Volcanogenic Massive Sulphide (VMS) Systems 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

Volcanogenic Massive Sulphide (VMS) systems represent one of the most economically significant sources of base and precious metals, including copper, zinc, lead, gold, and silver. These deposits form on or near the seafloor in submarine volcanic environments through hydrothermal fluid circulation, making them critical to modern mineral exploration, green metals supply chains, and critical minerals strategy. This training course delivers a comprehensive, industry-aligned understanding of VMS genesis, exploration models, geophysical targeting, geochemical signatures, and orebody architecture using cutting-edge exploration technologies such as 3D geological modelling, geostatistics, and predictive mineral systems mapping.

Volcanogenic Massive Sulphide (VMS) Systems Training Course is designed for professionals seeking advanced expertise in mineral exploration geology, ore deposit modelling, and mining geology workflows. It integrates real-world case studies from global VMS provinces such as the Noranda Belt, Iberian Pyrite Belt, and Canadian Shield analogues. Participants will gain hands-on exposure to exploration targeting, lithogeochemical interpretation, alteration mapping, and deposit-scale vectoring techniques. Emphasis is placed on data-driven exploration, AI-assisted mineral prediction, geometallurgy, and sustainable mining practices aligned with modern ESG and critical minerals demand.

Programme Curriculum

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Course Duration

5 days

Course Objectives

1. Understand VMS deposit formation models and submarine hydrothermal systems
2. Apply mineral systems approach to VMS exploration targeting
3. Interpret lithogeochemistry and alteration footprints
4. Develop orebody vectoring and pathfinder element strategies
5. Integrate geophysical datasets for sulphide detection
6. Build 3D geological models for VMS deposits
7. Evaluate tectonic settings and volcanic stratigraphy controls
8. Use machine learning in mineral prospectivity mapping
9. Conduct ore genesis reconstruction using isotopic tools
10. Assess geometallurgical variability in sulphide ores
11. Apply core logging and alteration mineralogy analysis
12. Identify critical metals enrichment zones
13. Design exploration targeting strategies for greenfield VMS discovery

Target Audience

1. Mineral exploration geologists
2. Mining geologists and resource modelers
3. Geophysicists in mineral exploration
4. Geochemists and analytical geoscientists
5. Graduate geology students and researchers
6. Mining engineers involved in orebody evaluation
7. Government geological survey professionals
8. ESG and critical minerals strategy analysts

Course Modules

Module 1: Fundamentals of VMS Systems

- Formation in submarine volcanic environments
- Hydrothermal fluid evolution and metal precipitation
- Classification of VMS deposit types
- Global metallogenic belts overview

- Case Study: Iberian Pyrite Belt (Spain–Portugal)

Module 2: Tectonic Settings & Volcanic Stratigraphy

- Back-arc basin and rift-related settings
- Structural controls on mineralization
- Stratigraphic sequencing of volcanic units
- Basin evolution models
- Case Study: Bathurst Mining Camp (Canada)

Module 3: Alteration Systems & Pathfinder Geochemistry

- Hydrothermal alteration zoning
- Pathfinder elements
- Lithogeochemical vectoring techniques
- Alteration halos and geochemical footprints
- Case Study: Noranda VMS District (Quebec)

Module 4: Geophysics for VMS Exploration

- IP chargeability and EM conductivity models
- Seafloor massive sulphide detection techniques
- Magnetic and gravity anomaly interpretation
- Data integration workflows
- Case Study: Flin Flon Belt (Canada)

Module 5: Orebody Geometry & 3D Modelling

- Lens-shaped sulphide geometry interpretation
- Structural deformation of ore lenses
- Wireframing and geological modelling software
- Grade distribution modeling
- Case Study: Kidd Creek Deposit (Canada)

Module 6: Geometallurgy & Mineral Processing Insights

- Sulphide mineral liberation characteristics
- Metallurgical variability in VMS ores
- Recovery optimization strategies
- Ore hardness and grindability analysis
- Case Study: Boliden District (Sweden)

Module 7: Advanced Exploration Technologies

- AI-driven prospectivity mapping
- Machine learning classification models
- Remote sensing alteration detection
- Drone-based geological mapping
- Case Study: Australian VMS Greenfield Exploration

Module 8: Economic Geology & Resource Evaluation

- Resource estimation techniques

- Cut-off grade optimization
- Critical minerals valuation
- ESG and sustainable mining frameworks
- Case Study: Iberian Pyrite Belt Mining Operations

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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