

Course No. 1511

DCS & Process Automation Training Course

INDUSTRIAL AUTOMATION & DIGITAL TECHNOLOGIES
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The DCS & Process Automation Training Course provides a comprehensive and practical framework for understanding, operating, maintaining, and optimizing Distributed Control Systems and process automation technologies used across modern industrial facilities. The course focuses on how advanced control and automation systems can improve process stability, operational efficiency, reliability, safety, and production performance while supporting effective monitoring and decision-making.

The program examines the architecture and functionality of Distributed Control Systems, including controllers, input and output systems, field instrumentation, operator stations, engineering stations, communication networks, Human-Machine Interfaces, alarm systems, and process monitoring capabilities. Participants will develop a clear understanding of how field devices, control strategies, automation platforms, and process equipment interact within an integrated industrial control environment.

A strong practical emphasis is placed on process control strategies, including feedback control, feedforward control, cascade control, and Proportional-Integral-Derivative control. Participants will explore process dynamics, controller tuning, loop stability, alarm management, abnormal operating conditions, and performance optimization, with the objective of improving process response, minimizing deviations, and maintaining consistent operational performance.

The course also addresses the integration of DCS platforms with Programmable Logic Controllers, industrial networks, field instrumentation, supervisory systems, and wider Operational Technology environments. Through industrial case studies, troubleshooting exercises, and practical workshops, participants will develop capabilities in control system diagnostics, maintenance, change management, reliability improvement, industrial cybersecurity, and continuous performance optimization.

Objectives

- Analyze the architecture, components, and operating principles of Distributed Control Systems during the first day of the course.
- Evaluate the relationship between field instrumentation, control systems, process equipment, and automation requirements.

- Apply process control principles and control loop concepts to improve industrial process stability and performance.
- Evaluate feedback, feedforward, and cascade control strategies and determine their appropriate industrial applications.
- Apply Proportional-Integral-Derivative control principles to tune control loops and improve process response.
- Develop practical approaches for alarm management, operational monitoring, and response to abnormal operating conditions.
- Evaluate the integration of DCS platforms with Programmable Logic Controllers, field instrumentation, industrial networks, and supervisory systems.
- Apply systematic troubleshooting techniques to identify control system faults and operational deviations.
- Evaluate maintenance, reliability, change management, and cybersecurity requirements for industrial control environments.
- Prepare an actionable improvement plan for DCS and process automation performance aligned with operational, reliability, safety, and efficiency objectives.

Who Should Attend

The DCS & Process Automation Training Course is designed for engineers, technicians, and professionals working in process control, instrumentation, automation, electrical engineering, process engineering, Operational Technology, maintenance, and reliability. It is particularly relevant to control engineers, automation engineers, instrumentation and control engineers, process engineers, electrical engineers, control system technicians, and industrial automation specialists involved in the design, operation, maintenance, or optimization of process control systems.

The course is also suitable for operations managers, engineering managers, maintenance managers, production managers, automation managers, reliability professionals, control room supervisors, process operators, and industrial project managers. It is highly relevant to executives and decision makers in government entities, ministries, public-sector organizations, oil and gas companies, petrochemical facilities, energy organizations, utilities, manufacturing companies, water and wastewater facilities, and large industrial organizations that rely on DCS and process automation to improve safety, reliability, operational efficiency, and production performance.

Learning Outcomes

- Explain the architecture, functions, and major components of Distributed Control Systems.
- Identify the relationship between field instruments, controllers, operator stations, process equipment, and automation systems.
- Analyze industrial control loops and identify factors affecting stability, response, and control performance.
- Apply feedback, feedforward, and cascade control principles to appropriate industrial process applications.
- Apply Proportional-Integral-Derivative control concepts to improve process stability and control loop performance.
- Evaluate alarm management practices and identify opportunities to improve operational monitoring and response.
- Analyze DCS integration with Programmable Logic Controllers, field devices, industrial networks, and supervisory systems.
- Troubleshoot common DCS, instrumentation, communication, and control loop problems using structured diagnostic methods.
- Evaluate maintenance, reliability, change management, and cybersecurity requirements for DCS environments.
- Develop a practical strategy for improving DCS and process automation performance in line with safety, reliability, productivity, and operational efficiency objectives.

Course Outline

DAY 01

DCS Architecture and Process Automation Fundamentals

- Introduction to Distributed Control Systems and process automation
- Evolution of industrial control systems
- DCS architecture and major system components
- Controllers and control processing units
- Input and output systems
- Field instrumentation and measurement devices
- Operator stations and engineering stations

DAY 01 — CONTINUED

- Industrial communication networks
- Human-Machine Interfaces and process visualization

PRACTICAL APPLICATION

Analyze a DCS architecture for an industrial facility and identify component functions and data flows

DAY 02

Process Control and Control Strategies

- Fundamentals of industrial process control
- Open-loop and closed-loop control
- Feedback control principles
- Feedforward control applications
- Cascade control strategies
- Proportional, Integral, and Derivative control
- Process dynamics and response characteristics
- Control loop stability
- Controller tuning and performance optimization

PRACTICAL APPLICATION

Analyze an industrial control loop, identify performance problems, and develop appropriate improvement and tuning actions

DAY 03

Process Automation and System Integration

- Principles of process automation design
- Integration of field instrumentation with DCS platforms
- Programmable Logic Controllers and industrial applications
- PLC and DCS integration
- Supervisory control and data acquisition

DAY 03 — CONTINUED

- Human-Machine Interfaces and operator stations
- Industrial communication networks and protocols
- Real-time process monitoring and data acquisition
- Automation system integration and information flow

PRACTICAL APPLICATION

Design an integrated process automation architecture connecting field devices, control systems, networks, and monitoring platforms

DAY 04

Alarm Management, Troubleshooting and Reliability

- Fundamentals of industrial alarm management
- Alarm classification and prioritization
- Abnormal operating conditions
- Process performance monitoring
- DCS and instrumentation troubleshooting
- Signal and communication fault analysis
- Control loop diagnostic techniques
- Preventive maintenance for DCS environments
- Change management and system modifications

PRACTICAL APPLICATION

Analyze a DCS failure scenario, identify the root cause, and develop corrective and preventive actions

DAY 05

DCS Performance Optimization and Process Automation Strategy

- Evaluating DCS and process automation performance
- Key performance and reliability indicators

DAY 05 — CONTINUED

- Control loop and process optimization
- Maintenance and reliability improvement
- Integration with modern Operational Technology environments
- Industrial cybersecurity considerations for DCS
- Operational continuity and resilience
- Risk management for automated control environments
- Continuous improvement strategies

FINAL WORKSHOP

Develop an integrated DCS and process automation improvement plan covering performance, reliability, safety, cybersecurity, and implementation priorities

Register or Request More Information

Course page: <https://quest-training.com/courses/dcs-process-automation-training-course>

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