Coal Preparation 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

The global coal processing sector is experiencing a monumental paradigm shift driven by stringent ESG compliance frameworks, intense geopolitical supply chain volatility, and the urgent necessity for precision beneficiation to fuel metallurgical steel manufacturing and high-efficiency power generation. Coal Preparation Techniques Training Course offers an immersive, technically rigorous curriculum engineered to bridge the critical skill gaps within modern coal preparation plants. By combining foundational physical separation physics with modern processing innovations, this program provides industry personnel with the capability to transform unpredictable raw ROM feeds into highly consistent, premium-grade clean coal products while aggressively minimizing carbon and tailing footprints.

Throughout this extensive program, participants will engage with the deep technical mechanics governing gravity concentration, advanced surface chemistry froth flotation, high-capacity dewatering circuits, and state-of-the-art dry coal sensor-based sorting technologies Attendees will master the interpretation of complex float-sink washability data, execute rigorous material balancing, and design optimized circuits capable of maximizing combustible matter recovery while maintaining precise quality parameters under fluctuating feed environments. Ultimately, this course serves as an operational blueprint to unlock peak thermodynamic and economic efficiencies, ensuring processing plants achieve maximum yield, seamless import substitution, and complete compliance with modern environmental mandates.

Programme Curriculum

Coal Preparation Techniques Training Course

Introduction

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Course Duration

5 days

Course Objectives

By the conclusion of this training program, participants will successfully achieve the following 13 core operational and strategic objectives:

1. Master Washability and Float-Sink Data Interpretation
2. Optimize Gravity Concentration Circuit Efficiencies
3. Deploy AI-Driven Froth Flotation Models
4. Implement Advanced Dry Sensor-Based Sorting
5. Maximize Ultrafine Liberation and Commenution Kinetics
6. Accelerate Metallurgical Import Substitution
7. Architect Real-Time Digital Twins for CPPs
8. Drive Closed-Loop Circuit Automation.
9. Achieve Water Recycling Closure Rates
10. Execute Predictive Asset Maintenance Strategies
11. Formulate Tailings Valorization and Reprocessing Schemes
12. Enforce Comprehensive ESG Tracking and Decarbonization
13. Minimize Tailings Loss and Sub-0.5mm Carbon Audits

Targeted Audience

- Coal Preparation Plant (CPP) Managers & Superintendents
- Process, Metallurgical, and Chemical Engineers.
- Operations Supervisors & Senior Plant Operators.
- Asset Integrity & Reliability Maintenance Engineers
- Digital Transformation Specialists & Automation Engineers
- Environmental Data Specialists & ESG Compliance Managers
- Mining Operations Directors & Resource Planners
- Strategic Procurement Officers & Coking Coal Buyers

Course Modules

Module 1: Coal Characterization, Washability Analytics, and Feed Blending Architecture

- Physical and Petrographic Characterization.
- Float-Sink Analysis Mechanics.
- Mathematical Modeling of Washability Curves.
- Near-Density Material (NDM) Matrix Evaluation.
- Smart Raw Coal Blending Systems.
- *Case Study:* Navigating High-NDM Resource Exploitation

Module 2: Commenution, Sizing Kinetics, and Selective Liberation Physics

- Run-of-Mine (ROM) Commenution Mechanics
- Liberation Optimization Algorithms
- High-Capacity Screening Dynamics
- Mitigation of Overgrinding and Slurry Management
- Modern Polyurethane and Wedge-Wire Media Selection
- *Case Study:* Mitigating the Fine-Generation Crisis in a Tier-1 Coking Washery

Module 3: Coarse and Intermediate Gravity Concentration Systems

- Heavy Medium Cyclone (HMC) Operational Physics
- Magnetite Circuit Management and Ephemeral Rheology.
- Jig Pulsing and Stratification Dynamics.
- Reflux Classifier (RC) Mechanics.
- Ecart Probability (Ep?) Efficiency Auditing
- *Case Study:* Stabilizing Dense Medium Density Outliers via Automated Magnetite Regulating Loops

Module 4: Fine Coal Surface Chemistry and Froth Flotation Optimization

- Surface Thermodynamic Phenomena and Hydrophobicity
- Advanced Reagent Chemistry Formulations
- Mechanical vs. Column Flotation Hydrodynamics.
- AI-Driven Multi-Variable Flotation Control
- Desulfurization via Reverse Froth Flotation
- *Case Study:* Deploying Machine Learning Models to Steady an Unstable Coking Flotation Circuit

Module 5: Dry Coal Processing and Sensor-Based Sorting Innovations

- X-Ray Transmission (XRT) Sorting Physics
- Electrostatic Separation Fundamentals for Arid Regions
- Air Table Gravity Stratification Mechanics
- Pre-Beneficiation Coarse Rock Scalping
- Operational Constraints and Limit Thresholds
- *Case Study:* Waterless Rock Scalping via XRT Deployment in an Arid Basin

Module 6: Solid-Liquid Separation, Dewatering Circuits, and Water Reclamation

- High-Rate and Paste Thickener Optimization
- Centrifugal Dewatering Kinematics
- High-Pressure Slurry Filtration Operations
- Flocculant Molecular Architecture Dynamics
- Establishing Closed-Loop Zero Liquid Discharge (ZLD)

- *Case Study:* Eliminating Slurry Tailings Storage Disasters via Total Filter Press Integration

Module 7: Plant Digitalization, AI Automation, and Predictive Maintenance

- Industrial IoT (IIoT) Sensor Networks and Data Fusion
- Plant-Wide 3D Digital Twin Implementations
- Predictive Maintenance vs. Reactive Breakdowns
- Advanced SCADA and PLC Loop Tuning.
- Machine Vision Froth Analysis Deployment.
- *Case Study:* Transitioning a Legacy CPP to Autonomous Operation via Digital Twin Architectures

Module 8: Tailings Valorization, ESG Compliance, and Decarbonization Frameworks

- Reprocessing Historical Coal Tailings Assets
- Continuous Particulate and Gaseous Emission Auditing
- Acid Mine Drainage (AMD) Prevention Topologies
- Eco-Friendly Reagent Alternatives
- Life-Cycle Assessment (LCA) Alignment
- *Case Study:* Transforming an Environmental Liability into an Economic Win through Tailings Reclamation

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