Critical Minerals 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

The Critical Minerals Exploration Training Course is designed to equip geoscientists, mining engineers, and resource professionals with advanced skills in critical minerals discovery, sustainable exploration, and resource evaluation. With global demand accelerating for lithium, cobalt, nickel, rare earth elements (REEs), graphite, and copper, the course focuses on modern exploration techniques that support the energy transition, electric vehicle supply chains, and green technology development. Participants will gain exposure to AI-driven mineral targeting, geospatial analytics, remote sensing, and ESG-compliant exploration frameworks, ensuring readiness for the future of mineral resource development.

This training integrates cutting-edge methodologies in exploration geoscience, geometallurgy, geophysics, and data-driven decision-making, bridging the gap between academic theory and real-world mineral discovery. It emphasizes sustainable practices aligned with global ESG standards, responsible mining, and strategic resource planning for critical mineral security. The course is structured to enhance both technical expertise and strategic insight in high-demand mineral economies worldwide.

Programme Curriculum

Critical Minerals Exploration Training Course

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Course Duration

5 Days

Course Objectives

1. Master critical minerals exploration systems and global supply chain dynamics
2. Apply AI-powered mineral targeting and predictive geoscience modeling
3. Understand lithium brine, pegmatite, and hard rock exploration techniques
4. Evaluate rare earth element (REE) deposit formation and geochemistry
5. Integrate remote sensing and hyperspectral imaging in mineral discovery
6. Develop skills in geophysical survey interpretation (magnetic, gravity, EM)
7. Implement GIS-based mineral prospectivity mapping
8. Assess ESG compliance and sustainable mining frameworks
9. Analyze ore body characterization and resource estimation techniques
10. Utilize big data analytics in exploration decision-making
11. Strengthen understanding of plate tectonics and mineralization systems
12. Improve competency in drilling strategies and core logging protocols
13. Build capability in strategic critical mineral supply security planning

Target Audience

1. Exploration geologists
2. Mining engineers
3. Geophysicists and geochemists
4. Mineral resource analysts
5. Government mineral policy advisors
6. ESG and sustainability consultants in mining
7. Graduate students in geoscience and mining disciplines
8. Mining industry project managers and consultants

Course Modules

Module 1: Global Critical Minerals System

- Overview of lithium, cobalt, nickel, graphite, REEs
- Global supply chain and geopolitical drivers
- Mineral security and energy transition demand
- Deposit types and global distribution
- Case Study: Lithium Triangle (Chile–Argentina–Bolivia) resource boom and EV supply chain impact

Module 2: Mineral Exploration Geology

- Ore genesis and mineralization processes
- Tectonic settings for critical minerals
- Structural geology in ore localization

- Geochemical pathfinders
- Case Study: Norilsk Nickel deposit (Russia) magmatic sulfide system

Module 3: Remote Sensing & Hyperspectral Analysis

- Satellite-based mineral detection techniques
- Spectral signatures of alteration minerals
- Drone-based exploration surveys
- Image processing and interpretation
- Case Study: Pilbara iron ore mapping using hyperspectral datasets (Australia)

Module 4: Geophysical Exploration Techniques

- Magnetic, gravity, seismic and EM surveys
- Subsurface anomaly detection
- Data acquisition and processing
- 3D geophysical modeling
- Case Study: Voisey's Bay nickel-copper discovery (Canada) using EM surveys

Module 5: Geochemistry & Geometallurgy

- Rock, soil, and stream sediment sampling
- Trace element geochemistry
- Mineral fingerprinting techniques
- Metallurgical behavior prediction
- Case Study: Bushveld Complex platinum group metals (South Africa) geochemical profiling

Module 6: GIS & AI in Mineral Exploration

- GIS mapping and spatial analysis
- Machine learning for prospectivity modeling
- Big data integration in exploration workflows
- Predictive mineral targeting
- Case Study: AI-assisted gold discovery models in Western Australia

Module 7: Drilling, Core Logging & Resource Estimation

- Exploration drilling methods (RC, diamond drilling)
- Core logging and sampling standards
- Grade estimation techniques
- JORC/NI 43-101 reporting standards
- Case Study: Carlin Trend gold deposits (USA) resource modeling success

Module 8: ESG, Sustainability & Critical Mineral Strategy

- Environmental and social governance frameworks
- Responsible mining practices
- Water and land management in exploration
- Circular economy in mineral supply chains
- Case Study: Chile's lithium ESG transformation strategy in Atacama Desert

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

Start Date	End Date	Location	Price
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