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Course Name

Internet Of things (IOT) – Manufacturing

Sector Name

Digital Transformation and Innovation

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Internet Of things (IOT) – Manufacturing

Course Introduction

The Internet of Things (IoT) is revolutionizing the manufacturing industry by enabling smart devices and machines to collect, share, and act on data in real-time.

Through this program, participants will gain an in-depth understanding of how IoT technologies are transforming manufacturing operations, enhancing productivity, and optimizing processes.

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Target Audience

- ✓ IoT Engineer
- ✓ Manufacturing Engineer
- ✓ Industrial Automation Specialist
- ✓ Smart Factory Manager
- ✓ Embedded Systems Engineer
- ✓ Data Analyst
- ✓ Supply Chain Manager
- ✓ IT/OT Integration Specialist
- ✓ Cybersecurity Specialist
- ✓ Maintenance Engineer

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Learning Objectives

- ✓ Define IoT and its role in manufacturing.
- ✓ Identify key IoT technologies and components, including sensors, actuators, cloud services, and communication protocols.
- ✓ Understand how IoT drives smart manufacturing and Industry 4.0.
- ✓ Gain hands-on experience with various types of IoT sensors, such as touch sensors, temperature sensors, pressure sensors, and motion sensors.
- ✓ Understand the concept of sensor fusion and its applications in IoT systems.
- ✓ Configure and collect data from IoT sensors to monitor manufacturing processes.
- ✓ Understand the role of embedded systems, robots, drones, wearables, and machine vision in IoT-enabled manufacturing.
- ✓ Apply IoT-enabled devices for real-time process monitoring, inspection, and automation.
- ✓ Explore the role of Edge Computing vs Cloud Computing in IoT.
- ✓ Learn how IoT devices communicate via LAN, WAN, and other networking protocols.
- ✓ Understand key network architectures such as smart gateways, edge/fog computing, and how to secure IoT networks.
- ✓ Apply security protocols to ensure the safety and privacy of IoT deployments in manufacturing.

- ✓ Understand the different cloud deployment models (public, private, hybrid) and how they relate to IoT.
- ✓ Use IoT platforms (e.g., Microsoft Azure, IBM Watson IoT) for device management, data analytics, and application development.
- ✓ Understand Big Data analytics in IoT and its role in predictive maintenance and real-time decision-making.
- ✓ Use real-time data to implement predictive maintenance systems and minimize downtime in manufacturing operations.
- ✓ Understand the use of RFID, GPS, and asset tracking for real-time monitoring in the manufacturing floor.
- ✓ Explore the integration of IoT with ERP and MES systems for a seamless flow of data across business operations.
- ✓ Gain insights into the future of IoT in manufacturing, including AI, machine learning, 5G, and autonomous systems.
- ✓ Stay ahead of emerging trends like autonomous robots and smart factories powered by IoT.

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Course Outline

✓ Day 01

Introduction to IoT in Manufacturing

- ✓ What is IoT?
- ✓ History and evolution of IoT technologies.
- ✓ IoT's role in the manufacturing industry (Smart Manufacturing, Industry 4.0).
- ✓ Key drivers of IoT in manufacturing: Efficiency, Automation, Predictive Maintenance, Real-Time Monitoring.

Basic IoT Concepts and Technologies:

- ✓ Sensors and actuators in IoT.
- ✓ Data collection and real-time analytics.
- ✓ Communication protocols (MQTT, HTTP, CoAP).
- ✓ Role of cloud computing in IoT systems.
- ✓ Case Studies.

IoT System Architecture and Building Blocks:

- ✓ Primary Building Blocks of IoT
- ✓ Things: Devices, sensors, and actuators.
- ✓ Connectivity: Types of connections (Wi-Fi, Bluetooth, Zigbee, LPWAN, etc.).
- ✓ The Cloud: Data storage, processing, and analysis.

Sensor Technologies in IoT:

- ✓ Sensor Fusion.
- ✓ Types of Sensors in Manufacturing.
- ✓ Interactive Activity: Explore IoT sensor kits and configure basic sensors for data collection.

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Course Outline

✓ Day 02

Advanced Sensor Technologies

- ✓ Resistive Touch Sensors: Function and applications.
- ✓ Capacitive Touch Sensors: Advantages and Use Cases.
- ✓ Surface Acoustic Wave (SAW) Sensors: How they work and where they are used.
- ✓ Proximity, temperature, and vibration sensors.
- ✓ Pressure sensors for process control.
- ✓ Motion sensors and their role in robotics and automation.
- ✓ Interactive Activity: Hands-on activity: Configuring a touch sensor in an IoT environment.

