Intro to IoT and Connectivity for Industry 4.0

COURSE OUTLINE

Catalogue Number	77-3301-0011
Category	Industry 4.0
Duration	15 Hours
Prerequisite Courses	Introduction to Industry 4.0

Activity 1: Introduction to Sensors

- What are Sensors?
- The Need for Sensors
- How Do Sensors Work?
- Types of Sensors
- Technologies that Use Sensors

Activity 2: Introduction to Smart Sensors

- What are Smart Sensors?
- The Need for Smart Sensors
- How Do Smart Sensors Work?
- Receiving and Transmitting Data

Activity 3: Introduction to Actuators

- What are Actuators?
- How Do Actuators Work?
- Actuators and IoT
- Industrial Applications of Actuators

Activity 4: Introduction to PLCs

- The Purpose of PLCs
- Structure and Function
- How Do PLCs Work?
- PLC Programming Languages
- Types of PLCs

Activity 5: IoT and IIoT

- Defining IoT
- Key Components of IoT
- The Industrial Internet of Things
- IoT Connectivity Models
- Benefits and Challenges

Activity 6: IIoT Opportunities, Risks, and Challenges

- The Risky Game of the Industrial Internet of Things
- Challenges and Rewards

Activity 7: The Potential of Connectivity in IIoT

- Networking and Connectivity
- Flexible Manufacturing Systems
- Changing Manufacturing Processes
- CNC Machining
- New Manufacturing Processes
- Additive Manufacturing

Activity 8: How a Sensor Connects to the Cloud

- How Connectivity Works
- Sensor Connectivity Methods
- Good vs Bad Connections
- Web Services: Definition and Function
- Web Service Technologies

Activity 9: Introduction to Edge Computing

- The Problems with Cloud Computing
- Fog and Edge Computing: Definitions and Structure
- Applications of Fog and Edge Computing

Activity 10: SCADA Systems

- SCADA: Definition and Importance
- Functions and Applications of SCADA Systems
- Advantages of SCADA
- Cloud-Based SCADA
- SCADA Security

Activity 11: Vision Systems

- Vision Systems and Machine Vision: Definition
- Applications of Vision Systems
- Machine Vision and IIoT
- Working Principle
- Types of Vision Systems
- Implementing Vision Systems in Industry 4.0

Activity 12: Architecture of Smart Manufacturing Systems

- Smart Manufacturing: Definition, Characteristics, and Objectives
- Design Principles
- Smart Manufacturing Architecture
- Communication Model

Activity 13: Introduction to Communication Protocols

- Protocols and Standards: Definition and Function
- Protocol Components
- Common Communication Protocols
- Communication Protocols for IoT

Activity 14: Tracking Methods

- Asset Tracking
- Types of Tags
- Barcodes and QR Codes
- RFID and NFC
- Zigbee
- LTE Advanced
- GPS