GIS for Archaeology and Cultural Heritage Mapping Training Course

Professional Development Training Course Outline

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

Course Introduction

GIS for Archaeology and Cultural Heritage Mapping Training Course provides **archaeologists, heritage professionals, and cultural resource managers** with essential skills in **Geographic Information Systems (GIS)** for advanced **archaeological research, cultural heritage management, and digital preservation**. Participants will gain hands-on expertise in **geospatial data acquisition, analysis, visualization, and interpretation**, unlocking new dimensions for understanding and safeguarding our shared past. From **site discovery and excavation documentation to predictive modeling and heritage impact assessment**, GIS offers unparalleled capabilities for informed decision-making and sustainable heritage practices in the **digital humanities** era.

Leveraging cutting-edge **geospatial technologies** and **remote sensing techniques**, this course empowers participants to integrate diverse archaeological datasets, including **historical maps, aerial imagery, LiDAR, and survey data**, into comprehensive spatial databases. Through practical exercises and real-world **case studies**, attendees will master techniques for **archaeological site mapping, landscape analysis, 3D reconstruction, and threat assessment**, crucial for **heritage conservation, urban planning, and sustainable tourism**. This training is vital for professionals seeking to enhance their **digital archaeology** skills and contribute to the effective management and interpretation of **cultural landscapes** for future generations.

Programme Curriculum

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Course Objectives

1. Develop proficiency in collecting, integrating, and managing diverse **archaeological geospatial data** from various sources including **GPS, total stations, drone photogrammetry, and satellite imagery**.
2. Apply advanced **GIS analytical techniques** for archaeological pattern recognition, distribution analysis, and understanding spatial relationships within **cultural landscapes**.
3. Create precise **digital maps** and **site plans** for archaeological excavations and surveys, ensuring accurate **spatial metadata** and data integrity.
4. Utilize **remote sensing applications** like **LiDAR** and **multispectral imagery** for identifying buried archaeological features, paleo-landscapes, and unknown sites.
5. Construct **3D models** of archaeological sites, monuments, and artifacts for **virtual heritage**, reconstruction, and detailed spatial visualization.
6. Develop and apply **predictive models** to identify areas with high archaeological potential, optimizing survey strategies and resource allocation.
7. Employ GIS for **threat modeling** and **vulnerability assessment** of cultural heritage sites against natural hazards, climate change impacts, and anthropogenic pressures.
8. Conduct **GIS-based HIA** to evaluate the potential impact of development projects on cultural heritage resources and inform sustainable planning.
9. Design, populate, and manage robust **geodatabases** specifically tailored for archaeological and cultural heritage information.
10. Publish and share archaeological and cultural heritage data through **Web GIS platforms** for public engagement and collaborative research.
11. Implement best practices for **digital archiving** of geospatial archaeological data, ensuring long-term accessibility and preservation.
12. Georeference and analyze **historical maps** and archival sources within a GIS environment to reconstruct past landscapes and land use.
13. Explore the application of **Participatory GIS** in engaging local communities in heritage documentation and management initiatives.

Organizational Benefits

- Streamline the organization and accessibility of vast archaeological and cultural heritage datasets, reducing data loss and improving data consistency.
- Provide robust spatial insights for informed decisions in heritage management, conservation planning, and resource allocation.
- Optimize archaeological survey and excavation efforts through predictive modeling and targeted remote sensing, leading to more efficient use of resources.
- Enable early identification and assessment of threats to cultural heritage, facilitating proactive conservation and mitigation strategies.
- Facilitate seamless data sharing and visualization, fostering improved collaboration among archaeologists, government agencies, local communities, and other stakeholders.
- Develop interactive maps and 3D models for public outreach, education, and virtual tourism, enhancing public appreciation and awareness of cultural heritage.
- Generate accurate and visually compelling maps and reports for regulatory compliance, funding proposals, and academic publications.
- Contribute to the sustainable preservation of cultural assets by providing robust tools for monitoring, analysis, and management over time.

