Rare Earth Processing 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

Rare Earth Processing Training Course is designed to build advanced competencies in the extraction, separation, refining, and application of rare earth elements (REEs) the backbone of modern green energy transition, electric vehicles (EVs), wind turbines, semiconductors, and defense technologies. As global demand for critical minerals, permanent magnets (NdFeB), and strategic battery materials accelerates, this training equips learners with deep technical expertise in mineral beneficiation, hydrometallurgy, solvent extraction, and sustainable processing technologies.

This course integrates scientific principles with real-world industrial applications, focusing on eco-efficient rare earth recovery, circular economy practices, ESG-compliant mining, and advanced material purification systems. Participants gain practical insights into global supply chains, processing innovations, and geopolitical dynamics shaping the critical minerals economy, enabling them to contribute effectively to high-value sectors such as renewable energy, aerospace, defense manufacturing, and advanced electronics.

Programme Curriculum

Rare Earth Processing Training Course

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5 days

Course Objectives

1. Understand global critical minerals supply chain dynamics and REE market trends
2. Master rare earth ore beneficiation and mineral processing techniques
3. Apply principles of hydrometallurgy and pyrometallurgy in REE extraction
4. Optimize solvent extraction and ion exchange separation technologies
5. Analyze composition of light and heavy rare earth elements
6. Develop expertise in NdFeB permanent magnet production value chain
7. Implement green mining and sustainable processing technologies
8. Evaluate EV battery materials and rare earth integration systems
9. Enhance skills in process flow sheet design and plant optimization
10. Apply circular economy principles in rare earth recycling
11. Understand radioactive by-product management
12. Strengthen knowledge of ESG compliance in mining and mineral processing
13. Gain exposure to AI-driven mineral processing and smart plant automation

Target Audience

1. Mining engineers and metallurgical engineers
2. Chemical and process engineers
3. Geologists and mineral exploration professionals
4. Materials science researchers and academics
5. Government policymakers in energy and mining sectors
6. Renewable energy and EV industry professionals
7. Environmental and sustainability consultants
8. Industrial chemists and laboratory technicians

Course Modules

Module 1: Introduction to Rare Earth Elements & Global Supply Chain

- Classification of REEs
- Global distribution of rare earth deposits
- Strategic importance in EV and defense sectors
- Supply chain risks and geopolitical dependencies
- Market trends in **critical minerals economy**
- **Case Study:** China’s dominance in rare earth supply chain and diversification strategies in Australia and USA

Module 2: Rare Earth Geology and Ore Characterization

- Mineralogy of bastnäsite, monazite, xenotime
- Geological exploration techniques
- Geochemical sampling and analysis

- Ore reserve estimation methods
- Deposit modeling using GIS tools
- **Case Study:** Mount Weld rare earth deposit (Australia) geological evaluation

Module 3: Comminution and Physical Beneficiation

- Crushing and grinding technologies
- Gravity and magnetic separation methods
- Froth flotation for REE concentration
- Particle size optimization
- Energy efficiency in mineral processing
- **Case Study:** Bayan Obo beneficiation plant optimization (China)

Module 4: Hydrometallurgy & Leaching Processes

- Acid and alkaline leaching systems
- Pressure leaching techniques
- Kinetics of REE dissolution
- Impurity removal mechanisms
- Process safety and chemical handling
- **Case Study:** Acid leaching of monazite sands in India

Module 5: Solvent Extraction & Separation Technology

- Solvent extraction chemistry fundamentals
- Mixer-settler operations
- Selective separation of Nd, Pr, Dy, Tb
- Ion exchange systems
- Process optimization and scaling
- **Case Study:** Lynas Advanced Materials Plant (Malaysia) separation process

Module 6: Refining, Metallization & Magnet Production

- Rare earth oxide (REO) purification
- Metallothermic reduction processes
- Alloy production techniques
- NdFeB permanent magnet manufacturing
- Applications in EV motors and wind turbines
- **Case Study:** Tesla EV motor rare earth magnet supply integration

Module 7: Recycling & Circular Economy in Rare Earths

- E-waste and magnet recycling systems
- Urban mining techniques
- Hydrometallurgical recycling processes
- Lifecycle assessment (LCA) of REEs
- Waste minimization strategies
- **Case Study:** EU Rare Earth magnet recycling initiatives

Module 8: Sustainability, ESG & Advanced Processing Technologies

- Environmental impact of REE mining

- Radioactive waste management
- ESG compliance frameworks
- AI and automation in mineral plants
- Future innovations in green extraction
- **Case Study:** Sustainable rare earth processing model in Sweden

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

Start Date	End Date	Location	Price
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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