Google Earth Engine for Large-Scale Geospatial Analysis Training Course

Professional Development Training Course Outline

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

Course Introduction

Training Course on Google Earth Engine for Large-Scale Geospatial Analysis provides a comprehensive introduction to **Google Earth Engine (GEE)**, a powerful, cloud-based platform for **planetary-scale geospatial analysis**. Participants will gain hands-on experience leveraging GEE's vast **satellite imagery** and **geospatial datasets**, coupled with its robust **cloud computing capabilities**, to address real-world challenges in **environmental monitoring**, **land use change detection**, **disaster management**, and **climate studies**. The curriculum emphasizes practical application, scripting with **JavaScript API** and **Python API**, and the integration of **machine learning** for advanced spatial insights, equipping learners with in-demand skills for the evolving landscape of **big data GIS**.

The course delves into the intricacies of handling **multi-temporal** and **multi-spectral satellite data** , enabling users to perform complex **remote sensing analytics** efficiently. From fundamental concepts of **image processing** to advanced **time-series analysis** and **AI-powered classification**, this program empowers professionals to transform raw geospatial data into actionable intelligence. By mastering GEE, participants will be at the forefront of **geospatial innovation**, capable of executing analyses that were once computationally prohibitive, thus driving smarter decision-making across diverse sectors and contributing to **sustainable development** and **earth observation initiatives**.

Programme Curriculum

Google Earth Engine for Large-Scale Geospatial Analysis Training Course

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Course Duration

5 days

Course Objectives

1. Comprehend the core architecture and capabilities of GEE for cloud-based **geospatial data processing**.
2. Efficiently query, filter, and import vast **satellite imagery archives** (e.g., Landsat, Sentinel, MODIS) and other **geospatial data**.
3. Write and execute robust scripts using the **GEE API** for complex **spatial analysis workflows** .
4. Apply techniques for **image pre-processing**, **radiometric correction**, and **multi-spectral analysis**.
5. Utilize GEE for automated **land cover classification** and **change detection analysis**.
6. Analyze **temporal trends** and patterns in environmental data for **long-term monitoring**.
7. Apply **AI algorithms** within GEE for **supervised and unsupervised classification**, and **predictive modeling**.
8. Create dynamic **web maps** and **dashboards** to communicate spatial analysis results effectively.
9. Develop efficient, scalable scripts for **big data analytics** and repeatable processes.
10. Apply GEE skills to practical case studies in **deforestation monitoring**, **water resource management**, and **disaster assessment**.
11. Grasp the benefits and principles of **cloud-native geospatial platforms**.
12. Analyze climate-related datasets and contribute to **climate impact assessments**.
13. Learn best practices for efficient computation and memory management in **planetary-scale analysis**.

Organizational Benefits

- Empowering teams to derive rapid, accurate insights from massive geospatial datasets for improved strategic planning.
- Reducing reliance on expensive desktop software and high-performance computing infrastructure by leveraging GEE's cloud-based platform.

- Facilitating faster prototyping and execution of complex geospatial models and analyses, leading to quicker innovation.
- Enabling more effective tracking of environmental changes, resource management, and compliance.
- Automating repetitive geospatial tasks and workflows, freeing up valuable time for more analytical work.
- Equipping staff with cutting-edge skills in **cloud GIS**, **big data analytics**, and **AI for earth observation**.
- Providing tools for rapid damage assessment, flood mapping, and humanitarian aid coordination.
- Enabling data-driven contributions to global initiatives like deforestation reduction, food security, and climate action.

Target Audience

1. GIS and Remote Sensing Professionals
2. Environmental Scientists & Ecologists.
3. Climate Change Researchers.
4. Urban Planners & Development Experts.
5. Disaster Management & Humanitarian Aid Workers.
6. Data Scientists & AI/ML Engineers.
7. Agricultural Scientists & Agronomists.
8. University Students & Researchers.

