Sensor-Based Monitoring Systems Training Course

Professional Development Training Course Outline

Category	Architectural Engineering	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Sensor-Based Monitoring Systems are transforming modern industries by enabling real-time data acquisition, intelligent decision-making, and predictive insights across diverse environments such as manufacturing, healthcare, energy, transportation, and smart cities. Sensor-Based Monitoring Systems Training Course provides a comprehensive foundation in IoT-enabled sensor networks, Industrial IoT (IIoT), smart sensing technologies, and edge-to-cloud monitoring architectures. Participants will gain practical and theoretical knowledge on how sensor data is collected, processed, analyzed, and applied to improve operational efficiency, safety, and automation.

In today's digital economy, organizations are rapidly adopting AI-powered predictive maintenance, wireless sensor networks (WSN), condition-based monitoring, and cloud-integrated analytics platforms. This course equips learners with industry-relevant skills in data-driven monitoring systems, real-time visualization dashboards, SCADA integration, and machine learning-based anomaly detection, ensuring they are prepared for high-demand roles in smart infrastructure, industrial automation, and digital transformation ecosystems.

Programme Curriculum

Sensor-Based Monitoring Systems Training Course

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Course Duration

5 days

Course Objectives

1. Understand fundamentals of sensor technologies and IoT architectures
2. Apply Industrial IoT (IIoT) frameworks in real-world environments
3. Design wireless sensor networks (WSN) for monitoring applications
4. Implement real-time data acquisition and signal processing techniques
5. Develop skills in edge computing and cloud integration systems
6. Analyze sensor data using AI and machine learning algorithms
7. Apply predictive maintenance strategies in industrial systems
8. Build smart monitoring dashboards and visualization tools
9. Integrate SCADA systems with sensor networks
10. Improve system reliability using fault detection and diagnostics
11. Configure energy-efficient and scalable sensor deployments
12. Ensure cybersecurity in sensor-based monitoring systems
13. Deploy end-to-end smart automation and monitoring solutions

Target Audience

- IoT Engineers and Developers
- Electrical and Electronics Engineers
- Industrial Automation Specialists
- Data Analysts and Data Scientists
- Maintenance and Reliability Engineers
- IT and Network Infrastructure Professionals
- Smart City and Infrastructure Planners
- University Students in Engineering and Technology

Course Modules

Module 1: Fundamentals of Sensor Technologies

- Types of sensors: temperature, pressure, motion, gas
- Sensor calibration and accuracy principles
- Analog vs digital sensor systems
- Signal conditioning techniques
- Introduction to IoT-enabled sensors
- **Case Study:** Smart greenhouse environmental monitoring using temperature and humidity sensors for crop optimization.

Module 2: IoT and IIoT Architecture

- IoT ecosystem components and frameworks
- Industrial IoT (IIoT) system design
- Communication protocols (MQTT, CoAP)
- Device-to-cloud connectivity models
- Sensor integration in smart industries
- **Case Study:** Smart factory automation system using IIoT-enabled machinery monitoring.

Module 3: Wireless Sensor Networks (WSN)

- WSN topology and design principles
- Low-power communication protocols
- Data routing and network optimization
- Sensor node deployment strategies
- Energy harvesting techniques
- **Case Study:** Wildlife tracking system using distributed wireless sensors.

Module 4: Data Acquisition and Signal Processing

- Real-time data collection methods
- Noise filtering and signal enhancement
- Sampling and digitization techniques
- Time-series sensor data analysis
- Edge preprocessing techniques
- **Case Study:** Vibration monitoring in rotating machinery for early fault detection.

Module 5: Edge Computing and Cloud Integration

- Edge vs cloud computing models
- Distributed processing of sensor data
- Cloud platforms for IoT
- Data synchronization strategies
- Latency optimization techniques
- **Case Study:** Smart traffic monitoring system using edge-based real-time analytics.

Module 6: AI and Predictive Analytics in Monitoring Systems

- Machine learning for sensor data
- Anomaly detection algorithms
- Predictive maintenance models
- Data labeling and training pipelines
- AI-driven decision systems
- **Case Study:** Predicting equipment failure in power plants using AI-based sensor analytics.

Module 7: SCADA and Industrial Control Systems

- SCADA architecture and components
- Sensor integration with SCADA systems
- Real-time industrial control monitoring
- HMI (Human Machine Interface) design
- Alarm and event management systems

- **Case Study:** Water treatment plant monitoring and control using SCADA and sensor networks.

Module 8: Smart Monitoring Systems Deployment

- System design and architecture planning
- Cybersecurity in sensor networks
- Scalability and performance optimization
- Deployment best practices
- Maintenance and lifecycle management
- **Case Study:** Smart city air quality monitoring system with distributed sensor grids.

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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