Training Course on GIS for Green Infrastructure Planning

Professional Development Training Course Outline

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

Course Introduction

Training Course on GIS for Green Infrastructure Planning provides a robust foundation in leveraging Geographic Information Systems (GIS) for the strategic planning, design, and management of Green Infrastructure (GI). Participants will delve into cutting-edge geospatial techniques and tools essential for building resilient, sustainable, and livable urban and rural environments. Emphasizing practical applications and real-world case studies, this program equips professionals with the expertise to integrate natural systems into built environments, fostering ecological health, climate resilience, and enhanced community well-being.

As global challenges like climate change, rapid urbanization, and biodiversity loss escalate, the role of Green Infrastructure becomes increasingly critical. This course addresses the urgent need for skilled professionals who can utilize advanced GIS capabilities to analyze, visualize, and implement effective GI solutions. From urban forestry and stormwater management to habitat connectivity and public open space networks, participants will gain a holistic understanding of how GIS empowers data-driven decisions for sustainable land use planning and environmental management.

Programme Curriculum

Training Course on GIS for Green Infrastructure Planning

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10 days

Course Objectives

Upon completion of this course, participants will be able to:

1. Gain a strong understanding of core GIS concepts, data models (vector, raster), and spatial analysis techniques.
2. Comprehend the diverse elements of GI, including parks, greenways, wetlands, urban forests, and green roofs.
3. Learn methods for acquiring and integrating various spatial datasets relevant to GI planning
4. Apply sophisticated GIS tools for site suitability analysis, connectivity assessment, and hydrological modeling.
5. Utilize GIS to quantify and map the benefits of GI, such as stormwater retention, air quality improvement, and heat island mitigation.
6. Design interconnected GI systems for enhanced ecological function and community access.
7. Understand how to embed GI principles into comprehensive plans, zoning regulations, and development policies.
8. Apply GIS to assess climate vulnerabilities and design GI solutions for adaptation and mitigation.
9. Design and evaluate nature-based solutions for effective stormwater runoff control.
10. Employ GIS for habitat mapping, wildlife corridor identification, and biodiversity conservation efforts.
11. Create compelling maps, visualizations, and reports to engage stakeholders and secure project approvals.
12. Use GIS for monitoring, assessment, and adaptive management of implemented green infrastructure.
13. Understand the role of AI, IoT, and 3D GIS in the future of green infrastructure planning.

Organizational Benefits

- Data-driven insights leading to more effective and sustainable green infrastructure investments.
- Optimized allocation of resources for land use, water management, and environmental protection.
- Better planning and design, leading to more resilient and impactful green infrastructure projects.
- Improved adherence to environmental regulations and sustainability mandates.
- Reduced infrastructure maintenance costs through nature-based solutions and preventative planning.
- Clear and compelling communication of GI benefits to stakeholders and the public.

- Development of strategies to build climate-resilient communities and reduce carbon footprints.
- Equipping staff with cutting-edge skills in a rapidly evolving field.

Target Audience

1. Urban Planners & Regional Planners
2. Landscape Architects & Designers
3. Environmental Scientists & Consultants
4. Civil Engineers & Infrastructure Developers
5. GIS Analysts & Specialists
6. Government & Municipal Officers
7. Conservation & Natural Resource Managers
8. Real Estate Developers & Property Managers

Course Outline

Module 1: Introduction to GIS & Green Infrastructure

- Defining Green Infrastructure (GI) and its importance in modern planning.
- Overview of GIS capabilities for spatial analysis and visualization.
- The nexus between GIS, GI, and sustainable development goals.
- Types of spatial data relevant to GI
- **Case Study:** Mapping existing GI assets in a rapidly urbanizing city for baseline assessment.

Module 2: GIS Data Acquisition & Management for GI

- Sources of geospatial data for GI planning (satellite imagery, LiDAR, drones, open data portals).
- Data formats and projections: Understanding coordinate systems and transformations.
- Georeferencing and digitizing: Converting analog data to digital GIS layers.
- Database design and management for large GI datasets.
- **Case Study:** Utilizing high-resolution imagery and LiDAR data to identify potential green roof locations in a dense urban core.

Module 3: Core Spatial Analysis Techniques for GI

- Buffering and overlay analysis: Delineating influence zones and combining spatial layers.
- Clipping, merging, and dissolving: Data manipulation for targeted analysis.
- Proximity analysis: Assessing accessibility to green spaces and services.
- Network analysis: Optimizing pedestrian and ecological corridors.
- **Case Study:** Using proximity analysis to identify communities with limited access to public green spaces for targeted GI interventions.

Module 4: Hydrological Modeling & Stormwater Management with GIS

- Understanding watershed delineation and flow paths using Digital Elevation Models (DEMs).
- Mapping impervious surfaces and identifying areas of high runoff.
- Simulating stormwater flow and identifying potential flooding zones.
- Designing and modeling Nature-Based Solutions (NBS) like rain gardens and bioswales.
- **Case Study:** Modeling stormwater runoff in a suburban neighborhood to identify optimal locations for permeable pavements and bioretention areas.

