Training Course on AI-Powered Crop Yield and Quality Prediction

Professional Development Training Course Outline

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

Course Introduction

Artificial Intelligence (AI) is revolutionizing modern agriculture by enhancing precision, optimizing inputs, and boosting both crop yield prediction and produce quality analysis. As climate variability, resource limitations, and growing population demands put increasing pressure on food systems, AI-powered tools are emerging as essential technologies for sustainable and smart farming. Training Course on AI-Powered Crop Yield and Quality Prediction focuses on equipping participants with in-demand skills to use machine learning, remote sensing, big data analytics, and IoT for accurate prediction and decision-making in crop production.

By integrating real-time data collection, predictive modeling, and intelligent analytics, this course addresses the entire crop value chain—from seed to harvest. Participants will gain practical exposure to AI algorithms, agronomic modeling, and the application of data-driven platforms to ensure high yields, superior quality, and cost-effective farming. Through industry-relevant case studies, hands-on modules, and toolkits, this course empowers learners to become leaders in AI-driven agriculture innovation.

Programme Curriculum

Training Course on AI-Powered Crop Yield and Quality Prediction

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Course Objectives

1. Understand the fundamentals of AI and machine learning in precision agriculture
2. Analyze factors affecting crop yield and quality using data science techniques
3. Apply AI models to predict crop performance based on environmental and genetic data
4. Utilize remote sensing and drone data for real-time crop monitoring
5. Interpret big data for informed decision-making in farming practices
6. Deploy predictive models using Python, TensorFlow, and AI platforms
7. Integrate IoT and sensor data into AI-powered farming systems
8. Improve crop quality through early detection of diseases and nutrient deficiencies
9. Explore blockchain for traceability and food quality assurance
10. Leverage cloud computing and edge AI in agricultural operations
11. Conduct impact analysis of AI solutions on farming economics and sustainability
12. Develop custom AI dashboards and tools for field data visualization
13. Build capacity for AI-led agricultural extension and advisory services

Target Audience

1. Agronomists and crop scientists
2. Data scientists and AI developers
3. Agricultural extension officers
4. Smart farming solution providers
5. Precision agriculture consultants
6. University researchers and students
7. Government and policy professionals in agriculture
8. Agribusiness and food tech entrepreneurs

Course Duration: 10 days

Course Modules

Module 1: Introduction to AI in Agriculture

- Definition and scope of AI in agri-tech
- Evolution of digital agriculture
- Challenges and opportunities in AI adoption
- Role of AI in food security
- Ethical considerations in AI applications
- **Case Study: IBM Watson Decision Platform for Agriculture**

Module 2: Data Collection Techniques for Crop Monitoring

- Types of agricultural data: weather, soil, crop, satellite
- Using mobile apps and IoT sensors in the field
- Real-time vs. historical data for predictions
- Data quality and preprocessing
- Integration of multi-source data
- **Case Study: Arable Mark’s smart sensors for data capture**

Module 3: Machine Learning Models for Yield Prediction

- Overview of ML algorithms (SVM, Random Forest, CNNs)
- Building supervised models for crop output
- Training models with labeled datasets
- Evaluating model accuracy and performance
- Predictive maintenance for AI systems
- **Case Study: Microsoft FarmBeats AI for yield estimation**

Module 4: Remote Sensing and Drone Imagery

- Satellite vs UAV data comparison
- NDVI and spectral imaging analysis
- Detecting growth stages and anomalies
- GIS integration with AI
- Automated drone operations
- **Case Study: Skymatics drone solutions for crop surveillance**

Module 5: Crop Quality Detection using AI

- AI tools for visual crop inspection
- Detecting pests, diseases, and nutrient levels
- Quality grading using image recognition
- Correlating visual data with laboratory tests
- Enhancing market readiness and traceability
- **Case Study: PEAT's Plantix for disease diagnostics**

Module 6: Predictive Analytics with Climate and Weather Data

- Climate-smart AI algorithms
- Seasonal forecasting models
- Anomaly detection for weather extremes
- Linking meteorological data to crop decisions
- Building resilient AI systems
- **Case Study: aWhere's climate-smart agri-predictor**

Module 7: IoT Integration in Smart Farming

- IoT sensor types and deployment
- Collecting soil moisture, pH, and weather data
- Data transmission protocols (LoRa, MQTT)
- Power and connectivity management
- AI and IoT convergence in agriculture
- **Case Study: CropX IoT-based precision soil sensors**

Module 8: Big Data Platforms for Agriculture

- Data lakes vs. data warehouses in farming
- Cloud-based analytics tools (AWS, Azure, Google Cloud)
- Visualizing large-scale datasets
- Distributed computing for agri-prediction
- Data governance and policy issues
- **Case Study: FAO's WaPOR for big data on water productivity**

Module 9: Deep Learning for Crop Recognition

- CNNs for plant and weed classification

- Image segmentation and object detection
- Data augmentation techniques
- Transfer learning in agriculture
- Accuracy improvement strategies
- **Case Study: TensorFlow crop classifier project**

Module 10: AI Tools for Precision Fertilization and Irrigation

- AI in nutrient recommendation systems
- Variable Rate Technology (VRT) applications
- Smart irrigation modeling
- Integration with DSS (Decision Support Systems)
- Optimizing input usage for ROI
- **Case Study: Prospera AI's nutrient intelligence system**

Module 11: Blockchain for Crop Quality and Traceability

- Overview of blockchain in agri-supply chains
- Smart contracts for quality assurance
- Linking AI and blockchain systems
- Case examples from export compliance
- Food safety and recall management
- **Case Study: AgriDigital platform traceability for grains**

Module 12: AI-Driven Economic Impact Assessment

- Cost-benefit analysis of AI interventions
- Productivity vs. input cost optimization
- ROI calculators for smart farming
- Environmental benefits of AI precision
- Policy support for AI adoption
- **Case Study: IFPRI studies on AI-led yield gains**

Module 13: Custom Dashboard and Visualization Development

- Tools: Power BI, Tableau, Dash, Kibana
- Custom indicators for agronomic KPIs
- Building farmer-friendly dashboards
- Alert systems and automation
- Mobile-first design strategies
- **Case Study: AgUnity dashboard for cooperative farming**

Module 14: Case Studies and Real-world Applications

- Comparative analysis of global AI use in farming
- Cross-commodity applications (wheat, maize, rice, etc.)
- Successes and limitations of past projects
- Emerging trends in 2025 AI farming
- Discussion and group presentations
- **Case Study: India's Precision Agriculture Development Project**

Module 15: Final Capstone and Project Implementation

- Team-based AI implementation projects
- Design a predictive model from real data
- Present business cases to panel

- Industry mentorship and critique
- Certificate project submission and evaluation
- **Case Study: Student-built AI platform for Kenyan maize farming**

Training Methodology

- Interactive expert-led lectures
- Hands-on AI model development using real datasets
- Guided coding labs in Python and TensorFlow
- Case study analysis and group discussions
- Capstone projects with mentoring and peer review

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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