Training Course on GIS and Remote Sensing for Agronomy

Professional Development Training Course Outline

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

Course Introduction

In today’s data-driven agricultural landscape, Geographic Information Systems (GIS) and Remote Sensing (RS) technologies are revolutionizing how we understand and manage farming systems. Training Course on GIS and Remote Sensing for Agronomy equips agronomy professionals, researchers, and agricultural policymakers with the knowledge and skills to harness the power of GIS and RS for precision farming, crop health monitoring, land evaluation, and sustainable resource management. With a strong focus on spatial data analysis and satellite imagery interpretation, the course bridges the gap between field-level farming practices and advanced geospatial decision-making tools.

The course is designed to be practical, interactive, and hands-on, emphasizing real-world applications through case studies, demonstrations, and project-based learning. It highlights trending technologies like drone-based crop monitoring, NDVI analysis, AI-integrated land cover classification, and climate-smart agriculture. Participants will gain cutting-edge insights into how geospatial intelligence transforms agronomic decision-making and contributes to climate resilience, food security, and sustainable agricultural development.

Programme Curriculum

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Course Objectives

1. Understand the fundamentals of GIS and Remote Sensing in agronomy.
2. Analyze spatial data and apply geospatial analysis techniques.
3. Utilize satellite imagery to assess crop health and growth patterns.
4. Implement precision agriculture technologies using GIS tools.
5. Map and monitor soil health and fertility through RS data.
6. Perform land suitability analysis for crop planning and development.
7. Use drones and UAV imagery for detailed crop surveillance.
8. Conduct NDVI and vegetation index analysis for real-time farm insights.
9. Apply climate-smart agriculture practices supported by GIS.
10. Design decision support systems (DSS) for agronomic planning.
11. Perform yield prediction modeling using remote sensing data.
12. Understand big data and AI applications in spatial agriculture.
13. Gain skills in QGIS, ArcGIS, and Google Earth Engine for agriculture.

Target Audiences

1. Agronomists and agricultural consultants
2. GIS and RS professionals in agriculture
3. Environmental scientists
4. Agricultural extension officers
5. Researchers and academics in agronomy
6. Government officials in agriculture planning
7. Precision farming technology providers
8. Students pursuing agriculture or geospatial studies

Course Duration: 10 days

Course Modules

Module 1: Introduction to GIS and Remote Sensing in Agronomy

- Definition and importance in modern agriculture
- Evolution of GIS/RS applications in farming
- Types of spatial data (raster, vector)
- Overview of agronomic geospatial tools
- Key software: ArcGIS, QGIS, ERDAS Imagine
- **Case Study**: GIS adoption in maize farming in Kenya

Module 2: Remote Sensing Principles for Agriculture

- Electromagnetic spectrum basics
- Satellite sensors: Landsat, Sentinel, MODIS
- Spatial, temporal, radiometric, spectral resolution
- Image acquisition and interpretation
- Pre-processing of satellite imagery
- **Case Study**: Sentinel-2 data use in wheat phenology

Module 3: GPS and Field Data Collection Techniques

- Introduction to GPS in agriculture
- Ground truthing and field surveys
- Use of mobile GIS applications
- Data accuracy and correction techniques
- Integration of GPS data in GIS systems
- **Case Study**: GPS-enabled pest outbreak tracking

Module 4: Soil Mapping and Fertility Assessment

- Spatial variability of soil properties
- Digital soil mapping
- Remote sensing of soil moisture
- Soil health indicators in GIS
- Decision tools for fertilizer application
- **Case Study**: Soil fertility mapping in rice paddies

Module 5: Crop Monitoring Using Satellite Imagery

- Multispectral and hyperspectral imagery for crops
- Temporal crop monitoring
- Indicators of crop stress and vigor
- Remote sensing for pest/disease detection
- Crop inventory and classification methods
- **Case Study**: NDVI for crop stress analysis in Ethiopia

Module 6: Precision Agriculture and GIS

- Concept and components of precision farming
- Variable rate application mapping
- Site-specific crop management
- Spatial data layers for PA
- Integration with IoT and smart devices
- **Case Study**: GIS-driven variable irrigation in vineyards

Module 7: Vegetation Indices and NDVI Analysis

- What is NDVI and how it works
- Common vegetation indices: NDVI, EVI, SAVI
- Applications in biomass estimation
- Mapping chlorophyll and leaf area
- NDVI time series for trend analysis
- **Case Study**: NDVI-based yield forecast in sorghum

Module 8: Land Use and Land Cover Mapping

- Definitions and classification systems
- Supervised vs. unsupervised classification
- Change detection methods
- GIS-based land cover modeling
- Applications in land degradation assessment
- **Case Study**: LULC change in farming zones in Ghana

Module 9: Water Resource Management with GIS

- Remote sensing of evapotranspiration

- Water budgeting and irrigation planning
- Spatial analysis of water availability
- Mapping groundwater potential zones
- Water conservation planning with RS
- **Case Study**: Irrigation scheduling in arid zones

Module 10: Climate Change and GIS Applications

- Impacts of climate on agriculture
- Mapping vulnerability zones
- Agro-climatic zoning with GIS
- Carbon stock estimation using RS
- Early warning systems and disaster risk maps
- **Case Study**: GIS-based drought monitoring system

Module 11: Drone and UAV Technology for Agronomy

- Types of drones used in agriculture
- Image capture and photogrammetry
- High-resolution mapping workflows
- Crop scouting and weed detection
- Legal considerations and data ethics
- **Case Study**: UAV crop spraying project in India

Module 12: Big Data, AI & Machine Learning in Agronomy

- Introduction to big data in agriculture
- Machine learning models for classification
- Predictive analytics for yield forecasting
- Integration with RS data
- AI tools for agronomic decision-making
- **Case Study**: Deep learning for plant disease detection

Module 13: Decision Support Systems (DSS) and GIS

- Role of DSS in farm management
- Components of GIS-based DSS
- Modeling crop scenarios
- Real-time data integration
- User-friendly dashboards and maps
- **Case Study**: DSS for sugarcane planting decisions

Module 14: Sustainable Land Management and RS

- Principles of SLM and land use planning
- Identifying erosion-prone zones
- RS for biodiversity and conservation
- Spatial tools for agroforestry design
- Policies and sustainability indicators
- **Case Study**: GIS for integrated watershed management

Module 15: Final Project and Field Application

- Project planning and thematic mapping
- Team-based geospatial field projects
- Presentation of analysis results

- Feedback and peer evaluation
- Certification of completion
- **Case Study**: Group mapping of crop performance zones

Training Methodology

- Interactive lectures with real-time GIS demonstrations
- Hands-on software tutorials using QGIS, ArcGIS, and Google Earth Engine
- Fieldwork simulations using GPS and UAV imagery
- Case-based learning from global agricultural GIS applications
- Participant-centered group projects and discussions
- Evaluation via quizzes, projects, and application exercises

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

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