Predictive Maintenance in Mining 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 mining industry is rapidly transforming through Industry 4.0, AI-driven analytics, IoT-enabled monitoring, and smart asset management systems. Predictive Maintenance (PdM) has become a critical strategy for reducing downtime, improving equipment reliability, and optimizing operational efficiency in modern mining operations. By leveraging machine learning, sensor fusion, condition monitoring, and real-time data analytics, mining companies can shift from reactive maintenance to proactive and predictive decision-making.

Predictive Maintenance in Mining Training Course is designed to equip professionals with advanced skills in predictive maintenance systems, mining equipment diagnostics, vibration analysis, failure prediction models, and digital twin technology. Participants will gain practical knowledge of implementing data-driven maintenance strategies, AI-based fault detection, and asset performance optimization frameworks to improve safety, productivity, and cost efficiency in mining environments.

Programme Curriculum

Predictive Maintenance in Mining Training Course

Introduction

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Course Duration

5 days

Course Objectives

1. Understand Predictive Maintenance (PdM) frameworks in mining operations
2. Apply IoT-based condition monitoring systems
3. Analyze equipment failure modes and root cause analysis (RCA)
4. Develop machine learning models for failure prediction
5. Implement vibration analysis and thermography techniques
6. Use real-time sensor data for asset health monitoring
7. Integrate SCADA systems with predictive analytics
8. Improve equipment uptime and operational efficiency
9. Reduce maintenance costs through predictive strategies
10. Apply digital twin technology in mining equipment
11. Enhance safety through early fault detection systems
12. Optimize asset lifecycle management in mining fleets
13. Build data-driven maintenance decision-making capability

Target Audience

1. Mining Engineers
2. Maintenance Managers
3. Reliability Engineers
4. Plant Supervisors
5. Data Analysts in Mining
6. Mechanical & Electrical Engineers
7. Operations Managers
8. Technical Consultants in Mining & Heavy Industry

Course Modules

Module 1: Introduction to Predictive Maintenance in Mining

- Evolution from reactive to predictive maintenance
- PdM vs preventive vs condition-based maintenance
- Mining equipment lifecycle overview
- Role of AI and IoT in modern mining
- Case Study: Transition of a coal mine from reactive to predictive maintenance reducing downtime by 35%

Module 2: Mining Equipment Failure Analysis

- Common failure modes in crushers, conveyors, and haul trucks
- Root Cause Analysis (RCA) techniques
- Failure Mode and Effects Analysis (FMEA)
- Critical asset identification
- Case Study: Conveyor belt failure reduction through RCA implementation

Module 3: IoT and Sensor Technologies in Mining

- Industrial IoT architecture in mining
- Sensor types-vibration, temperature, pressure, acoustic
- Edge computing applications
- Data acquisition systems
- Case Study: Real-time truck engine monitoring using IoT sensors

Module 4: Condition Monitoring Techniques

- Vibration analysis fundamentals
- Infrared thermography applications
- Oil and wear debris analysis
- Ultrasonic testing methods
- Case Study: Early bearing failure detection in a SAG mill

Module 5: Machine Learning for Predictive Maintenance

- Supervised and unsupervised learning models
- Predictive failure classification
- Time-series analysis of equipment data
- Model training and validation
- Case Study: ML-based prediction of haul truck breakdowns

Module 6: Digital Twin Technology in Mining

- Concept of digital twins for mining assets
- Simulation of equipment performance
- Real-time data synchronization
- Scenario testing and optimization
- Case Study: Digital twin of an underground drilling system improving efficiency by 22%

Module 7: SCADA and Real-Time Monitoring Systems

- SCADA architecture in mining operations
- Data visualization dashboards
- Alarm and alert systems
- Integration with predictive analytics tools
- Case Study: SCADA-driven reduction of unplanned shutdowns in processing plant

Module 8: Predictive Maintenance Strategy Implementation

- Building PdM roadmap for mining operations
- KPI definition for maintenance performance
- Cost-benefit analysis of PdM systems
- Change management in maintenance culture
- Case Study: Full PdM implementation in a gold mining operation improving uptime by 40%

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

Start Date	End Date	Location	Price
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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