Mineral Beneficiation Techniques 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 Mineral Beneficiation Techniques Training Course is designed to equip professionals with advanced knowledge and practical skills in modern mineral processing and beneficiation technologies. The course focuses on high-demand industry trends such as sustainable mining, critical minerals processing, process optimization, resource efficiency, digital transformation in mining, green metallurgy, and tailings management. Participants will gain practical exposure to crushing, grinding, flotation, gravity separation, magnetic separation, dewatering, hydrometallurgy, and process control techniques used in modern beneficiation plants worldwide.

This intensive training programme integrates theoretical concepts, operational best practices, real-world case studies, simulation-based learning, and industrial applications to enhance productivity, improve recovery rates, reduce operational costs, and support environmental compliance in mining operations. The course aligns with global mining industry demands driven by energy transition minerals, automation, AI-driven process optimization, ESG compliance, circular economy strategies, and sustainable mineral value chains. Participants will develop the competence required to optimize beneficiation circuits, improve plant performance, manage process risks, and implement innovative beneficiation technologies for competitive mineral production.

Programme Curriculum

Mineral Beneficiation Techniques Training Course

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Course Duration

5 days

Course Objectives

After completing the course, participants will be able to:

1. Understand advanced Mineral Beneficiation Technologies and processing principles.
2. Apply Process Optimization Techniques for improved mineral recovery.
3. Analyze Crushing and Grinding Efficiency in beneficiation plants.
4. Implement modern Flotation Technology for complex ore treatment.
5. Evaluate Gravity Separation Systems for enhanced mineral concentration.
6. Apply Magnetic and Electrostatic Separation Techniques effectively.
7. Understand Hydrometallurgical Processing Methods and leaching systems.
8. Improve Plant Performance Monitoring and Process Control.
9. Integrate Digital Mining Technologies and Automation Systems in beneficiation operations.
10. Apply Sustainable Mining and ESG Practices in mineral processing.
11. Manage Tailings, Waste Reduction, and Water Recovery Systems efficiently.
12. Conduct Mineral Characterization and Ore Analysis for process improvement.
13. Develop strategies for Energy Efficiency and Carbon Reduction in beneficiation plants.

Target Audience

1. Mineral Processing Engineers
2. Metallurgical Engineers
3. Mining Engineers
4. Plant Operators and Supervisors
5. Geologists and Geometallurgists
6. Laboratory and Quality Control Personnel
7. Technical Managers and Project Engineers
8. Researchers, Consultants, and Mining Investors

Course Modules

Module 1: Introduction to Mineral Beneficiation

- Fundamentals of mineral processing
- Ore characterization and mineralogy
- Mineral value chain and beneficiation economics
- Sampling and analytical techniques

- Sustainable beneficiation principles
- **Case Study:** Optimization of iron ore beneficiation operations in South Africa

Module 2: Crushing and Grinding Technologies

- Comminution principles
- Crushing equipment selection
- Grinding circuit optimization
- Energy-efficient milling systems
- Equipment maintenance strategies
- **Case Study:** Energy reduction strategies in gold processing plants

Module 3: Gravity Separation Techniques

- Dense media separation
- Jigging and spirals
- Centrifugal concentrators
- Gravity circuit optimization
- Recovery improvement techniques
- **Case Study:** Chrome recovery enhancement using gravity concentration

Module 4: Flotation and Advanced Separation Processes

- Flotation chemistry fundamentals
- Reagent selection and optimization
- Froth management techniques
- Column flotation systems
- Complex sulphide ore processing
- **Case Study:** Copper flotation optimization in large-scale concentrators

Module 5: Magnetic and Electrostatic Separation

- Magnetic separation principles
- Low and high-intensity magnetic systems
- Electrostatic separation technologies
- Rare earth mineral beneficiation
- Industrial applications and troubleshooting
- **Case Study:** Heavy mineral sands separation process optimization

Module 6: Hydrometallurgy and Dewatering

- Leaching technologies
- Solvent extraction processes
- Thickening and filtration systems
- Water recovery technologies
- Tailings management systems
- **Case Study:** Heap leaching optimization in copper extraction

Module 7: Process Control, Automation, and Digital Mining

- Process instrumentation systems
- SCADA and plant automation

- AI-driven beneficiation optimization
- Real-time data analytics
- Smart mining technologies
- **Case Study:** Implementation of digital twins in mineral processing plants

Module 8: Sustainability, Safety, and ESG in Beneficiation

- Environmental compliance standards
- Energy and water efficiency
- Occupational health and safety
- ESG reporting in mining
- Circular economy applications
- **Case Study:** Sustainable tailings management and water recycling projects

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