Mineral Recovery Optimization 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

Mineral Recovery Optimization Training Course is designed to enhance operational efficiency, metallurgical performance, and sustainable extraction practices in modern mining and mineral processing environments. With rising global demand for critical minerals, mining companies are under increasing pressure to improve ore recovery rates, plant efficiency, cost reduction, and ESG compliance while maximizing throughput and minimizing waste. This training provides advanced insights into flotation optimization, hydrometallurgy efficiency, comminution control, and process automation strategies aligned with Industry 4.0 mining transformation.

This course equips engineers, metallurgists, and plant operators with practical tools and data-driven methodologies to improve mineral liberation, recovery efficiency, process stability, and plant reconciliation accuracy. Participants will gain hands-on expertise in optimizing recovery circuits, reducing losses in tailings, improving grade control, and applying real-world case studies from global mining operations in gold, copper, lithium, iron ore, and rare earth elements.

Programme Curriculum

Mineral Recovery Optimization Training Course

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Course Duration

5 days

Course Objectives

1. Optimize mineral recovery rates using advanced metallurgical techniques
2. Improve flotation circuit performance and reagent efficiency
3. Enhance ore beneficiation and separation efficiency
4. Reduce processing losses in tailings and waste streams
5. Implement data-driven process control and automation systems
6. Strengthen comminution circuit efficiency and energy reduction
7. Apply advanced hydrometallurgical recovery techniques
8. Improve plant throughput and operational productivity
9. Strengthen process mineralogy interpretation for recovery optimization
10. Enable real-time performance monitoring and predictive analytics
11. Optimize gravity separation and leaching processes
12. Improve sustainable mining and ESG-compliant recovery strategies
13. Develop expertise in end-to-end mineral processing optimization

Target Audience

1. Mining Engineers
2. Metallurgists and Process Engineers
3. Plant Operators and Supervisors
4. Mineral Processing Consultants
5. Geometallurgists
6. Mine Production Managers
7. Process Control and Automation Engineers
8. ESG and Sustainability Officers in Mining Operations

Course Modules

Module 1: Fundamentals of Mineral Recovery Optimization

- Key principles of mineral recovery and process efficiency
- Ore characteristics and liberation analysis
- Recovery vs grade trade-off strategies
- Process flow sheet interpretation
- **Case Study:** Gold recovery improvement in a low-grade ore deposit using optimized grind size control

Module 2: Comminution Circuit Optimization

- Crushing and grinding efficiency enhancement
- Energy consumption reduction strategies
- Mill load and throughput balancing

- Particle size distribution control
- **Case Study:** Copper mine reducing energy cost by 18% through SAG mill optimization

Module 3: Flotation Process Optimization

- Reagent selection and dosage control
- Air rate and froth stability management
- Pulp chemistry optimization
- Cell design and configuration efficiency
- **Case Study:** Platinum group metals recovery increase through froth depth optimization

Module 4: Gravity and Dense Media Separation

- Gravity concentration principles
- Dense media separation performance tuning
- Recovery of coarse and fine particles
- Equipment calibration and maintenance
- **Case Study:** Iron ore plant improving recovery by 12% using dense media circuit redesign

Module 5: Hydrometallurgy and Leaching Systems

- Leach kinetics and optimization strategies
- Cyanidation, acid leaching, and bioleaching principles
- Solution concentration control
- Metal recovery from pregnant leach solutions
- **Case Study:** Lithium extraction improvement using optimized leach residence time

Module 6: Process Control and Automation

- SCADA and DCS systems in mineral processing
- Real-time monitoring and control loops
- AI and machine learning in recovery optimization
- Predictive maintenance strategies
- **Case Study:** Smart copper plant reducing downtime by 22% through predictive analytics

Module 7: Tailings Management and Waste Reduction

- Tailings reprocessing techniques
- Water recovery and recycling systems
- Environmental impact reduction strategies
- Dry stacking and filtration systems
- **Case Study:** Gold mine recovering additional 6% metal from historical tailings

Module 8: Plant Performance Analysis & Optimization

- Mass balance and reconciliation techniques
- KPI tracking for mineral recovery
- Bottleneck identification methods
- Continuous improvement frameworks
- **Case Study:** Nickel processing plant increasing throughput by 15% via bottleneck removal

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

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