

Course No. 1512

SCADA Systems & Industrial Monitoring Training Course

INDUSTRIAL AUTOMATION & DIGITAL TECHNOLOGIES
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The SCADA Systems & Industrial Monitoring Training Course provides a comprehensive and practical framework for understanding, operating, maintaining, and optimizing Supervisory Control and Data Acquisition systems used across modern industrial environments. The course focuses on how SCADA technologies support real-time monitoring, data acquisition, operational control, visualization, alarm management, equipment supervision, and informed decision-making across distributed industrial assets.

The program examines the architecture and major components of SCADA systems, including field devices, sensors, remote terminal units, programmable controllers, communication networks, servers, operator workstations, human-machine interfaces, historians, databases, and supervisory applications. Participants will develop a clear understanding of how field information is collected, transmitted, processed, visualized, stored, and used to support industrial operations.

A strong practical emphasis is placed on industrial monitoring and control. Participants will explore real-time data acquisition, process visualization, alarm and event management, trend analysis, historical data, dashboards, reporting, and operator interaction. The course also examines communication protocols and system integration, enabling participants to understand how SCADA platforms connect with industrial equipment, control systems, distributed assets, and operational technology environments.

The course further addresses system reliability, troubleshooting, cybersecurity, maintenance, performance optimization, and operational continuity. Through practical exercises, industrial scenarios, and case studies, participants will develop the ability to analyze SCADA architectures, identify monitoring and communication issues, improve alarm and visualization practices, and develop practical approaches for strengthening industrial monitoring and supervisory control capabilities.

Objectives

- Analyze SCADA architecture, components, and operating principles during the first day of the course.
- Evaluate the functions of sensors, remote terminal units, programmable controllers, communication networks, servers, and operator workstations within SCADA environments.

- Apply principles of industrial data acquisition, transmission, processing, visualization, and storage.
- Design effective monitoring and visualization concepts for industrial processes and distributed assets.
- Evaluate alarm, event, trend, and historical data management practices to improve operational awareness.
- Apply industrial communication and integration principles to connect SCADA systems with field equipment and control platforms.
- Develop systematic approaches for troubleshooting communication, data acquisition, visualization, and SCADA system faults.
- Assess SCADA cybersecurity risks and identify appropriate measures for protecting industrial monitoring environments.
- Evaluate SCADA system reliability, availability, maintenance requirements, and operational continuity considerations.
- Prepare an actionable SCADA improvement plan aligned with operational performance, monitoring requirements, reliability, cybersecurity, and business objectives.

Who Should Attend

The SCADA Systems & Industrial Monitoring Training Course is designed for engineers, technicians, and professionals working in industrial automation, instrumentation and control, electrical engineering, process control, operational technology, industrial information systems, maintenance, and plant operations. It is particularly relevant to SCADA engineers, control engineers, automation engineers, instrumentation specialists, industrial network specialists, control room operators, maintenance technicians, and professionals responsible for industrial monitoring and supervisory systems.

The course is also suitable for plant managers, operations managers, engineering managers, maintenance managers, reliability professionals, automation managers, control room supervisors, industrial project managers, and digital transformation specialists. It is highly relevant to executives and decision makers in government entities, ministries, public-sector organizations, oil and gas companies, energy organizations, utilities, water and wastewater facilities, manufacturing companies, transportation infrastructure, and large industrial organizations that depend on reliable monitoring, data acquisition, supervisory control, and real-time operational visibility.

Learning Outcomes

- Explain the architecture, functions, and operating principles of modern SCADA systems.
- Identify the roles of field devices, sensors, remote terminal units, programmable controllers, servers, networks, and operator workstations.
- Analyze the flow of industrial data from field devices to SCADA applications, databases, dashboards, and historical systems.
- Design basic SCADA monitoring and visualization structures for industrial processes and distributed assets.
- Apply principles of alarm, event, trend, and historical data management to support effective operational monitoring.
- Evaluate industrial communication protocols and integration requirements for SCADA environments.
- Troubleshoot common SCADA communication, data acquisition, visualization, and system performance problems.
- Assess cybersecurity and access control requirements for industrial SCADA environments.
- Develop maintenance and reliability approaches for improving SCADA system availability and operational continuity.
- Develop a practical SCADA improvement roadmap covering monitoring, integration, reliability, cybersecurity, and performance requirements.

Course Outline

DAY 01

SCADA Architecture and Industrial Monitoring Fundamentals

- Introduction to SCADA systems and industrial monitoring
- Evolution of supervisory control and data acquisition technologies
- SCADA architecture and major system components
- Field sensors and measurement devices
- Remote Terminal Units and Programmable Logic Controllers
- SCADA servers and operator workstations
- Human-Machine Interfaces and process visualization
- Industrial communication infrastructure

DAY 01 — CONTINUED

- Data acquisition and real-time monitoring

PRACTICAL APPLICATION

Analyze the architecture of a representative industrial SCADA system and map data flows between field devices, controllers, networks, and operator stations

DAY 02

Industrial Data Acquisition, Visualization and Communication

- Principles of industrial data acquisition
- Real-time data collection and processing
- Signal transmission and communication fundamentals
- Industrial communication networks
- Common industrial communication protocols
- Data quality, integrity, and availability
- SCADA graphical interfaces and process visualization
- Designing effective operator displays and dashboards
- Historical data and process trends

PRACTICAL APPLICATION

Design a SCADA monitoring interface for a selected industrial process and determine the required data points, communication paths, and visualization elements

DAY 03

Alarm Management, Historical Data and Operational Monitoring

- Fundamentals of SCADA alarm management
- Alarm classification and prioritization
- Alarm notifications and operator response
- Event management and sequence analysis
- Trend monitoring and historical data analysis
- Data historians and industrial databases

DAY 03 — CONTINUED

- Operational dashboards and performance reporting
- Identifying abnormal process conditions
- Supporting operational decisions through SCADA information

PRACTICAL APPLICATION

Analyze a simulated SCADA alarm and event scenario and develop an improved monitoring and response approach

DAY 04

SCADA Integration, Troubleshooting and Cybersecurity

- Integration of SCADA with PLC and DCS environments
- SCADA integration with industrial equipment and control systems
- Industrial networks and communication troubleshooting
- Diagnosing data acquisition and communication failures
- Server, workstation, and application troubleshooting
- SCADA system redundancy and availability
- Industrial cybersecurity fundamentals
- User access, authentication, and security controls
- Backup, recovery, and operational continuity

PRACTICAL APPLICATION

Diagnose a simulated SCADA communication and system failure and develop corrective, preventive, and cybersecurity actions

DAY 05

SCADA Reliability, Optimization and Implementation Strategy

- Evaluating SCADA system performance and reliability
- SCADA maintenance strategies
- System availability and redundancy considerations
- Improving visualization and operator effectiveness

DAY 05 — CONTINUED

- Optimizing alarms, trends, and monitoring dashboards
- Managing system changes and upgrades
- Cybersecurity improvement priorities
- Performance indicators for industrial monitoring systems
- Developing a SCADA modernization and improvement roadmap

FINAL WORKSHOP

Develop an integrated SCADA improvement plan covering architecture, monitoring, communication, reliability, cybersecurity, maintenance, and performance objectives

Register or Request More Information

Course page: <https://quest-training.com/courses/scada-systems-industrial-monitoring-training-course>

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