Remote Sensing in Mineral Exploration Training Course

Professional Development Training Course Outline

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

Course Introduction

Remote Sensing in Mineral Exploration is a cutting-edge geospatial training program designed to equip learners with advanced capabilities in satellite image analysis, geospatial intelligence, AI-driven mineral targeting, and predictive exploration modeling. In today's rapidly evolving mining sector, technologies such as Remote Sensing, GIS (Geographic Information Systems), Hyperspectral Imaging, LiDAR, and Machine Learning are revolutionizing how mineral deposits are discovered, mapped, and evaluated. Remote Sensing in Mineral Exploration Training Course focuses on integrating multispectral and hyperspectral satellite data (Sentinel-2, Landsat 8/9, ASTER) with geological datasets to enhance exploration efficiency, reduce costs, and improve decision-making accuracy in mineral-rich terrains.

The program emphasizes real-world applications in gold, copper, lithium, cobalt, rare earth elements (REEs), and critical minerals exploration, aligning with global demand for sustainable and data-driven mining practices. Participants will gain hands-on experience in geospatial analytics, spectral signature analysis, structural geology interpretation, anomaly detection, and AI-based mineral prospectivity mapping. With the rise of digital mining, ESG compliance, and smart exploration technologies, this course prepares geoscientists, engineers, and analysts to lead innovation in the mining and resource sector using advanced remote sensing workflows and industry-standard tools.

Programme Curriculum

Remote Sensing in Mineral Exploration Training Course

Introduction

Remote Sensing in Mineral Exploration is a cutting-edge geospatial training program designed to equip learners with advanced capabilities in satellite image analysis, geospatial intelligence, AI-driven mineral targeting, and predictive exploration modeling. In today's rapidly evolving mining sector, technologies such as Remote

Sensing, GIS (Geographic Information Systems), Hyperspectral Imaging, LiDAR, and Machine Learning are revolutionizing how mineral deposits are discovered, mapped, and evaluated. Remote Sensing in Mineral Exploration Training Course focuses on integrating multispectral and hyperspectral satellite data with geological datasets to enhance exploration efficiency, reduce costs, and improve decision-making accuracy in mineral-rich terrains.

The program emphasizes real-world applications in gold, copper, lithium, cobalt, rare earth elements (REEs), and critical minerals exploration, aligning with global demand for sustainable and data-driven mining practices. Participants will gain hands-on experience in geospatial analytics, spectral signature analysis, structural geology interpretation, anomaly detection, and AI-based mineral prospectivity mapping. With the rise of digital mining, ESG compliance, and smart exploration technologies, this course prepares geoscientists, engineers, and analysts to lead innovation in the mining and resource sector using advanced remote sensing workflows and industry-standard tools.

Course Duration

5 days

Course Objectives

1. Master Remote Sensing fundamentals for mineral exploration workflows
2. Apply GIS-based geospatial analysis for mineral targeting
3. Interpret multispectral and hyperspectral satellite imagery
4. Use Sentinel-2 and Landsat data for lithological mapping
5. Identify hydrothermal alteration zones using spectral signatures
6. Integrate AI and Machine Learning in mineral prospectivity modeling
7. Perform lineament and structural geology analysis using DEM data
8. Develop mineral anomaly detection models using geospatial data
9. Use LiDAR data for terrain and structural interpretation
10. Conduct exploration targeting for critical minerals
11. Apply image classification techniques
12. Enhance decision-making using predictive geospatial analytics
13. Support ESG-compliant and sustainable mining exploration strategies

Target Audience

1. Geologists and Exploration Geologists
2. Mining Engineers and Resource Analysts
3. GIS and Remote Sensing Professionals
4. Earth Science Researchers and Academics
5. Petroleum and Mineral Exploration Consultants
6. Environmental and ESG Analysts in Mining Sector
7. Government Geological Survey Officers
8. Data Scientists in Geospatial and Earth Observation Fields

Course Modules

Module 1: Fundamentals of Remote Sensing in Geology

- Principles of electromagnetic spectrum and reflectance
- Satellite platforms-**Sentinel-2, Landsat 8/9, ASTER**

- Resolution types: spatial, spectral, radiometric, temporal
- Introduction to mineral spectral signatures
- Remote sensing data acquisition and preprocessing
- **Case Study:** Gold exploration in the **Witwatersrand Basin (South Africa)** using multispectral satellite imagery.

Module 2: GIS for Mineral Exploration

- GIS software overview
- Spatial data integration and layering techniques
- Georeferencing and coordinate systems
- Geological map digitization and interpretation
- Spatial database management for mining datasets
- **Case Study:** Copper deposit mapping in **Zambia's Copperbelt using GIS spatial overlays**.

Module 3: Multispectral & Hyperspectral Image Analysis

- Spectral bands and mineral detection
- ASTER and Hyperion data processing
- Spectral angle mapper (SAM) technique
- Mineral mapping using band ratios
- Hydrothermal alteration detection
- **Case Study:** Lithium-bearing pegmatite identification in **Western Australia using hyperspectral imaging**.

Module 4: Structural Geology & Lineament Analysis

- DEM and hillshade interpretation
- Fault and fracture mapping techniques
- Lineament extraction using remote sensing
- Structural controls on mineralization
- Tectonic setting interpretation
- **Case Study:** Gold-bearing shear zones in **Tanzania's Lake Victoria Goldfields**.

Module 5: AI & Machine Learning in Mineral Exploration

- Introduction to geospatial AI
- Supervised vs unsupervised classification
- Random Forest and SVM models
- Predictive mineral prospectivity mapping
- Big data integration in exploration
- **Case Study:** AI-based copper prospectivity mapping in **Chile's Atacama Desert**.

Module 6: LiDAR and 3D Terrain Modeling

- LiDAR fundamentals and data acquisition
- Digital Elevation Models
- 3D geological visualization
- Terrain ruggedness and slope analysis
- Vegetation penetration and subsurface mapping
- **Case Study:** Nickel exploration in dense forest regions of **Indonesia using LiDAR terrain models**.

Module 7: Mineral Targeting & Anomaly Detection

- Geochemical and geophysical integration
- Anomaly mapping techniques
- Alteration zone classification
- Prospectivity modeling workflows
- Risk and uncertainty analysis
- **Case Study:** Rare earth element (REE) targeting in **Inner Mongolia, China**.

Module 8: Sustainable & Smart Mining Exploration

- ESG integration in mineral exploration
- Remote sensing for environmental monitoring
- Climate impact assessment in mining zones
- Digital twin concepts in mining
- Smart exploration workflows and automation
- **Case Study:** Sustainable lithium exploration in **Nevada, USA with ESG compliance mapping**.

Training Methodology

- 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