Geochemical Exploration Methods 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

Geochemical Exploration Methods Training Course is designed to equip professionals with advanced skills in mineral exploration geochemistry, anomaly detection, and geochemical mapping techniques. The course integrates modern approaches such as multi-element geochemical analysis, portable XRF applications, machine learning in exploration data, and GIS-based geochemical modeling to improve discovery success rates in mineral exploration projects. Participants will gain hands-on knowledge of how geochemical signatures are used to locate ore bodies, assess mineral potential, and reduce exploration risk in both greenfield and brownfield terrains.

This training emphasizes real-world application through case-driven learning, data interpretation workflows, and field-based sampling strategies aligned with global mining industry standards. It supports decision-making in critical minerals exploration, sustainable mining practices, and digital geoscience transformation. By the end of the course, learners will be able to design and implement geochemical surveys, interpret multi-layer datasets, and integrate geochemical results into exploration models that support high-value mineral discovery programs.

Programme Curriculum

Geochemical Exploration Methods Training Course

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Course Duration

5 days

Course Objectives

1. Master advanced geochemical exploration techniques for mineral targeting
2. Apply multi-element geochemical data interpretation for anomaly detection
3. Understand pathfinder element geochemistry in ore deposit systems
4. Develop skills in soil, stream sediment, and rock chip sampling strategies
5. Use portable XRF (pXRF) and field geochemical tools effectively
6. Integrate GIS and spatial geochemical mapping workflows
7. Apply machine learning in geochemical anomaly prediction
8. Interpret lithogeochemical alteration patterns for ore systems
9. Design cost-effective mineral exploration survey programs
10. Evaluate critical minerals and battery metals geochemistry
11. Conduct quality assurance and quality control in geochemical data
12. Build 3D geochemical models for subsurface exploration targeting
13. Align exploration strategies with sustainable and ESG-compliant mining practices

Target Audience

1. Exploration geologists
2. Mining engineers
3. Geochemists and laboratory analysts
4. Resource estimation professionals
5. Graduate geology students
6. Mineral exploration consultants
7. Government geological survey staff
8. Mining company technical managers

Course Modules

Module 1: Fundamentals of Geochemical Exploration

- Principles of geochemical dispersion and element mobility
- Primary vs secondary geochemical halos
- Types of ore-related geochemical signatures
- Sampling media selection
- **Case Study:** Discovery of gold anomalies in West African greenstone belts

Module 2: Sampling Design & Field Methodologies

- Grid design for geochemical surveys

- Orientation surveys and baseline studies
- Sample density optimization techniques
- Contamination control and field protocols
- **Case Study:** Copper exploration sampling strategy in Chilean porphyry systems

Module 3: Analytical Techniques & Laboratory Geochemistry

- ICP-MS, AAS, and XRF analytical methods
- Detection limits and precision control
- Sample preparation workflows
- Geochemical database management
- **Case Study:** Rare earth element analysis in Australian ionic clay deposits

Module 4: Pathfinder Elements & Ore Indicator Systems

- Pathfinder element associations
- Element zoning in hydrothermal systems
- Lithogeochemical alteration mapping
- Geochemical vectoring techniques
- **Case Study:** Epithermal gold system in Nevada, USA

Module 5: GIS & Spatial Geochemical Mapping

- Geochemical data visualization in GIS platforms
- Interpolation methods (kriging, IDW)
- Anomaly threshold mapping
- Multi-layer spatial integration
- **Case Study:** Nickel laterite exploration in Indonesia using GIS modeling

Module 6: Advanced Data Analytics & Machine Learning

- Geochemical dataset preprocessing
- Clustering and anomaly detection algorithms
- Predictive mineral prospectivity modeling
- AI-driven exploration targeting
- **Case Study:** Machine learning-based gold prediction in Canadian Shield

Module 7: Critical Minerals Exploration

- Geochemistry of lithium, cobalt, nickel, and REEs
- Brine, pegmatite, and sediment-hosted systems
- Battery metals exploration workflows
- Strategic mineral supply chain relevance
- **Case Study:** Lithium brine exploration in the Atacama Desert

Module 8: Integrated Exploration & Resource Targeting

- Integration of geophysical and geochemical datasets
- 3D geological and geochemical modeling
- Drill target prioritization techniques
- Risk reduction in exploration decisions
- **Case Study:** Integrated copper-gold porphyry discovery model in Peru

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

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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