Mineral Processing Simulation 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 Processing Simulation Training Course is designed to equip professionals with advanced competencies in digital process optimization, predictive analytics, smart mineral beneficiation, and simulation-driven decision-making. The course integrates modern simulation technologies, process modeling, artificial intelligence applications, digital twin systems, data analytics, and sustainable mineral processing strategies to enhance operational efficiency, plant productivity, recovery optimization, and energy management across mining and metallurgical operations. Participants gain practical exposure to real-world mineral processing challenges through interactive simulations, industrial case studies, and scenario-based process analysis.

This intensive training program addresses emerging global trends in Industry 4.0 mining technologies, sustainable processing systems, automation, machine learning integration, flotation optimization, grinding circuit control, process troubleshooting, and ESG-driven operational excellence. The course emphasizes practical application of simulation software for crushing, grinding, flotation, classification, thickening, dewatering, hydrometallurgy, and plant performance optimization. Participants will develop strategic skills in process efficiency enhancement, cost reduction, risk mitigation, operational forecasting, process control systems, and production optimization using modern digital tools and simulation methodologies widely adopted in the global mining and mineral processing industry.

Programme Curriculum

Mineral Processing Simulation Training Course

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Course Duration

5 days

Course Objectives

1. Develop advanced skills in Mineral Processing Simulation and Digital Process Modeling.
2. Enhance competencies in AI-driven Process Optimization and Predictive Analytics.
3. Improve understanding of Grinding Circuit Optimization and Energy Efficiency.
4. Master Flotation Process Simulation and Recovery Maximization Techniques.
5. Apply Industry 4.0 Technologies in Smart Mining Operations.
6. Strengthen capabilities in Process Control Automation and Digital Twin Applications.
7. Analyze plant performance using Big Data Analytics and Real-Time Monitoring Systems.
8. Optimize Crushing, Screening, and Classification Circuit Performance.
9. Develop expertise in Sustainable Mineral Beneficiation and ESG Compliance Strategies.
10. Improve troubleshooting skills using Advanced Process Simulation Software Tools.
11. Enhance decision-making through Scenario-Based Operational Forecasting Models.
12. Integrate Machine Learning Applications in Mineral Processing Operations.
13. Improve operational profitability through Cost Optimization and Production Efficiency Techniques.

Target Audience

1. Mineral Processing Engineers
2. Metallurgical Engineers
3. Mining Engineers
4. Plant Operators and Supervisors
5. Process Control Engineers
6. Production Managers
7. Research and Development Specialists
8. Consultants and Technical Professionals in Mining and Metallurgy

Course Modules

Module 1: Fundamentals of Mineral Processing Simulation

- Introduction to simulation principles in mineral processing
- Process flow sheet development and digital modeling

- Mass balance and process calculations
- Simulation software overview and applications
- Process data collection and validation
- **Case Study:** Simulation-based optimization of a copper concentrator plant to improve throughput and recovery.

Module 2: Crushing and Grinding Circuit Simulation

- Comminution theory and process dynamics
- Crushing circuit modeling and optimization
- Grinding mill simulation techniques
- Energy efficiency improvement strategies
- Equipment performance analysis
- **Case Study:** Optimization of SAG mill performance using simulation tools in a gold processing plant.

Module 3: Classification and Screening Systems

- Hydrocyclone performance modeling
- Screening efficiency analysis
- Particle size distribution simulation
- Circulating load optimization
- Classification control strategies
- **Case Study:** Improving classification efficiency in an iron ore beneficiation plant.

Module 4: Flotation Process Simulation

- Flotation kinetics and recovery modeling
- Reagent optimization strategies
- Air flow and pulp density simulation
- Froth stability analysis
- Multi-stage flotation circuit optimization
- **Case Study:** Recovery enhancement in a phosphate flotation circuit using predictive simulation.

Module 5: Thickening, Filtration, and Dewatering

- Thickener performance simulation
- Filtration system optimization
- Tailings management strategies
- Water recovery and recycling technologies
- Sustainable dewatering practices
- **Case Study:** Tailings water recovery optimization in a base metals processing facility.

Module 6: Process Control and Automation

- Introduction to process automation systems
- PLC and SCADA integration concepts
- Real-time monitoring and control systems
- Digital twin implementation in mineral plants
- Alarm management and operational stability
- **Case Study:** Implementation of automated process control in a coal beneficiation plant.

Module 7: Data Analytics and Predictive Maintenance

- Industrial data analysis techniques
- Predictive maintenance strategies
- Machine learning applications in mineral processing
- Sensor technologies and IoT integration
- Performance forecasting and reporting
- **Case Study:** Predictive maintenance implementation for flotation cell reliability improvement.

Module 8: Sustainable and Smart Mineral Processing

- ESG and sustainability frameworks
- Energy-efficient processing technologies
- Carbon footprint reduction strategies
- Waste minimization and resource recovery
- Smart mining and Industry 4.0 innovations
- **Case Study:** Digital transformation and sustainability optimization in a modern mineral processing plant.

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
21 Sep 2026	25 Sep 2026	Online	$1,000
21 Sep 2026	25 Sep 2026	Physical	$1,500
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0

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

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