Industrial Mineral Processing 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 Industrial Mineral Processing Training Course is designed to equip learners with advanced knowledge and practical expertise in modern mineral beneficiation, extraction technologies, and sustainable processing systems. As global demand for critical minerals, rare earth elements, and high-purity industrial minerals continues to rise, this course focuses on cutting-edge mineral processing technologies, ore beneficiation techniques, comminution optimization, froth flotation systems, and digital mineral processing solutions. It bridges the gap between theoretical mineralogy and real-world plant operations, ensuring participants gain hands-on exposure to modern processing circuits and equipment used in mining and metallurgy industries.

This training emphasizes process efficiency optimization, AI-driven mineral processing, ESG-compliant mining operations, energy-efficient comminution, tailings management, and sustainable resource recovery systems. Participants will develop strong competencies in plant design, mineral characterization, separation techniques, and process control systems used in modern concentrators. With increasing global focus on green mining, circular economy, smart mining technologies, and decarbonization of mineral industries, this course prepares engineers, technicians, and professionals to meet evolving industry standards and excel in high-demand mineral processing roles worldwide.

Programme Curriculum

Industrial Mineral Processing Training Course

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Course Duration

5 days

Course Objectives

1. Understand advanced mineral processing and ore beneficiation principles
2. Apply comminution, crushing, and grinding circuit optimization techniques
3. Master froth flotation and hydrometallurgical separation processes
4. Analyze mineral liberation and particle size distribution (PSD)
5. Implement smart mining and AI-based process control systems
6. Improve plant recovery rates and metallurgical efficiency
7. Design sustainable tailings management and waste reduction systems
8. Apply energy-efficient mineral processing strategies
9. Evaluate gravity separation and magnetic separation technologies
10. Integrate digital twin and automation in mineral plants
11. Ensure ESG compliance and sustainable mining operations
12. Optimize process flow sheets for industrial minerals
13. Enhance real-time data analytics for mineral processing plants

Target Audience

1. Mining engineers and metallurgical engineers
2. Plant operators and mineral processing technicians
3. Geologists and exploration professionals
4. Chemical and process engineers
5. Mining company supervisors and production managers
6. Environmental and sustainability officers in mining sector
7. Graduates in mining, geology, and materials engineering
8. Government mining regulators and consultants

Course Modules

Module 1: Introduction to Mineral Processing Systems

- Fundamentals of ore beneficiation and mineral classification
- Overview of processing plant flow sheets
- Mineral properties and liberation concepts
- Industry applications in base and precious metals

- Case Study: Iron ore beneficiation plant optimization in Australia

Module 2: Crushing, Grinding & Comminution

- Primary, secondary, and tertiary crushing systems
- Grinding mills (SAG, ball mills, rod mills)
- Energy efficiency in comminution circuits
- Particle size reduction modeling
- Case Study: Energy reduction in copper grinding circuits (Chile mining plant)

Module 3: Screening and Classification Techniques

- Vibrating screens and hydrocyclones
- Particle size distribution analysis
- Classification efficiency optimization
- Wet vs dry screening methods
- Case Study: Coal classification efficiency improvement in South Africa

Module 4: Froth Flotation Technology

- Principles of surface chemistry in flotation
- Reagents: collectors, frothers, modifiers
- Flotation cell design and operation
- Sulfide and non-sulfide mineral flotation
- Case Study: Platinum group metals (PGM) flotation recovery optimization

Module 5: Gravity and Magnetic Separation

- Dense media separation techniques
- Spiral concentrators and shaking tables
- Magnetic separators for iron and rare earths
- Process selection criteria
- Case Study: Tin ore recovery using gravity separation in Southeast Asia

Module 6: Hydrometallurgy & Chemical Processing

- Leaching techniques
- Solvent extraction and ion exchange
- Electrowinning and precipitation
- Chemical kinetics in mineral dissolution
- Case Study: Gold cyanidation plant optimization

Module 7: Process Control & Smart Mining Technologies

- Automation in mineral plants
- AI and machine learning applications
- SCADA and DCS systems
- Real-time monitoring and control
- Case Study: Digital twin implementation in a copper concentrator

Module 8: Tailings Management & Sustainable Mining

- Tailings storage facility (TSF) design

- Water recovery and recycling systems
- Environmental impact reduction strategies
- ESG and regulatory compliance
- Case Study: Dry stacking tailings system in iron ore 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:

Register Online Now

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