Ore Dressing Principles 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

Ore Dressing Principles Training Course is designed to equip mining professionals, metallurgists, process engineers, and plant operators with advanced competencies in mineral processing, beneficiation technologies, and sustainable extraction systems. In today's rapidly evolving mining industry, organizations are adopting digital transformation, AI-driven process optimization, smart mining technologies, energy-efficient beneficiation systems, and ESG-compliant operational strategies to improve productivity and profitability. This course provides participants with practical expertise in crushing, grinding, screening, flotation, gravity separation, magnetic separation, thickening, filtration, and tailings management while integrating modern trends such as automation, predictive maintenance, process simulation, data analytics, and sustainable resource recovery.

Participants will gain comprehensive knowledge of ore characterization, process control, recovery optimization, plant performance analysis, and operational risk management through industry-based case studies and hands-on technical discussions. The course emphasizes operational excellence, lean mineral processing systems, cost optimization, production efficiency, environmental sustainability, digital mining innovation, and advanced metallurgical techniques. By combining theoretical foundations with practical applications, this training empowers professionals to improve recovery rates, reduce operational losses, optimize plant throughput, enhance safety compliance, and implement world-class ore beneficiation strategies aligned with Industry 4.0 mining practices.

Programme Curriculum

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Course Duration

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Course Objectives

1. Understand advanced ore dressing and mineral beneficiation principles.
2. Apply AI-driven process optimization techniques in mineral processing plants.
3. Improve recovery efficiency using modern flotation and gravity separation methods.
4. Analyze crushing, grinding, and screening circuit performance for productivity enhancement.
5. Implement sustainable mining and ESG-focused beneficiation practices.
6. Utilize digital transformation and smart mining technologies in ore processing.
7. Optimize plant throughput using real-time process monitoring and automation systems.
8. Develop predictive maintenance strategies for mineral processing equipment reliability.
9. Improve tailings management and environmental compliance standards.
10. Apply data analytics and process simulation tools for operational decision-making.
11. Enhance energy efficiency and cost reduction in beneficiation operations.
12. Strengthen risk management, safety performance, and operational excellence practices.
13. Evaluate emerging trends in green mining, circular economy, and resource recovery technologies.

Target Audience

1. Mineral Processing Engineers
2. Metallurgical Engineers
3. Mining Engineers
4. Plant Operators and Supervisors
5. Production and Process Managers
6. Maintenance and Reliability Engineers
7. Environmental and Sustainability Officers
8. Technical Consultants and Mining Professionals

Course Modules

Module 1: Fundamentals of Ore Dressing Principles

- Introduction to mineral processing and beneficiation
- Ore characterization and mineral liberation analysis
- Physical and chemical properties of ores
- Process flow sheets and plant layouts
- Industry case study on gold ore beneficiation optimization
- **Case Study:** Analysis of a modern gold processing plant improving recovery rates through optimized grinding circuits.

Module 2: Crushing, Grinding, and Screening Technologies

- Comminution principles and equipment selection
- Primary, secondary, and tertiary crushing systems
- Grinding circuit optimization techniques
- Screening efficiency and classification systems
- Energy-efficient comminution technologies
- **Case Study:** Copper processing plant reducing operational costs through advanced grinding optimization.

Module 3: Gravity and Magnetic Separation Methods

- Gravity concentration techniques
- Dense media separation systems
- Magnetic separation technologies
- High-gradient magnetic separators
- Process efficiency improvement methods
- **Case Study:** Iron ore beneficiation project utilizing magnetic separation for higher-grade concentrate production.

Module 4: Flotation and Advanced Separation Technologies

- Froth flotation fundamentals
- Reagent chemistry and flotation kinetics
- Column flotation and advanced flotation systems
- Process troubleshooting and optimization
- Digital flotation monitoring technologies
- **Case Study:** Lead-zinc flotation plant achieving enhanced recovery using AI-based flotation control systems.

Module 5: Thickening, Filtration, and Tailings Management

- Thickening principles and equipment
- Filtration technologies and applications
- Tailings disposal and environmental management
- Water recovery and recycling systems
- ESG and sustainable mining compliance practices
- **Case Study:** Tailings management improvement project reducing environmental impact and water consumption.

Module 6: Process Control, Automation, and Digital Mining

- Smart mining and Industry 4.0 applications

- Process instrumentation and control systems
- SCADA and automated beneficiation plants
- Predictive maintenance and IoT technologies
- Data-driven operational decision-making
- **Case Study:** Digital transformation project improving plant efficiency through automated process control.

Module 7: Plant Performance Optimization and Troubleshooting

- Key performance indicators (KPIs) in mineral processing
- Bottleneck identification and debottlenecking techniques
- Recovery improvement strategies
- Operational risk assessment and mitigation
- Lean processing and cost optimization approaches
- **Case Study:** Mineral processing plant increasing throughput through process bottleneck elimination.

Module 8: Sustainable Mining and Emerging Trends

- Green mining technologies and sustainability practices
- Circular economy and resource recovery systems
- Energy-efficient beneficiation technologies
- Carbon reduction and environmental stewardship
- Future trends in mineral processing innovation
- **Case Study:** Sustainable beneficiation initiative integrating renewable energy into mineral processing 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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Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com