

Course No. 1509

Industrial Robotics & Automation Training Course

**INDUSTRIAL AUTOMATION & DIGITAL TECHNOLOGIES
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS**

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Industrial Robotics & Automation Training Course provides a comprehensive and practical framework for understanding, applying, and managing industrial robotics and automation technologies across modern manufacturing and industrial environments. The course focuses on how robotic systems and advanced automation can improve productivity, quality, precision, safety, equipment utilization, and operational flexibility while supporting the integration of machines, control systems, data, and people.

The program covers the fundamental principles of industrial robotics and automation, including robot types, mechanical components, motion systems, controllers, sensors, actuators, motors, industrial networks, and control technologies. Participants will develop a clear understanding of how robotic systems interact with industrial control systems, production lines, machinery, and automated processes to create reliable and efficient operating environments.

A strong practical focus is placed on industrial robotics applications such as material handling, assembly, welding, painting, packaging, inspection, and quality control. The course also examines industrial sensors, motion control, machine vision, programmable control systems, and automated production processes, with emphasis on improving cycle times, reducing process errors, increasing equipment efficiency, and strengthening operational safety.

The course further addresses robot programming, system integration, preventive maintenance, troubleshooting, safety requirements, and performance optimization. Through practical exercises, industrial case studies, and implementation workshops, participants will develop the ability to assess automation opportunities, select appropriate robotic technologies, evaluate integration requirements, and develop practical plans for implementing or improving industrial robotics and automation systems.

Objectives

- Analyze the fundamental principles, components, and applications of industrial robotics and automation during the first day of the course.
- Evaluate industrial processes to identify tasks suitable for robotics and automation based on productivity, quality, safety, and operational requirements.

- Design a practical industrial robotic system concept incorporating the robot, controller, sensors, actuators, and supporting equipment.
- Apply fundamental motion control, programming, and operational principles to operate industrial robots effectively and safely.
- Evaluate the integration requirements for connecting robots with production lines, industrial control systems, networks, and manufacturing equipment.
- Apply industrial automation technologies to improve production, material handling, assembly, inspection, and packaging processes.
- Evaluate the role of industrial sensors and machine vision systems in improving accuracy, quality, inspection, and automated operations.
- Develop practical preventive maintenance and troubleshooting approaches for robotic and automated systems.
- Assess safety risks associated with industrial robots and automated systems and identify appropriate safeguards for personnel and equipment.
- Prepare an actionable industrial robotics and automation implementation plan covering requirements, priorities, integration, safety, and performance indicators.

Who Should Attend

The Industrial Robotics & Automation Training Course is designed for engineers and professionals working in manufacturing, production, engineering, automation, control systems, instrumentation, maintenance, reliability, and operational technology. It is particularly relevant to automation and control engineers, robotics engineers, industrial engineers, production engineers, instrumentation and control specialists, automation technicians, maintenance professionals, and personnel involved in designing, operating, maintaining, or improving industrial systems.

The course is also suitable for plant managers, operations managers, engineering managers, maintenance managers, production managers, quality managers, industrial project managers, digital transformation specialists, and operational technology professionals. It is highly relevant to executives and decision makers in government entities, ministries, public-sector organizations, oil and gas companies, energy organizations, utilities, manufacturing companies, industrial facilities, and large corporations seeking to improve productivity, quality, safety, equipment reliability, and operational flexibility through industrial robotics and automation.

Learning Outcomes

- Explain the fundamental principles, architectures, and major components of industrial robotics and automation systems.
- Identify different types of industrial robots and evaluate their suitability for specific manufacturing and operational applications.
- Analyze industrial processes and identify activities that can be improved through robotics and automation.
- Design a basic industrial robotic system incorporating mechanical, electrical, sensing, and control components.
- Apply fundamental principles of robot movement, positioning, motion control, and programming.
- Evaluate requirements for integrating industrial robots with production lines, control systems, machinery, and industrial networks.
- Apply sensors and machine vision technologies to support automated inspection, quality control, and process optimization.
- Develop preventive maintenance and troubleshooting procedures to improve robotic system reliability and availability.
- Assess industrial robot safety requirements and identify appropriate protective measures and safe operating practices.
- Develop an industrial robotics or automation project plan aligned with operational objectives and measurable performance indicators.

Course Outline

DAY 01

Industrial Robotics and Automation Fundamentals

- Introduction to industrial robotics and automation
- Evolution of industrial automation technologies
- Types of industrial robots and their applications
- Major components of industrial robotic systems
- Robot axes, joints, movement, and positioning systems
- Controllers, motors, drives, and actuators
- Sensors used in robotic systems

DAY 01 — CONTINUED

- Relationship between robotics and industrial control systems
- Industrial robotics applications in manufacturing and production

PRACTICAL APPLICATION

Analyze an industrial process and identify suitable opportunities for robotics and automation

DAY 02

Industrial Control and Automation Systems

- Fundamentals of industrial control systems
- Programmable Logic Controllers
- Sensors, actuators, drives, and motors
- Motion, speed, and position control
- Automated production line control
- Industrial communication networks
- Robot integration with industrial control systems
- Sequential automation and operational monitoring
- Developing operational and control logic

PRACTICAL APPLICATION

Design a basic control and automation system for a selected industrial process

DAY 03

Robot Programming and Industrial Applications

- Fundamentals of industrial robot programming
- Coordinate systems and robot movement
- Motion and path planning
- Material handling and transfer applications
- Robotic assembly and welding
- Robotic painting and coating applications

DAY 03 — CONTINUED

- Packaging and palletizing automation
- Robotic inspection and quality applications
- Industrial machine vision systems

PRACTICAL APPLICATION

Develop an operational sequence for an industrial robot and evaluate its expected performance

DAY 04

Robot Integration, Safety and Maintenance

- Integrating robots into production lines
- Integration with industrial machinery and control systems
- Designing robotic work cells
- Communication between robots and industrial systems
- Industrial robot safety principles
- Protective zones, guarding, and safe stopping systems
- Preventive maintenance for robotic and automated systems
- Troubleshooting and downtime analysis
- Improving robotic system reliability and operational performance

PRACTICAL APPLICATION

Analyze a robotic work cell and identify integration, safety, maintenance, and reliability requirements

DAY 05

Automation Strategy and Industrial Transformation

- Assessing organizational readiness for robotics and automation
- Identifying and prioritizing automation opportunities
- Evaluating the operational and economic value of automation projects
- Selecting appropriate robots and automation technologies

DAY 05 — CONTINUED

- Integration requirements and future scalability
- Change management and workforce skills for automated operations
- Performance indicators for robotics and automation
- Continuous improvement of automated systems
- Developing an industrial automation roadmap

FINAL WORKSHOP

Designing an integrated industrial robotics and automation project with implementation stages, priorities, safety requirements, and performance indicators

Register or Request More Information

Course page: <https://quest-training.com/courses/industrial-robotics-automation-training-course>

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