Target Audience

1. Archaeologists and Field Technicians
2. Cultural Heritage Managers
3. Museum Professionals.
4. Historians and Art Historians
5. Urban Planners and Architects.
6. Environmental Scientists and Conservationists
7. Government Agency Staff.
8. Academics and Researchers.

Course Outline

Module 1: Introduction to GIS for Archaeology and Cultural Heritage

- Fundamentals of GIS: Concepts, components, and data models (vector, raster).
- The role of GIS in modern archaeological practice and heritage management.
- Spatial thinking for cultural landscapes.
- Overview of GIS software (e.g., ArcGIS Pro, QGIS) and their applications.
- Case Study: **The use of GIS in documenting the UNESCO World Heritage Site of Petra, Jordan, for site management and visitor flow analysis.**

Module 2: Geospatial Data Acquisition and Management

- Principles of geographic coordinate systems and map projections.
- GPS data collection for archaeological features and survey points.
- Introduction to remote sensing platforms
- Data input, digitization, and attribute table management.
- Case Study: **Mapping and managing archaeological survey data from the Nazca Lines in Peru using differential GPS and integrating it with satellite imagery for landscape context.**

Module 3: Working with Raster Data and Remote Sensing

- Raster data models: Pixels, resolution, and data types.
- Georeferencing historical maps and unreferenced imagery.
- Image interpretation for archaeological features

- Introduction to LiDAR data for bare-earth modeling and archaeological prospection.
- Case Study: **Discovering previously unknown Roman villa sites in the UK using LiDAR data to reveal subtle earthworks beneath forest cover.**

Module 4: Advanced Vector Data Editing and Topology

- Creating and editing vector features (points, lines, polygons) for archaeological objects and boundaries.
- Maintaining data quality through topological rules and validation.
- Working with archaeological databases and linking them to spatial data.
- Data conversion and interoperability between different GIS formats.
- Case Study: **Building a comprehensive geodatabase for the ancient city of Pompeii, documenting building structures, artifact find spots, and public spaces with high spatial accuracy.**

Module 5: Spatial Analysis for Archaeological Interpretation

- Proximity analysis (buffers, nearest neighbor) for understanding spatial relationships.
- Overlay analysis (intersect, union, clip) for combining different layers of archaeological information.
- Viewshed analysis for understanding visibility and defensive strategies of ancient sites.
- Network analysis for reconstructing ancient pathways and connectivity.
- Case Study: **Analyzing the visibility of prehistoric burial mounds in a landscape to understand their ceremonial significance and inter-visibility patterns in Ireland.**

Module 6: Digital Elevation Models (DEMs) and Terrain Analysis

- Generating DEMs from contour lines, LiDAR, and other elevation data.
- Deriving terrain parameters: Slope, aspect, hillshade, and curvature.
- Hydrological modeling for understanding water flow and its impact on site formation or preservation.
- Site suitability analysis based on environmental and topographical factors.
- Case Study: **Using DEMs to model ancient irrigation systems in arid regions like the Moche Valley in Peru, revealing the complex water management strategies of past societies.**

Module 7: Predictive Modeling for Archaeological Site Location

- Concepts of predictive modeling in archaeology.
- Identifying environmental variables correlated with archaeological site distribution.
- Statistical and machine learning approaches to generate probability maps of site presence.
- Validation and refinement of predictive models.
- Case Study: **Developing a predictive model for identifying potential Native American archaeological sites in a rapidly developing region of North America to guide cultural resource management.**

Module 8: GIS for Cultural Resource Management (CRM)

- Integrating archaeological survey results into a CRM framework.
- Heritage Impact Assessment (HIA) methodologies using GIS.
- Mapping and managing cultural heritage zones and protected areas.
- Legal and ethical considerations in managing archaeological data.
- Case Study: **Utilizing GIS to assess the impact of a proposed highway extension on known and potential archaeological sites in the Nile Delta, Egypt, and recommending**

mitigation strategies.

