



Instrumentation & Controls

## Advanced Robotics in Manufacturing

## Course Introduction

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Advanced robotics in manufacturing plays a pivotal role in increasing efficiency, precision, and safety across various production processes. By automating complex tasks and enhancing human capabilities, robots are transforming industries such as automotive, electronics, and pharmaceuticals. Robotics also helps reduce human error, improve workplace safety, and allow for higher production rates, making it an essential component of modern manufacturing.

This training program will cover a wide range of topics, from the basics of robotic programming and control systems to advanced applications and integration into manufacturing workflows. Participants will learn how to program, troubleshoot, and integrate robots, as well as how to leverage vision systems and sensors for enhanced precision. The course also explores the latest trends and innovations in robotics and how these technologies are shaping the future of manufacturing.

## Target Audience

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This course is designed for engineers, automation specialists, production managers, and anyone involved in the implementation, management, or maintenance of robotics in manufacturing environments.

## Learning Objectives

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At the end of the training course, participants will be able to:

- Understand the role of advanced robotics in modern manufacturing environments.
- Learn the fundamentals of programming and controlling industrial robots.
- Gain knowledge of robotic vision systems and sensor technologies for improved precision.
- Develop skills to integrate robots into existing manufacturing systems and workflows.

- Explore advanced robotic applications and future trends in robotics in manufacturing.

## Course Outline

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### • 01 DAY ONE

#### Introduction to Advanced Robotics in Manufacturing

- Overview of robotics and automation in manufacturing industries
- Key advantages of using robotics in manufacturing: efficiency, precision, and safety
- Types of industrial robots: articulated, SCARA, delta, and Cartesian robots
- The role of robots in enhancing production processes and reducing human error
- Overview of robotic components: actuators, sensors, controllers, and end effectors
- The evolution of robotics technology and current trends in manufacturing

### • 02 DAY TWO

#### Robotic Programming and Control Systems

- Introduction to robotic programming languages: RAPID, KRL, Python, etc.
- How to program robots for specific manufacturing tasks
- Understanding the concept of robot kinematics and motion planning
- Setting up and configuring robot controllers for different applications
- Techniques for teaching robots tasks through manual guidance or offline programming
- The importance of simulation software in testing and optimizing robotic operations
- Troubleshooting common programming issues and errors

### • 03 DAY THREE

#### Robotic Vision and Sensing Technologies

- The role of vision systems in robotics for object detection and quality control
- Overview of vision sensors: cameras, laser scanners, and 3D sensors
- How to integrate vision systems into robotic workflows
- Using machine learning for improving vision system accuracy and adaptability
- Calibration and maintenance of vision systems
- The use of proximity, force, and tactile sensors in robotic applications

### • 04 DAY FOUR

Robotic Integration in Manufacturing Systems

- How robots are integrated into existing manufacturing systems and workflows
- The role of Industrial Internet of Things (IIoT) in enhancing robotic capabilities
- Connecting robots with automated material handling systems and conveyors
- Safety measures when integrating robots with human workers (cobots)
- Best practices for ensuring smooth communication between robots and other equipment
- Managing data flow and robot performance in connected manufacturing environments

• 05 DAY FIVE

Advanced Applications and Future Trends in Robotic Manufacturing

- Overview of advanced robotic applications: additive manufacturing, welding, packaging, etc.
- The role of artificial intelligence and deep learning in enhancing robotic functionality
- Predictive maintenance for robotics and reducing downtime
- The impact of 5G and edge computing on robotics in manufacturing
- Emerging trends: autonomous robots, collaborative robots, and swarm robotics
- The future of robotics in mass customization and flexible production systems
- Ethical considerations and workforce implications of advanced robotics in manufacturing

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
April 7, 2025	April 11, 2025	5 days	4250.00 \$	UAE - Dubai
Sept. 1, 2025	Sept. 5, 2025	5 days	4950.00 \$	England - London
Oct. 5, 2025	Oct. 9, 2025	5 days	4250.00 \$	Qatar - El Doha