Training Course on Advanced Sensor Technologies for Real-Time Farm Monitoring

Professional Development Training Course Outline

Category	Agriculture	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

In the face of climate change, resource scarcity, and population growth, advanced sensor technologies are transforming modern agriculture into a data-driven, sustainable enterprise. Training Course on Advanced Sensor Technologies for Real-Time Farm Monitoring aims to equip participants with cutting-edge knowledge and skills for precision farming, enabling them to enhance productivity, improve decision-making, and reduce environmental impact. With the integration of IoT-based smart farming systems, real-time data collection, and AI-powered analytics, farmers and agricultural professionals can now monitor crop health, soil conditions, livestock behavior, and environmental variables more efficiently than ever before.

This course provides a strategic blend of theoretical insights and practical applications, covering a wide range of topics such as wireless sensor networks (WSNs), remote sensing, drones, GPS mapping, machine learning in agriculture, and smart irrigation systems. Designed for professionals across the agricultural value chain, the program ensures participants can implement scalable, real-time monitoring solutions that drive precision agriculture, sustainability, and food security.

Programme Curriculum

Training Course on Advanced Sensor Technologies for Real-Time Farm Monitoring

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Course Objectives

1. Understand the core principles of real-time farm monitoring systems.
2. Explore the role of IoT and AI in agriculture.
3. Gain hands-on experience with wireless sensor networks (WSNs).
4. Analyze real-time soil health and moisture tracking.
5. Implement remote sensing techniques using drones and satellites.
6. Integrate smart irrigation systems for water efficiency.
7. Develop data-driven crop management strategies.
8. Learn about livestock monitoring sensors and behavior analytics.
9. Apply machine learning models for yield prediction.
10. Design farm dashboards for visualization and control.
11. Evaluate sensor calibration, accuracy, and maintenance.
12. Explore blockchain and data security in sensor networks.
13. Understand the environmental and economic impact of smart farming.

Target Audiences

1. Agronomists & Soil Scientists
2. Agribusiness Managers
3. Smart Farming Technology Providers
4. Agricultural Engineers
5. Government & Policy Advisors
6. Farm Owners & Managers
7. Research Scientists in Agriculture
8. Environmental and Climate Analysts

Course Duration: 10 days

Course Modules

Module 1: Fundamentals of Smart Farming and Sensors

- Introduction to Smart Agriculture
- Types of Sensors in Modern Farming
- Key Components of Real-Time Monitoring
- Sensor Communication Protocols
- Benefits of Sensor Integration
- **Case Study: India’s PM-Kisan IoT Deployment**

Module 2: Wireless Sensor Networks (WSNs) in Agriculture

- Architecture and Topologies
- Power Efficiency in WSNs
- Deployment Challenges and Solutions
- Real-time Data Transmission
- Network Security Essentials
- **Case Study: WSN-based Vineyard Monitoring in Italy**

Module 3: Soil Health Monitoring

- Soil pH and Nutrient Sensors
- Moisture Detection Techniques
- In-situ vs Remote Sensing
- Real-Time Alert Systems
- Integration with Fertilizer Schedulers
- **Case Study: Soil Sensor Grid in Kenya's Maize Belt**

Module 4: Smart Irrigation Systems

- Drip vs Sprinkler Smart Controllers
- Rain and Flow Sensors
- Automated Water Use Optimization
- IoT-based Water Scheduling
- ROI in Precision Irrigation
- **Case Study: Israel's Netafim IoT Irrigation Solution**

Module 5: Weather and Climate Sensors

- Real-Time Climate Data Collection
- Temperature, Wind & Humidity Sensors
- AI for Microclimate Modeling
- Early Warning Systems
- Farm Resilience and Risk Reduction
- **Case Study: AgWeatherNet in Washington State**

Module 6: Livestock Monitoring and Health Tracking

- Wearable Sensors for Cattle
- Temperature, Motion & GPS Devices
- Health & Reproductive Cycle Monitoring
- Alert Systems for Disease Outbreaks
- Animal Welfare and Productivity
- **Case Study: MooMonitor+ Deployment in Ireland**

Module 7: Drone Integration for Precision Agriculture

- Types of Drones in Farming
- Multispectral and Thermal Imaging
- Crop Mapping & Yield Analysis
- Drone Data Integration with Sensors
- Legal and Safety Considerations
- **Case Study: Drone-Based Crop Analytics in Brazil**

Module 8: AI and Machine Learning in Farm Monitoring

- AI for Pattern Recognition in Crops
- Predictive Analytics for Pests & Disease
- Integrating Sensor Data with ML Models
- Real-Time Decision Support Tools
- ROI Evaluation Models
- **Case Study: Microsoft AI4Earth in African Farms**

Module 9: GPS and Geospatial Mapping Tools

- GPS-Guided Tractors & Machinery
- Field Boundary Detection

- Mapping Crop Zones with Sensors
- Integration with Soil and Drone Data
- Site-Specific Management Systems
- **Case Study: John Deere GPS & PrecisionTech**

Module 10: Smart Greenhouse Management

- Environmental Control Sensors
- Energy-Efficient Climate Regulation
- CO?, Light & Nutrient Monitoring
- Automated Ventilation and Shading
- Smart Fertigation Techniques
- **Case Study: Netherlands' Sensor Greenhouse**

Module 11: Data Analytics & Dashboard Visualization

- Real-Time Farm Dashboards
- Data Integration from Multiple Sources
- Custom Alerts and Thresholds
- Mobile App Interfaces
- Performance Reporting
- **Case Study: FarmLogs Dashboard System**

Module 12: Blockchain & Secure Data Management

- Role of Blockchain in Agriculture
- Ensuring Data Integrity from Sensors
- Smart Contracts for Crop Insurance
- Data Sharing Among Stakeholders
- Traceability & Compliance Monitoring
- **Case Study: AgriDigital in Australia**

Module 13: Calibration, Maintenance & Sensor Accuracy

- Sensor Calibration Best Practices
- Lifetime and Durability Testing
- Real-Time Diagnostics
- Troubleshooting Common Errors
- Scheduled Maintenance Protocols
- **Case Study: Sensor Audit in Canada’s AgriTech Labs**

Module 14: Economic Analysis & Cost-Benefit Assessment

- ROI of Smart Technologies
- Yield Improvement Metrics
- Cost Analysis of Sensor Installation
- Government Incentives & Grants
- Scaling from Pilot to Full Deployment
- **Case Study: Economic Impact in California Almond Farms**

Module 15: Policy, Ethics, and Environmental Impact

- Data Ethics in Sensor Use
- Environmental Sustainability Metrics
- Policy Frameworks Supporting Smart Farming
- Climate Smart Agriculture Principles

- Future Trends and Tech Policy
- **Case Study: EU CAP Green Deal Compliance Monitoring**

Training Methodology

- Interactive lectures and demonstrations
- Hands-on sessions with real sensor kits
- Group assignments with data simulation
- Case study analysis and group discussions
- Access to online resources and dashboards
- Final project based on real-time monitoring design

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	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

Ready to enroll or request a customized program? Book online or contact us:

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