Course Outline

Module 1: Introduction to Google Earth Engine & Cloud GIS

- Overview of Google Earth Engine.
- Introduction to Cloud-Native Geospatial.
- GEE Code Editor & API Basics.
- Data Models in GEE
- Basic Visualization & Exporting Data
- **Case Study:** Visualizing global deforestation trends using Hansen Global Forest Change data.

Module 2: Accessing and Managing Earth Observation Data

- Exploring the GEE Public Data Catalog
- Image Collection Filtering
- Handling Multi-Spectral and Multi-Temporal Data.
- Working with Vector Data
- Data Import and Export Best Practices.
- **Case Study:** Accessing and preparing Sentinel-2 imagery for regional agricultural monitoring.

Module 3: Fundamentals of Remote Sensing in GEE

- Radiometric and Atmospheric Correction.
- Image Indices Calculation
- Image Operations

- Geometric Transformations & Projections.
- Zonal Statistics & Reducers
- **Case Study:** Mapping urban heat islands using Landsat thermal bands and calculating LST

Module 4: Land Use/Land Cover Classification

- Supervised Classification Techniques.
- Unsupervised Classification (Clustering)
- Accuracy Assessment.
- Change Detection Methodologies
- Mapping & Quantifying Land Cover Change.
- **Case Study:** Detecting and quantifying forest cover loss due to illegal mining in the Amazon over a decade

Module 5: Time-Series Analysis and Anomaly Detection

- Creating and Analyzing Image Time Series.
- Phenological Studies.
- Smoothing and Filtering Time Series Data
- Detecting Anomalies and Disturbances
- Regression Analysis on Time Series.
- **Case Study:** Monitoring drought impact on vegetation health in East Africa using MODIS NDVI time series.

Module 6: Advanced Machine Learning in GEE

- Introduction to Advanced Classifiers
- Feature Engineering for Machine Learning performance.
- Object-Based Image Analysis (OBIA) Concepts
- Deep Learning Integration (Conceptual)
- GEE for Big Data Machine Learning Pipelines
- **Case Study:** Identifying informal settlements from high-resolution imagery using advanced classification.

Module 7: Water Resources & Disaster Management Applications

- Surface Water Mapping.
- Flood Inundation Mapping.
- Drought Monitoring & Assessment.
- Agricultural Monitoring & Food Security.
- Burned Area Mapping & Fire Severity Assessment
- **Case Study:** Rapid assessment of flood-affected areas in a South Asian delta region using Sentinel-1.

Module 8: Building Interactive Applications & Scalable Workflows

- GEE Apps Development.
- User Interface (UI) Elements in GEE.
- Exporting Results for External Use
- Automating Complex Workflows
- Connecting GEE with Other Platforms
- **Case Study:** Developing a custom GEE app to monitor and visualize mangrove forest change for a coastal conservation project.

Training Methodology

This course employs a **blended learning approach** combining theoretical concepts with extensive **hands-on practical exercises**. The methodology is designed for maximum engagement and skill acquisition:

- **Interactive Lectures:** Concise presentations introducing GEE concepts, remote sensing principles, and analysis techniques.
- **Live Coding Demonstrations:** Step-by-step walkthroughs of GEE JavaScript and Python scripts in the Code Editor and Jupyter Notebooks.
- **Hands-on Exercises:** Practical assignments and challenges to reinforce learning, with immediate feedback and instructor support.
- **Case Study-Driven Learning:** Application of GEE skills to real-world scenarios, fostering critical thinking and problem-solving.
- **Collaborative Learning:** Group activities and discussions to share insights and troubleshoot challenges.
- **Q&A Sessions:** Dedicated time for participants to ask questions and clarify doubts.
- **Project-Based Learning:** A culminating project where participants apply learned skills to a self-selected geospatial analysis problem.
- **Resource Sharing:** Provision of code snippets, datasets, and documentation for continued learning.

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

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