results with maintenance, reliability, and asset management requirements.

Course Outline

DAY 01

Process Plant Commissioning Fundamentals and Operational Readiness

- Introduction to pre-commissioning, commissioning, start-up, and operational readiness
- Commissioning within the process plant project lifecycle
- Transition from engineering and construction to plant operation
- Commissioning strategy, philosophy, and execution planning
- Roles and responsibilities of engineering, construction, commissioning, operations, and maintenance teams
- Review of process flow diagrams, system boundaries, technical specifications, and project documentation
- Identification of critical process systems, utility systems, and supporting infrastructure
- Management of interfaces between project execution and plant operations
- Commissioning milestones, readiness requirements, and decision gates

> **PRACTICAL APPLICATION**
>
> Developing an operational readiness and commissioning plan for a process plant

DAY 02

Pre-Commissioning, Inspection, and System Readiness

- Planning and organization of pre-commissioning activities
- Mechanical completion and system turnover requirements
- Inspection of equipment, piping, valves, electrical systems, and instrumentation
- Verification of installation quality and system completion
- Management of punch list items and outstanding work
- Cleaning, flushing, pressure testing, and preparation of process systems
- Verification of utility and support systems
- Readiness checks for electrical, instrumentation, control, and communication systems
- Verification of alarms, interlocks, trips, and protective functions
- Permit-to-work, isolation, and energy control requirements

CASE STUDY

Conducting a process plant readiness review and developing corrective actions

DAY 03

Equipment Commissioning and Start-up Execution

- Principles of controlled system energization and start-up sequencing
- Commissioning and start-up of rotating equipment
- Start-up considerations for pumps, compressors, valves, vessels, and static equipment
- Commissioning of process systems and verification of operating sequences
- Electrical power and auxiliary utility system start-up
- Instrumentation and control system activation and verification
- Testing alarms, interlocks, trips, and protective functions
- Monitoring pressure, temperature, flow, level, and other critical operating parameters
- Identifying deviations and equipment or process problems during initial operation

PRACTICAL APPLICATION

Managing a controlled start-up sequence and evaluating operating conditions

DAY 04

Process Safety, Risk Management, and Operational Stabilization

- Process safety principles during commissioning and start-up
- Identification and management of start-up risks
- Permit-to-work and energy isolation requirements
- Management of simultaneous operations and operational interfaces
- Emergency shutdown systems and critical protective functions
- Management of Change during commissioning and start-up
- Response to abnormal operating conditions and equipment failures
- Troubleshooting methods and root cause analysis
- Operational communication, control room coordination, and field team coordination

> **PRACTICAL APPLICATION**
> Analyzing an abnormal start-up scenario and developing an effective response and control plan

DAY 05

Operational Stabilization, Handover, and Continuous Improvement

- Monitoring plant performance following initial start-up
- Achieving stable operating conditions and production readiness
- Verification of technical and operational performance requirements
- Review of commissioning results, test records, and start-up data
- Management and close-out of outstanding commissioning activities
- Preparation of commissioning, start-up, and handover reports
- Preparation of operating and maintenance documentation
- Handover requirements for operations, maintenance, and asset management teams
- Integration of commissioning results with maintenance and reliability plans
- Lessons learned and continuous improvement opportunities
- Best practices for transitioning from commissioning to stable routine operation

DAY 05 — CONTINUED

FINAL WORKSHOP

Developing a complete Process Plant Commissioning & Start-up Implementation Plan covering readiness, testing, risk management, start-up, stabilization, and final handover

Register or Request More Information

Course page: https://quest-training.com/courses/process-plant-commissioning-start-up-training-course
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