Geospatial Data Science with Python/R Training Course

Professional Development Training Course Outline

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

Course Introduction

In the era of smart cities, climate change modeling, and digital agriculture, Geospatial Data Science has emerged as a critical field that intersects data science, GIS (Geographic Information Systems), and machine learning. Geospatial Data Science with Python/R Training Course is designed to equip professionals, researchers, and data enthusiasts with cutting-edge skills in spatial data analysis, visualization, and modeling using powerful open-source programming tools—Python and R. With real-world datasets and hands-on experience, participants will explore spatial patterns, automate workflows, and build predictive models relevant to urban planning, environmental monitoring, disaster management, and beyond.

This course is structured to provide both theoretical and applied knowledge on geospatial data engineering, remote sensing analytics, and spatial machine learning. Participants will gain proficiency in key libraries like GeoPandas, Rasterio, Leaflet, GDAL, and sf, and learn to solve complex geospatial problems using both Python and R. By the end of the course, learners will be confident in transforming raw geospatial data into actionable insights for decision-making and policy development.

Programme Curriculum

Geospatial Data Science with Python/R Training Course

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Course Objectives

By the end of this course, participants will be able to:

1. Understand the fundamentals of geospatial data science and GIS principles.
2. Use Python and R libraries for spatial data manipulation and visualization.
3. Conduct spatial data wrangling and feature engineering.
4. Perform spatial joins, buffering, and clipping techniques.
5. Analyze raster and vector data for remote sensing applications.
6. Build interactive geospatial dashboards and maps.
7. Apply machine learning algorithms to spatial data.
8. Model spatial dependencies using spatial econometrics.
9. Integrate big geospatial data with open-source cloud services.
10. Leverage web-based GIS platforms for publishing maps.
11. Develop workflows for automated spatial data pipelines.
12. Conduct spatial-temporal analysis for urban development.
13. Evaluate case studies in environmental science, epidemiology, and urban analytics.

Target Audience

This course is ideal for:

1. GIS analysts and geospatial professionals
2. Data scientists transitioning into spatial data science
3. Urban planners and smart city developers
4. Environmental researchers and ecologists
5. Public health analysts using spatial epidemiology
6. Remote sensing specialists and earth observation experts
7. Academic researchers and graduate students
8. Government agencies and policy makers using location data

Course Duration: 5 days

Course Modules

Module 1: Introduction to Geospatial Data Science

- Fundamentals of GIS and spatial thinking
- Types of spatial data: raster vs vector
- Coordinate systems and projections
- Overview of Python and R in geospatial workflows
- Spatial data sources and repositories
- **Case Study: Mapping COVID-19 Spread by Region**

Module 2: Spatial Data Handling with Python

- Working with GeoPandas and Fiona

- Data cleaning and geocoding
- Merging shapefiles with tabular data
- Spatial joins and queries
- Visualization with Matplotlib and Folium
- **Case Study: Urban Green Spaces Analysis Using Python**

Module 3: Geospatial Analysis with R

- Introduction to sf and raster packages
- Spatial data frames and manipulations
- Visualizing maps with ggplot2 and leaflet
- Geostatistical methods in R
- Raster calculations and zonal statistics
- **Case Study: Deforestation Trends in the Amazon Using R**

Module 4: Raster Data Processing and Remote Sensing

- Satellite imagery fundamentals
- Using Rasterio and GDAL for preprocessing
- NDVI and land cover classification
- Multi-band raster analysis
- Remote sensing applications in agriculture and forestry
- **Case Study: Crop Health Assessment from Sentinel-2 Data**

Module 5: Spatial Statistics and Modeling

- Introduction to spatial autocorrelation (Moran's I)
- Hotspot and cluster analysis
- Spatial regression models
- Spatial interpolation techniques
- Integrating spatial stats in R/Python
- **Case Study: Air Quality Prediction Across Urban Areas**

Module 6: Spatial Machine Learning

- Machine learning workflow for spatial data
- Random Forest and SVM for land cover classification
- Feature selection and validation
- Spatial cross-validation
- Supervised vs unsupervised learning in GIS
- **Case Study: Urban Expansion Prediction Using ML**

Module 7: Building Interactive Maps and Dashboards

- Introduction to web mapping frameworks
- Creating dashboards with Dash, Shiny, and Leaflet
- Plotly and Bokeh for spatial visualization
- Embedding maps in web applications
- Deploying dashboards on the web
- **Case Study: Disaster Impact Visualization Dashboard**

Module 8: Advanced Topics and Cloud-based Geospatial Processing

- Google Earth Engine (GEE) for massive-scale processing
- Spatial data on the cloud with AWS and GEE
- Batch processing and automation with Python/R

- API integration and real-time mapping
- Trends in big spatial data analytics
- **Case Study: Flood Risk Mapping Using Google Earth Engine**

Training Methodology

- Hands-on coding in Python and R using Jupyter and RStudio
- Live demonstrations and guided tutorials
- Real-world datasets and scenarios
- Interactive quizzes and challenges
- Capstone project with mentorship
- Post-training support and access to code repositories

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

Start Date	End Date	Location	Price
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:

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