Smart Devices for Industry 4.0

COURSE OUTLINE

Course Name	**Smart Devices for Industry 4.0**
Catalogue Number	3300-0001
Category	Industry 4.0, Automation, and IIoT
Duration	15 hours (without PLC) / 25 hours (with PLC)
Recommended Prerequisites	PLC Technology Courses

1. Introduction to Field Devices

- What are Field Devices?
- Field Devices in the Automation Pyramid
- Sensors vs Actuators
- Examples of Sensors
- Examples of Actuators

2. Conventional Sensors

- How Sensors Work: Electrical Principles
- Digital vs Analog Sensors
- Contact and Non-Contact Sensors
- Safety Guidelines for Working with Field Devices

3. Introduction to Smart Sensors

- Conventional vs Smart Sensors
- Common Components of Smart Sensors
- Smart Sensors in Manufacturing
- Introducing Intelitek's Smart Devices

4. Introduction to Device Communication and Industrial Networks

- Communication Protocols and Mediums
- Ethernet and LANs
- IP Addresses and Subnets
- Network Switches
- Industrial Ethernet and Fieldbus
- Local and Remote I/O

5. **Introduction to IO-Link**
    - Characteristics of IO-Link
    - Advantages of IO-Link
    - Device Diagnostics
    - Port Modes
    - Cyclic vs Acyclic Communication
    - IO-Link and IoT: MQTT and OPC UA Protocols
    - Connecting the IO-Link Master (Lab Activity)
6. **Inductive Sensors**
    - Inductive Sensor Working Principle
    - Applications of Inductive Sensors
    - Introduction to LR Device
    - Your Inductive Sensor: Function, Characteristics, and Memory
    - Working with the Inductive Sensor (Lab Activity)
7. **Ultrasonic Proximity Sensors**
    - Ultrasonic Sensor Working Principle
    - Applications of Ultrasonic Sensors
    - Your Ultrasonic Sensor: Function, Characteristics, and Memory
    - Working with the Ultrasonic Sensor (Lab Activity)
8. **Photoelectric Proximity Sensors**
    - Photoelectric Sensor Working Principle
    - Applications of Inductive Sensors
    - Your Photoelectric Sensor: Function, Characteristics, and Memory
    - Working with the Photoelectric Sensor (Lab Activity)
9. **Choosing a Sensor**
    - Selecting the Right Sensor for Your Application
    - Key Considerations for Choosing and Mounting a Sensor
    - Sensor Footprints and Positioning

10. Cloud Monitoring: Part 1

- Monitoring and Supervision in Industry
- The IIoT Monitoring Software (IFM Moneo) Interface
- Common Features of Monitoring Software
- Setting Up the Monitoring Software (Lab Activity)
- Analysis and Ticketing (Lab Activity)
- Calculated Values and Info Points (Lab Activity)

11. Actuators and the Signal Lamp

- Actuators in Industry
- Signal Lamp (Stack Light) Components
- Signal Lamp Modes
- Your Signal Lamp: Function, Characteristics, and Memory
- Working with the Signal Lamp (Lab Activity)

12. The RFID Read/Write Head

- RFID in Industry and Asset Tracking
- RFID Head Components
- Read and Write Modes
- Your RFID Head: Function, Characteristics, and Memory
- RFID Tracking (Lab Activity)

Additional Content: Integrating a PLC and IO-Link System (Optional: Requires a PLC and HMI Screen)

Introduction to Controller/Master Integration

Requirements for Integration

Device Descriptions

Connecting to the PLC (Lab Activity)

Slave Devices and the PLC (Lab Activity)

Exercises with Slave Devices (Lab Activity)

PLC to Sensor Communication: RFID (Lab Activity)

RFID and Controller Logic (Lab Activity)

Connecting to an HMI (Lab Activity)

RFID and the HMI (Lab Activity)

The Security System (Lab Activity)

Important Note: *This outline is subject to change.*