Module 5: Ecosystem Services Assessment using GIS

- Introduction to ecosystem services provided by GI
- Quantifying and mapping ecosystem service benefits using spatial data.
- Valuing ecosystem services for economic justification of GI projects.
- Integrating ecosystem service maps into planning decisions.
- **Case Study:** Mapping urban heat island effect and identifying areas where tree canopy cover can provide significant cooling benefits.

Module 6: Biodiversity & Habitat Connectivity Analysis with GIS

- Mapping existing habitat patches and identifying critical ecological areas.
- Analyzing habitat fragmentation and connectivity using least-cost path analysis.
- Designing wildlife corridors and stepping stones for species movement.
- Assessing the impact of development on biodiversity.
- **Case Study:** Mapping forest patches and identifying potential corridors to connect fragmented habitats for migratory bird species.

Module 7: Site Suitability Analysis for Green Infrastructure

- Multi-criteria decision analysis (MCDA) in GIS for optimal site selection.
- Combining ecological, social, and economic factors for suitability assessment.
- Identifying suitable locations for various GI types.
- Scenario planning: Evaluating different development options.
- **Case Study:** Identifying optimal sites for new community gardens based on soil quality, sunlight, accessibility, and community need.

Module 8: Integrating GIS with Urban Planning & Policy

- Role of GIS in comprehensive plans, master plans, and zoning ordinances.
- Developing GI-focused policies and regulations using spatial data.
- Public participation GIS (PPGIS): Engaging communities in GI planning.
- GIS for land use change detection and monitoring.
- **Case Study:** Using GIS to inform updates to a city's zoning code to encourage green infrastructure implementation in new developments.

Module 9: Climate Change Adaptation & Resilience with GIS

- Mapping climate change impacts.
- Designing GI solutions for climate adaptation
- Assessing community vulnerability to climate risks using GIS.
- Developing resilient infrastructure strategies.
- **Case Study:** Mapping flood-prone areas in a coastal city and identifying where mangrove restoration or green dikes can reduce flood risk.

Module 10: Urban Forestry & Green Space Management with GIS

- Inventory and assessment of urban tree canopy and green spaces.
- Managing urban forest health, species diversity, and pest control.
- Optimizing tree planting locations for maximum environmental benefits.
- GIS for park management and recreational planning.
- **Case Study:** Using tree inventory data to identify areas with low canopy cover for targeted tree planting initiatives to improve air quality and reduce urban heat.

Module 11: Green Infrastructure Design & Visualization in GIS

- Principles of effective map design and cartography for GI communication.
- Creating compelling visualizations of proposed GI projects.
- Using GIS for design iteration and spatial optimization.
- Integrating CAD data into GIS for detailed design.
- **Case Study:** Creating a 3D visualization of a proposed green street design, showcasing permeable pavers, street trees, and bioswales.

Module 12: Monitoring & Evaluation of Green Infrastructure with GIS

- Developing indicators for GI performance monitoring.
- Using remote sensing and field data for ongoing assessment.
- Tracking changes in GI over time and evaluating project success.
- Adaptive management strategies based on GIS monitoring data.
- **Case Study:** Monitoring the effectiveness of a new green roof in reducing stormwater runoff using real-time sensor data integrated with GIS.

Module 13: Advanced GIS Tools & Technologies for GI

- Introduction to scripting and automation in GIS.
- Web GIS and cloud-based platforms for collaborative GI planning.
- Integration of GIS with Building Information Modeling (BIM) for comprehensive project design.
- Emerging technologies: AI/Machine Learning in GI analysis, LiDAR applications.
- **Case Study:** Developing a Python script to automate the calculation of green space accessibility across multiple neighborhoods.

Module 14: Funding, Policy & Implementation of Green Infrastructure

- Exploring funding mechanisms and grants for GI projects.
- Developing business cases for green infrastructure investments.
- Understanding legal and policy frameworks supporting GI.
- Strategies for successful GI project implementation and maintenance.
- **Case Study:** Analyzing successful funding models for municipal green infrastructure programs in different cities.

Module 15: Future Trends & Capstone Project

- Future of GIS in green infrastructure: Smart cities, digital twins, citizen science.
- The evolving role of the GI professional in a changing climate.
- Ethical considerations in geospatial data use for GI.
- **Capstone Project:** Participants apply learned GIS skills to develop a comprehensive Green Infrastructure plan for a chosen real-world site or community.
- **Case Study:** Presenting innovative GIS-driven GI projects from around the globe that exemplify best practices and future trends.

Training Methodology

This course employs a blended learning approach, combining:

- **Interactive Lectures:** Engaging presentations on theoretical concepts and practical applications.
- **Hands-on Software Exercises:** Extensive practical sessions using industry-standard GIS software (e.g., ArcGIS Pro, QGIS).

- **Real-World Case Studies:** In-depth analysis of successful green infrastructure projects globally.
- **Group Discussions & Collaborative Projects:** Fostering peer-to-peer learning and problem-solving.
- **Practical Demonstrations:** Live demonstrations of GIS tools and workflows.
- **Q&A Sessions:** Opportunities for participants to clarify doubts and explore specific challenges.
- **Individualized Feedback:** Personalized guidance and support from experienced instructors.

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

Start Date	End Date	Location	Price
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
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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