IoT Devices and Intelligent Machines:

- ✓ Edge devices vs. cloud-based processing.
- ✓ Embedded systems and microcontrollers (e.g., Raspberry Pi, Arduino).
- ✓ Robots and Drones: Applications in manufacturing, inspection, and logistics.
- ✓ Wearables: How wearables enhance worker safety and productivity.
- ✓ Biometrics: Role in access control and personalized experiences.
- ✓ Computer and Machine Vision: Quality inspection, defect detection, and automation.
- ✓ Applications of VR and AR in training, maintenance, and remote assistance.
- ✓ Interactive Activity: Set up a simple machine vision system for product inspection.

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Course Outline

✓ Day 03

Energy Harvesting and Sustainability in IoT

- ✓ Overview of energy harvesting (e.g., solar, vibration, thermal).
- ✓ Use of energy harvesting in IoT devices for low-power, autonomous operations.
- ✓ How IoT enables energy efficiency and waste reduction in manufacturing.
- ✓ Smart grid systems and energy management.
- ✓ Interactive Activity: Demonstration of energy harvesting devices in an IoT setup.

Networking Technologies for IoT:

- ✓ Local Area Network (LAN): How LAN supports IoT devices in manufacturing.
- ✓ Wide Area Network (WAN): IoT in global manufacturing environments.
- ✓ IoT Network Architecture: Smart gateways, edge and fog computing.
- ✓ Smart gateways: Connecting IoT devices to the cloud.
- ✓ Virtualization: Optimizing IoT device communication.
- ✓ Edge and Fog computing: Benefits of decentralized processing.
- ✓ Securing data communication in IoT.
- ✓ Security protocols and encryption methods.
- ✓ Practical application.

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✓ Day 04

Cloud Technologies for IoT:

- ✓ Versions of the Cloud: Public, private, hybrid clouds.
- ✓ On-Premises Data Centers: When and why they are used in IoT deployments.
- ✓ Virtual Chaining and vCPE (Virtual Customer Premises Equipment).
- ✓ Big Data Analytics in IoT: Collecting, processing, and analyzing large volumes of data.
- ✓ IoT service management platforms (e.g., AWS IoT, Microsoft Azure IoT).
- ✓ Credentials management and authentication for IoT devices.
- ✓ Security and threat intelligence in cloud-based IoT systems.
- ✓ Practical Application.

IoT Platforms and Device Management:

- ✓ Key IoT platforms: IBM Watson IoT, Microsoft Azure IoT, Google Cloud IoT.
- ✓ Role of IoT platforms in device management, data analytics, and application development.
- ✓ Provisioning, configuration, and monitoring of IoT devices.
- ✓ Firmware updates and remote management of devices.
- ✓ Integrating IoT applications with ERP and MES systems.
- ✓ Developing custom IoT apps for specific manufacturing needs.
- ✓ Practical Application.

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Course Outline

✓ Day 05

Advanced Applications of IoT in Manufacturing:

- ✓ How IoT enables predictive maintenance through real-time monitoring and data analysis.
- ✓ Case study: Predictive maintenance in a manufacturing plant.
- ✓ Using IoT for real-time location tracking of assets and inventory.
- ✓ RFID and GPS-based tracking systems in manufacturing.
- ✓ The role of IoT in achieving a smart factory: automation, machine learning, and process optimization.
- ✓ Interactive Activity: Simulate a predictive maintenance system using real-time sensor data.

IoT Security, Privacy, and Future Trends:

- ✓ Securing IoT devices and networks.
- ✓ Privacy concerns and regulations (e.g., GDPR, CCPA).
- ✓ Risk management strategies for IoT deployments.
- ✓ The future of AI and machine learning in IoT systems.
- ✓ Integration of 5G networks and IoT.
- ✓ The rise of autonomous machines and robotics in manufacturing.
- ✓ Interactive Activity: Design a security protocol for an IoT-enabled manufacturing system.

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
April 26, 2027	April 30, 2027	5 days	4250.00 $	UAE , Dubai
Sept. 28, 2026	Oct. 2, 2026	5 days	4950.00 $	Italy , Rome
Dec. 28, 2026	Jan. 1, 2027	5 days	4250.00 $	UAE , Dubai
April 4, 2027	April 8, 2027	5 days	4250.00 $	KSA , Riyadh

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