Training Course on Robotics for Greenhouse and Vertical Farm Operations

Professional Development Training Course Outline

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

Course Introduction

The agricultural industry is undergoing a transformative shift with the integration of robotics, AI-driven systems, and smart automation technologies in greenhouse and vertical farming operations. This specialized training course is designed to equip participants with the technical knowledge and practical skills to implement and manage robotics solutions that enhance productivity, ensure sustainability, and optimize controlled environment agriculture (CEA) systems. As the global demand for fresh, local produce rises, so does the need for smart farming innovations that reduce labor dependency, minimize resource consumption, and promote year-round crop yields.

Training Course on Robotics for Greenhouse and Vertical Farm Operations provides a comprehensive understanding of robotic applications in precision agriculture, covering both hardware and software solutions tailored for indoor farming systems. Participants will explore real-world applications, from seeding and transplanting to crop monitoring and harvesting automation. The program also emphasizes the role of data-driven robotics, AI-based decision-making, and IoT-integrated ecosystems in achieving climate-resilient, high-efficiency food production models.

Programme Curriculum

Training Course on Robotics for Greenhouse and Vertical Farm Operations

Introduction

The agricultural industry is undergoing a transformative shift with the integration of robotics, AI-driven systems, and smart automation technologies in greenhouse and vertical farming operations. This specialized training course is designed to equip participants with the technical knowledge and practical skills to implement and manage robotics solutions that enhance productivity, ensure sustainability, and optimize controlled environment agriculture (CEA) systems. As the global demand for fresh, local produce rises, so does the need for smart farming innovations that reduce labor dependency, minimize resource consumption, and promote year-round crop yields.

Training Course on Robotics for Greenhouse and Vertical Farm Operations provides a comprehensive understanding of robotic applications in precision agriculture, covering both hardware and software solutions tailored for indoor farming systems. Participants will explore real-world applications, from seeding and transplanting to crop monitoring and harvesting automation. The program also emphasizes the role of data-driven robotics, AI-based decision-making, and IoT-integrated ecosystems in achieving climate-resilient, high-efficiency food production models.

Training Objectives

1. Understand the fundamentals of agricultural robotics in smart farming.
2. Explore AI and machine vision applications in plant health and crop monitoring.
3. Analyze robotics in automated irrigation and nutrient delivery systems.
4. Learn about robotic arms, drones, and AGVs in greenhouse operations.
5. Understand vertical farming automation systems and growth optimization.
6. Integrate sensor-based decision-making systems for climate control.
7. Design energy-efficient robotic systems for indoor farming.
8. Evaluate data analytics in predictive farming using robotics.
9. Identify sustainable practices through robot-assisted resource management.
10. Apply robotics to reduce labor dependency and improve yields.
11. Understand software integration using IoT and cloud platforms.
12. Study real-world case studies in smart greenhouses and vertical farms.
13. Develop strategies for scaling autonomous indoor farming technologies.

Target Audience

1. Agricultural Engineers
2. Agritech Entrepreneurs
3. Greenhouse Managers
4. Vertical Farm Operators
5. Precision Farming Researchers
6. Urban Farming Startups
7. Government and NGO Agri-Development Officers
8. Students in Agriculture and Robotics

Course Duration: 10 days

Course Modules

Module 1: Introduction to Robotics in Controlled Environment Agriculture

- Overview of CEA and smart agriculture
- Importance of robotics in indoor farming
- Evolution of agri-robotics technologies
- Types of robots used in agriculture
- Challenges and opportunities
- **Case Study: FarmBot Open-Source Farming Robot**

Module 2: Sensor Integration and Environmental Monitoring

- IoT sensors in climate and soil monitoring
- Real-time data collection and analytics
- Temperature and humidity control
- Light intensity and CO2 monitoring
- Calibration and maintenance
- **Case Study: Priva Climate Sensor System**

Module 3: Automated Irrigation and Fertigation Systems

- Precision irrigation technologies
- Robotic fertigation mechanisms
- Integration with nutrient film techniques
- Role of AI in water management
- Resource optimization
- **Case Study: Growlink Automation Platform**

Module 4: Robotic Seeding and Transplanting Systems

- Seeding robots and depth control
- Automated transplanting arms
- Programming robotic cycles
- Root zone monitoring
- Labor cost reduction
- **Case Study: Spread Co. Ltd Seeding Robot (Japan)**

Module 5: Harvesting Robotics in Indoor Farming

- Types of robotic harvesters
- AI-enabled fruit and leaf detection
- Gentle gripping and sorting
- Yield prediction through data
- Post-harvest quality assurance
- **Case Study: Octinion Strawberry Picking Robot**

Module 6: AI and Machine Vision in Crop Monitoring

- Image recognition and AI models
- Pest and disease identification
- Growth tracking and maturity models
- Yield forecasting
- Multi-spectral imaging
- **Case Study: Iron Ox AI-Powered Farm Monitoring**

Module 7: Autonomous Guided Vehicles (AGVs) in Farming

- Navigation systems and path planning
- Payload management and tasks
- Charging and docking automation
- Safety protocols in robot movement
- Interoperability with other systems
- **Case Study: AgBot Autonomous Transporter**

Module 8: Vertical Farming Automation

- Modular design and robotic trays
- LED lighting system integration
- Multi-tiered robotic access
- Automated nutrient recycling
- Space utilization optimization
- **Case Study: Plenty’s Robotized Vertical Farm**

Module 9: Data Analytics and Predictive Farming

- Collecting big data from sensors and robots

- Cloud-based data analysis tools
- Predictive analytics for yield and health
- Data visualization dashboards
- Decision support systems
- **Case Study: CropX Smart Soil Data Platform**

Module 10: Robotics and Climate Control Systems

- Temperature control algorithms
- CO2 and air flow regulation
- HVAC integration with robotics
- Weather forecasting integration
- Smart alerts and automation
- **Case Study: Autogrow Greenhouse Climate Solution**

Module 11: Energy Efficiency in Robotic Farming

- Renewable energy sources
- Smart energy usage tracking
- Solar-powered systems
- Reducing carbon footprint
- Energy return-on-investment
- **Case Study: EcoRobotix Solar Weeder**

Module 12: Hydroponics and Aquaponics Automation

- Robotic nutrient mixing
- Tank monitoring and balancing
- Water quality control
- Waste management automation
- Plant health tracking
- **Case Study: GroPod Automated Hydroponic System**

Module 13: Safety, Ethics, and Regulations

- Worker safety and robot interaction
- Ethical concerns in automation
- Data privacy laws
- Industry-specific compliance
- Risk mitigation strategies
- **Case Study: EU Agri-Robot Safety Protocols**

Module 14: Cost-Benefit Analysis and Investment Planning

- CapEx and OpEx comparison
- ROI estimation
- Funding sources and grants
- Payback period calculations
- Cost optimization strategies
- **Case Study: ROI of Robotic Installations in Smart Farms (USAID)**

Module 15: Future Trends and Scaling Innovations

- Next-gen robotic innovations
- Integration with blockchain and AR
- Global market trends

- Collaborative robots (cobots)
- Scale-up strategies
- **Case Study: iFarm Vertical Farming Global Expansion**

Training Methodology

- Interactive expert-led lectures and demos
- Hands-on robotics simulations and labs
- Field visits to high-tech greenhouse or vertical farm
- Group activities and solution brainstorming
- Real-world case study analysis
- Assessments, project design, and feedback loops

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

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$6,000
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:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com