Module 9: 3D GIS and Visualization for Heritage

- Creating 3D scenes and extruding features for realistic representations.
- Building virtual reality (VR) and augmented reality (AR) models from GIS data.
- Publishing 3D web scenes for interactive online exploration.
- Applications of 3D GIS in reconstruction, public outreach, and site interpretation.
- Case Study: **Reconstructing the historical layers of the Roman Colosseum in 3D using laser scanning and archival plans, allowing virtual tours and educational experiences.**

Module 10: Web GIS and Online Mapping for Heritage Dissemination

- Principles of Web GIS architectures and platforms (e.g., ArcGIS Online, Leaflet, OpenLayers).
- Creating interactive web maps for public access and stakeholder collaboration.
- Sharing and embedding web maps in websites and applications.
- Data security and intellectual property issues in online heritage data.
- Case Study: **Developing an online interactive map of historical shipwrecks along a coastline, allowing researchers and the public to explore submerged cultural heritage.**

Module 11: Integration with Other Digital Humanities Tools

- Connecting GIS with photogrammetry software for 3D model generation.
- Interfacing GIS with statistical software for advanced spatial statistics.
- Introduction to scripting (e.g., Python) for automating GIS tasks.
- Exploring historical GIS and its use in tracing historical urban development.
- Case Study: **Combining GIS with historical census data to analyze demographic changes and their impact on neighborhood heritage in a historic European city.**

Module 12: Data Quality, Metadata, and Archiving

- Assessing data accuracy, precision, and resolution in archaeological datasets.
- Creating comprehensive metadata for geospatial data according to standards
- Strategies for long-term digital archiving and preservation of heritage data.
- Version control and data provenance for archaeological projects.
- Case Study: **Implementing a robust metadata standard for a national archaeological site inventory to ensure discoverability and usability of data for future research and management.**

Module 13: Emerging Trends and Future of GIS in Heritage

- Big data in archaeology and the application of machine learning.
- The role of Artificial Intelligence (AI) in archaeological pattern recognition.
- Citizen science and crowdsourcing for heritage mapping initiatives.
- Ethical considerations of new technologies in heritage documentation and interpretation.
- Case Study: **Exploring the use of AI algorithms to automatically detect archaeological features from high-resolution satellite imagery across vast un-surveyed landscapes.**

Module 14: Practical Project and Application

- Participants will work on a real-world archaeological or cultural heritage mapping project.
- Defining project scope, data requirements, and methodological approach.
- Applying learned GIS techniques to solve a practical heritage problem.
- Data analysis, map production, and report generation.

- Case Study: **Teams will choose a local heritage site and develop a GIS-based management plan, including mapping, risk assessment, and proposed conservation strategies.**

Module 15: Presentation and Discussion

- Participants present their final projects, showcasing their GIS skills and findings.
- Peer feedback and constructive criticism sessions.
- Discussion on career opportunities and professional development in GIS for heritage.
- Networking opportunities with experts and fellow professionals.
- Case Study: **Reviewing successful GIS applications in global heritage initiatives and discussing their transferable lessons for various cultural contexts.**

Training Methodology

This course employs a **blended learning approach** emphasizing practical application and hands-on experience.

- **Interactive Lectures**: Concise theoretical foundations and conceptual understanding.
- **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 GIS applications in archaeology and cultural heritage from around the globe.
- **Guided Projects**: Participants work on individual or group projects applying learned skills to practical scenarios.
- **Expert Demonstrations**: Live demonstrations of advanced GIS techniques and workflows.
- **Q&A Sessions and Discussions**: Facilitating knowledge sharing and problem-solving.
- **Resource Sharing**: Access to comprehensive course materials, datasets, and relevant academic papers.
- **Continuous Assessment**: Practical assignments and a final project to gauge skill acquisition.

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.

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
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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