# Water Resources GIS Applications Training Course

Professional Development Training Course Outline

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

## Course Introduction

Water resources are under increasing pressure due to climate change, rapid urbanization, population growth, watershed degradation, groundwater depletion, and extreme weather events. Geographic Information Systems (GIS) have become one of the most powerful technologies for water resources management, hydrological modeling, watershed analysis, flood risk assessment, groundwater mapping, irrigation planning, environmental monitoring, and sustainable water governance. By integrating satellite imagery, remote sensing, GPS, spatial databases, and geospatial analytics, GIS enables organizations to make evidence-based decisions that improve water security, optimize infrastructure investments, and strengthen disaster preparedness.

Water Resources GIS Applications Training Course equips participants with practical skills in ArcGIS Pro, QGIS, remote sensing, spatial analysis, digital elevation modeling (DEM), hydrological analysis, watershed delineation, flood modeling, groundwater assessment, geodatabase development, and web GIS applications. Through hands-on exercises, real-world datasets, and industry case studies, participants will gain the expertise needed to design, analyze, visualize, and manage water resources projects that support sustainable development, climate resilience, and integrated water resources management (IWRM).

## Programme Curriculum

**Water Resources GIS Applications Training Course**

**Introduction**

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**Course Duration**

5 days

**Course Objectives**

By the end of the training, participants will be able to:

1. Apply advanced GIS techniques for water resources management.
2. Perform watershed delineation using Digital Elevation Models (DEM).
3. Conduct hydrological modeling for river basin management.
4. Analyze flood risk mapping using spatial analytics.
5. Develop groundwater potential mapping using GIS and remote sensing.
6. Integrate satellite imagery and Earth observation data into water resource projects.
7. Design and manage enterprise geodatabases for water infrastructure.
8. Perform spatial decision support analysis for water allocation.
9. Utilize ArcGIS Pro and QGIS for advanced geospatial workflows.
10. Create interactive Web GIS dashboards for water monitoring.
11. Conduct water quality mapping and environmental assessment using GIS.
12. Apply climate resilience and disaster risk reduction techniques in water resource planning.
13. Develop GIS-based decision support systems (DSS) for sustainable water management.

**Target Audience**

1. Water Resources Engineers
2. GIS Analysts and Geospatial Professionals
3. Hydrologists and Hydrogeologists
4. Environmental Scientists and Consultants
5. Irrigation and Agricultural Engineers
6. Government Water and Environmental Officers
7. NGO and Development Project Professionals
8. Researchers, University Lecturers, and Graduate Students

**Course Modules**

**Module 1: Introduction to GIS for Water Resources**

- Fundamentals of GIS and spatial data
- GIS software
- Coordinate systems and map projections
- Water resources data models
- Spatial database development

- **Case Study:** Development of a GIS database for a regional water authority.

**Module 2: Spatial Data Acquisition and Remote Sensing**

- GPS data collection
- Satellite imagery interpretation
- Remote sensing for water monitoring
- Drone mapping applications
- Data quality assessment
- **Case Study:** Using Sentinel-2 imagery to monitor reservoir water levels.

**Module 3: Watershed and Hydrological Analysis**

- Digital Elevation Models (DEM)
- Watershed delineation
- Flow direction and accumulation
- Stream network generation
- Catchment characterization
- **Case Study:** Watershed delineation for integrated river basin management.

**Module 4: Flood Risk Assessment and Disaster Management**

- Flood hazard mapping
- Flood susceptibility analysis
- Hydraulic modeling integration
- Climate change scenarios
- Emergency response mapping
- **Case Study:** GIS-based flood risk mapping for urban flood resilience.

**Module 5: Groundwater and Water Quality Mapping**

- Groundwater potential mapping
- Aquifer vulnerability assessment
- Water quality spatial analysis
- Pollution hotspot mapping
- Groundwater recharge analysis
- **Case Study:** Groundwater suitability assessment using GIS multicriteria analysis.

**Module 6: GIS Applications in Irrigation and Water Infrastructure**

- Irrigation network mapping
- Canal and pipeline management
- Water distribution optimization
- Asset management systems
- Infrastructure maintenance planning
- **Case Study:** GIS implementation for irrigation modernization projects.

**Module 7: Advanced Spatial Analysis and Web GIS**

- Spatial statistics
- Multi-criteria decision analysis (MCDA)
- Web GIS development

- Dashboard creation
- Cloud GIS platforms
- **Case Study:** Interactive dashboard for real-time water infrastructure monitoring.

**Module 8: Capstone Project and Emerging Technologies**

- Integrated water resources management (IWRM)
- AI and Machine Learning in GIS
- Big Data for water resources
- Internet of Things (IoT) integration
- Final GIS project presentation
- **Case Study:** Smart watershed management using GIS, IoT, and AI-driven analytics.

## 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 |

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

**Register Online Now**

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