Magnetic Separation 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

Magnetic Separation Techniques Training Course is a specialized industrial learning program designed to equip learners with advanced knowledge of mineral processing, material beneficiation, and high-gradient magnetic separation systems used across mining, recycling, metallurgy, and chemical industries. This course focuses on modern dry and wet magnetic separation technologies, rare-earth magnetic systems, ferromagnetic recovery processes, and industrial-scale ore beneficiation optimization. Participants gain practical and theoretical expertise in separating magnetic and non-magnetic materials efficiently while improving yield, purity, and operational efficiency in processing plants.

With increasing global demand for critical minerals, sustainable resource recovery, and zero-waste processing systems, magnetic separation has become a core technology in modern industrial engineering. This training emphasizes process optimization, plant performance enhancement, mineral liberation techniques, and advanced separation physics, enabling professionals to improve recovery rates and reduce operational costs. Learners will also explore real-world industrial applications in mining tailings recovery, recycling of e-waste, iron ore beneficiation, and food-grade metal contamination removal systems, making this course highly relevant to current industry demands.

Programme Curriculum

Magnetic Separation Techniques Training Course

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Course Duration

5 days

Course Objectives

1. Understand principles of magnetic susceptibility and mineral magnetism
2. Apply high-intensity magnetic separation (HIMS) techniques
3. Analyze wet vs dry magnetic separation systems
4. Optimize ore beneficiation and mineral recovery processes
5. Operate rare-earth magnetic separators
6. Improve process efficiency in mineral processing plants
7. Identify ferromagnetic and paramagnetic materials
8. Reduce contamination using industrial metal separation systems
9. Enhance tailings recovery and waste valorization
10. Implement sustainable mining and green processing solutions
11. Conduct magnetic circuit design and field intensity analysis
12. Troubleshoot industrial separation plant inefficiencies
13. Apply AI-driven and sensor-based separation technologies

Target Audience

1. Mining engineers and metallurgical engineers
2. Mineral processing plant operators
3. Chemical and process engineers
4. Recycling and waste management professionals
5. Industrial technicians and maintenance engineers
6. Environmental sustainability consultants
7. Research scientists in materials engineering
8. Technical supervisors in beneficiation plants

Course Modules

Module 1: Fundamentals of Magnetic Separation

- Basic physics of magnetism and field strength
- Magnetic vs non-magnetic material behavior
- Types of magnetic forces in industrial systems
- Introduction to separator equipment
- Industrial safety considerations

- **Case Study:** Iron ore separation efficiency improvement in Australian mining operations

Module 2: Magnetic Separation Equipment Types

- Drum separators and roll separators
- Wet high-intensity magnetic separators (WHIMS)
- Rare-earth magnetic systems
- Overband and crossbelt separators
- Industrial configuration selection
- **Case Study:** Upgrading separator systems in a South African platinum plant

Module 3: Ore Beneficiation Techniques

- Liberation of minerals through crushing/grinding
- Grade improvement strategies
- Recovery rate optimization
- Feed material characterization
- Process flow design
- **Case Study:** Hematite beneficiation optimization in Brazilian iron mines

Module 4: Wet Magnetic Separation Processes

- Slurry-based separation systems
- Particle size distribution effects
- Fluid dynamics in separation tanks
- Magnetic field interaction in wet systems
- Maintenance and scaling challenges
- **Case Study:** Nickel recovery enhancement in Canadian processing facility

Module 5: Dry Magnetic Separation Systems

- Air-based separation principles
- Low moisture mineral processing
- Energy efficiency improvements
- Dust control systems
- Industrial throughput optimization
- **Case Study:** Coal beneficiation plant improvement in India

Module 6: Industrial Recycling Applications

- E-waste metal recovery systems
- Scrap metal sorting technologies
- Automotive recycling applications
- Urban mining techniques
- Contaminant removal processes
- **Case Study:** Copper recovery from electronic waste in European recycling plant

Module 7: Process Optimization & Automation

- Sensor-based sorting systems
- AI-driven separation control
- Real-time monitoring systems

- Data analytics in plant optimization
- Predictive maintenance strategies
- **Case Study:** Smart beneficiation plant implementation in China

Module 8: Environmental & Sustainable Applications

- Tailings reprocessing techniques
- Waste reduction strategies
- Carbon footprint reduction
- Circular economy integration
- Regulatory compliance systems
- **Case Study:** Sustainable tailings recovery project in Chile copper mining

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- 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
07 Sep 2026	11 Sep 2026	Online	$1,000
07 Sep 2026	11 Sep 2026	Physical	$1,500
14 Sep 2026	18 Sep 2026	Online	$1,000
14 Sep 2026	18 Sep 2026	Physical	$1,500
21 Sep 2026	25 Sep 2026	Online	$1,000
21 Sep 2026	25 Sep 2026	Physical	$1,500
28 Sep 2026	02 Oct 2026	Online	$1,000
28 Sep 2026	02 Oct 2026	Physical	$1,500

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

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