Geophysical Exploration Techniques 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

Geophysical Exploration Techniques form the backbone of modern subsurface investigation, enabling accurate detection and characterization of underground structures for mineral exploration, oil and gas exploration, geothermal energy development, groundwater studies, and environmental geophysics. Geophysical Exploration Techniques Training Course delivers a comprehensive, industry-aligned understanding of advanced geophysical. Participants will gain strong technical competence in integrating GIS, remote sensing, and geospatial analytics with geophysical datasets for high-resolution subsurface imaging.

In the era of AI-driven geoscience, digital twin earth modeling, and 3D subsurface visualization, geophysical exploration has evolved into a data-intensive discipline requiring advanced interpretation and modeling skills. This course emphasizes practical field applications, data acquisition strategies, processing workflows, inversion techniques, and interpretation frameworks used in global exploration industries. Learners will be equipped to handle critical minerals exploration, carbon capture storage (CCS), infrastructure site investigation, and sustainable resource development, making them industry-ready geoscience professionals.

Programme Curriculum

Geophysical Exploration Techniques Training Course

Introduction

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Course Duration

5 days

Course Objectives

1. Master seismic reflection and refraction data acquisition techniques
2. Understand gravity and magnetic anomaly interpretation
3. Apply electromagnetic (EM) and magnetotelluric (MT) methods for deep exploration
4. Develop competency in electrical resistivity tomography (ERT) modeling
5. Integrate GIS and remote sensing for geophysical mapping
6. Perform advanced subsurface imaging and 3D geological modeling
7. Apply AI and machine learning in geophysical data interpretation
8. Conduct mineral exploration targeting using geophysical datasets
9. Analyze oil and gas reservoir characterization techniques
10. Evaluate groundwater and aquifer mapping methods
11. Implement data inversion and signal processing workflows
12. Use geospatial analytics for exploration decision-making
13. Develop integrated solutions for sustainable geoscience and ESG compliance

Target Audience

1. Geologists and Exploration Geoscientists
2. Mining Engineers and Mineral Exploration Teams
3. Petroleum Engineers and Oil & Gas Analysts
4. Environmental Scientists and Hydrogeologists
5. GIS and Remote Sensing Professionals
6. Graduate Students in Geophysics/Geology
7. Government Geological Survey Staff
8. Energy Transition and Critical Minerals Consultants

Course Modules

Module 1: Fundamentals of Geophysical Exploration

- Principles of geophysics and earth physics
- Types of geophysical methods and applications
- Rock properties and physical parameters
- Field survey planning and design
- Introduction to subsurface imaging systems
- **Case Study:** Regional mineral mapping using integrated geophysical baseline survey in shield terrains.

Module 2: Seismic Exploration Techniques

- Seismic reflection and refraction principles
- Data acquisition and source-receiver systems
- Seismic wave propagation analysis
- Processing workflows and noise reduction
- 2D and 3D seismic interpretation
- **Case Study:** Hydrocarbon reservoir identification using 3D seismic imaging in sedimentary basins.

Module 3: Gravity and Magnetic Methods

- Gravity anomaly measurement techniques
- Magnetic field surveying and instrumentation
- Data correction and reduction techniques
- Structural interpretation of anomalies
- Basin and basement delineation
- **Case Study:** Iron ore deposit detection using aeromagnetic survey interpretation.

Module 4: Electrical and Electromagnetic Methods

- Electrical Resistivity Tomography (ERT)
- Induced Polarization (IP) methods
- Magnetotelluric (MT) deep imaging
- EM survey instrumentation and field setup
- Subsurface conductivity modeling
- **Case Study:** Groundwater aquifer mapping using ERT in semi-arid regions.

Module 5: Remote Sensing and GIS in Geophysics

- Satellite imagery interpretation
- Hyperspectral data analysis
- GIS-based spatial modeling
- Lineament and structural mapping
- Integration with geophysical datasets
- **Case Study:** Mineral exploration targeting using satellite-based alteration mapping.

Module 6: Data Processing and Inversion Techniques

- Signal filtering and noise suppression
- Forward and inverse modeling concepts
- Software tools for geophysical processing
- Uncertainty analysis and validation
- Multi-method data integration
- **Case Study:** 2D inversion modeling for geothermal reservoir characterization.

Module 7: 3D Subsurface Modeling and Interpretation

- 3D visualization techniques
- Geological modeling workflows
- Integration of multi-geophysical datasets
- Reservoir and basin modeling
- Digital subsurface reconstruction

- **Case Study:** 3D structural modeling for offshore oil field development.

Module 8: Applied Geophysics in Industry

- Mineral exploration workflows
- Hydrocarbon exploration systems
- Environmental and engineering geophysics
- Geothermal energy exploration
- Critical minerals and ESG applications
- **Case Study:** Lithium brine exploration using integrated geophysical and geochemical methods.

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:

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