Petrography for Ore Analysis Training Course

Professional Development Training Course Outline

Category	General Training	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Petrography for Ore Analysis is a specialized, high-impact training program designed to equip geoscientists, mining engineers, and mineral analysts with advanced skills in mineral identification, ore texture interpretation, ore microscopy, and paragenesis reconstruction. Petrography for Ore Analysis Training Course integrates microscopic petrography, reflected light microscopy, ore mineralogy, geometallurgy, and economic geology principles to enable precise characterization of ore-bearing rocks. Participants gain critical competencies in understanding mineral associations, alteration patterns, sulfide mineral systems, and ore-forming processes, which are essential for modern mineral exploration and mining optimization.

In today’s mining industry driven by AI-enabled mineral exploration, critical mineral demand, ESG-driven resource efficiency, and digital geoscience workflows, petrographic analysis remains a cornerstone for decision-making. This training emphasizes ore microscopy, quantitative mineralogy, texture-genesis interpretation, and integrated geochemical-petrographic modeling, empowering professionals to support resource estimation, metallurgical performance prediction, and exploration targeting. The program bridges classical petrography with cutting-edge geometallurgical applications and data-driven mineral systems analysis.

Programme Curriculum

Petrography for Ore Analysis Training Course

Introduction

Petrography for Ore Analysis is a specialized, high-impact training program designed to equip geoscientists, mining engineers, and mineral analysts with advanced skills in mineral identification, ore texture interpretation, ore microscopy, and paragenesis reconstruction. Petrography for Ore Analysis Training Course integrates microscopic petrography, reflected light microscopy, ore mineralogy, geometallurgy, and economic geology

principles to enable precise characterization of ore-bearing rocks. Participants gain critical competencies in understanding mineral associations, alteration patterns, sulfide mineral systems, and ore-forming processes, which are essential for modern mineral exploration and mining optimization.

In today's mining industry driven by AI-enabled mineral exploration, critical mineral demand, ESG-driven resource efficiency, and digital geoscience workflows, petrographic analysis remains a cornerstone for decision-making. This training emphasizes ore microscopy, quantitative mineralogy, texture-genesis interpretation, and integrated geochemical-petrographic modeling, empowering professionals to support resource estimation, metallurgical performance prediction, and exploration targeting. The program bridges classical petrography with cutting-edge geometallurgical applications and data-driven mineral systems analysis.

Course Duration

10 Days

Course Objectives

1. Master ore petrography and reflected light microscopy techniques
2. Identify and classify ore minerals and gangue mineral assemblages
3. Interpret mineral paragenesis and ore-forming sequences
4. Analyze sulfide mineral textures and replacement structures
5. Apply geometallurgical mineral characterization workflows
6. Integrate thin section and polished section analysis
7. Develop competency in quantitative mineral modal analysis
8. Understand hydrothermal alteration systems and zoning
9. Evaluate ore texture-genesis relationships for exploration targeting
10. Use digital petrography and image analysis tools
11. Correlate geochemical data with petrographic observations
12. Support mineral resource modeling and metallurgical prediction
13. Apply AI-driven mineral classification and ore system modeling

Target Audience

1. Geologists (Exploration & Mining)
2. Mining Engineers
3. Mineralogists & Petrographers
4. Geometallurgists
5. Metallurgical Engineers
6. Earth Science Researchers
7. Laboratory Technicians (Mineral Labs)
8. Graduate Students in Geology/Mining

Course Modules

Module 1: Fundamentals of Petrography

- Rock and mineral classification principles
- Optical mineralogy basics
- Ore vs gangue distinction
- Introduction to reflected light microscopy
- Case study: Iron ore banded formations

Module 2: Ore Mineralogy Essentials

- Sulfides, oxides, carbonates, silicates
- Economic mineral identification
- Ore mineral associations
- Mineral stability concepts
- Case study: Porphyry copper systems

Module 3: Reflected Light Microscopy

- Polarized reflected light techniques
- Ore mineral reflectance properties
- Polishing techniques for ores
- Image calibration methods
- Case study: Gold-bearing quartz veins

Module 4: Transmitted Light Petrography

- Thin section analysis
- Crystal optics fundamentals
- Mineral interference patterns
- Grain boundary analysis
- Case study: Volcanogenic massive sulfides (VMS)

Module 5: Ore Textures and Structures

- Replacement textures
- Exsolution and intergrowths
- Brecciation textures
- Growth zoning patterns
- Case study: Epithermal gold deposits

Module 6: Paragenesis and Mineral Sequences

- Mineral formation timelines
- Sequential crystallization
- Hydrothermal evolution
- Stage classification
- Case study: Skarn deposit evolution

Module 7: Hydrothermal Alteration Systems

- Alteration mineral assemblages
- Zoning patterns
- Fluid-rock interaction
- Alteration mapping
- Case study: Copper porphyry alteration halos

Module 8: Sulfide Mineral Systems

- Pyrite, chalcopyrite, galena systems
- Sulfide paragenesis

- Replacement textures
- Oxidation pathways
- Case study: Lead-zinc sulfide deposits

Module 9: Oxide and Carbonate Ore Systems

- Hematite, magnetite systems
- Carbonate replacement deposits
- Supergene enrichment
- Weathering profiles
- Case study: Banded iron formations (BIF)

Module 10: Geometallurgy Integration

- Ore variability analysis
- Metallurgical performance prediction
- Liberation studies
- Process mineralogy
- Case study: Copper recovery optimization

Module 11: Digital Petrography

- Automated mineral mapping
- Image processing techniques
- AI classification tools
- Data visualization
- Case study: Machine learning mineral identification

Module 12: Quantitative Mineralogy

- Modal mineral analysis
- Point counting methods
- Grain size distribution
- Statistical mineral data
- Case study: Gold grade estimation variability

Module 13: Ore Genesis Models

- Magmatic ore formation
- Hydrothermal systems
- Sedimentary ore processes
- Metamorphic ore genesis
- Case study: Nickel sulfide deposits

Module 14: Exploration Petrography

- Target generation
- Drill core logging integration
- Alteration halos mapping
- Structural controls
- Case study: Greenstone belt gold exploration

Module 15: Advanced Integrated Case Studies

- Multi-method mineral analysis
- Petrography + geochemistry integration
- Deposit-scale modeling
- Exploration decision-making
- Case study: Porphyry-epithermal transition systems

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	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com