Equipment Reliability Engineering 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

Equipment Reliability Engineering is a critical discipline that focuses on maximizing asset uptime, reducing unplanned failures, and optimizing lifecycle performance through predictive maintenance (PdM), reliability-centered maintenance (RCM), and Asset Performance Management (APM) strategies. In today's Industry 4.0 environment, organizations are increasingly leveraging AI-driven maintenance, IoT-enabled condition monitoring, digital twins, and advanced analytics to transform traditional maintenance into a proactive, data-driven reliability culture. Equipment Reliability Engineering Training Course equips professionals with modern tools and methodologies to improve operational efficiency, reduce total cost of ownership (TCO), and enhance overall plant reliability.

This comprehensive program integrates practical engineering principles with real-world industrial applications, focusing on failure analysis, root cause elimination, asset optimization, vibration diagnostics, lubrication excellence, and maintenance strategy optimization. Participants will gain hands-on exposure to global best practices used in high-performing industries such as oil & gas, manufacturing, mining, power generation, and process industries. The course is designed to build strong competency in reliability engineering frameworks that directly support zero breakdown operations, world-class maintenance systems, and continuous improvement (CI) excellence.

Programme Curriculum

Equipment Reliability Engineering Training Course

Introduction

Equipment Reliability Engineering is a critical discipline that focuses on maximizing asset uptime, reducing unplanned failures, and optimizing lifecycle performance through predictive maintenance (PdM), reliability-centered maintenance (RCM), and Asset Performance Management (APM) strategies. In today's Industry 4.0 environment, organizations are increasingly leveraging AI-driven maintenance, IoT-enabled condition

monitoring, digital twins, and advanced analytics to transform traditional maintenance into a proactive, data-driven reliability culture. Equipment Reliability Engineering Training Course equips professionals with modern tools and methodologies to improve operational efficiency, reduce total cost of ownership (TCO), and enhance overall plant reliability.

This comprehensive program integrates practical engineering principles with real-world industrial applications, focusing on failure analysis, root cause elimination, asset optimization, vibration diagnostics, lubrication excellence, and maintenance strategy optimization. Participants will gain hands-on exposure to global best practices used in high-performing industries such as oil & gas, manufacturing, mining, power generation, and process industries. The course is designed to build strong competency in reliability engineering frameworks that directly support zero breakdown operations, world-class maintenance systems, and continuous improvement (CI) excellence.

Course Duration

5 days

Course Objectives

1. Master Reliability-Centered Maintenance (RCM 2.0) frameworks for asset optimization
2. Apply Predictive Maintenance (PdM) strategies using real-time condition data
3. Implement Industry 4.0 smart maintenance systems and digital transformation tools
4. Conduct advanced Root Cause Analysis (RCA) for chronic failure elimination
5. Develop Asset Performance Management (APM) strategies for critical equipment
6. Utilize condition monitoring techniques including vibration, thermography, and oil analysis
7. Improve Mean Time Between Failures (MTBF) and reduce downtime costs
8. Build competency in failure mode and effects analysis (FMEA)
9. Optimize maintenance planning using data-driven decision-making models
10. Enhance equipment lifecycle management (ELM) and cost control
11. Implement Total Productive Maintenance (TPM) best practices
12. Integrate AI and machine learning in predictive maintenance systems
13. Drive operational excellence and reliability maturity transformation

Target Audience

1. Maintenance Engineers and Supervisors
2. Reliability Engineers and Analysts
3. Plant/Operations Managers
4. Mechanical, Electrical, and Industrial Engineers
5. Condition Monitoring Specialists
6. Asset Integrity Engineers
7. Production and Process Engineers
8. Technical Managers in Manufacturing, Oil & Gas, Mining, and Power Plants

Course Modules

Module 1: Fundamentals of Equipment Reliability Engineering

- Core concepts of reliability, availability, maintainability (RAM)
- Understanding failure patterns and bathtub curve analysis
- Introduction to **MTBF, MTTR, and OEE metrics**

- Reliability-centered thinking in modern plants
- Case Study: FMCG plant improved OEE from 68% to 82% using reliability mapping

Module 2: Reliability-Centered Maintenance (RCM)

- RCM decision logic and criticality analysis
- Functional failure and failure mode identification
- Maintenance task optimization strategies
- Risk-based maintenance prioritization
- Case Study: Power plant reduced maintenance cost by 22% using RCM framework

Module 3: Predictive Maintenance & Condition Monitoring

- Vibration analysis fundamentals and fault detection
- Infrared thermography for thermal anomaly detection
- Oil analysis and wear particle diagnostics
- Sensor-based IoT condition monitoring systems
- Case Study: Mining company reduced gearbox failures by 40% using PdM sensors

Module 4: Root Cause Analysis (RCA) & Failure Investigation

- Structured RCA methodologies
- Data collection and failure evidence analysis
- Chronic failure elimination techniques
- Corrective and preventive action systems
- Case Study: Petrochemical plant eliminated recurring pump failures using RCA

Module 5: Asset Performance Management

- APM architecture and digital reliability systems
- Asset health indexing and risk scoring
- Reliability dashboards and KPI visualization
- Integration with CMMS/EAM systems
- Case Study: Manufacturing plant improved asset uptime by 18% using APM software

Module 6: Lubrication Excellence & Tribology

- Lubrication fundamentals and oil selection standards
- Contamination control and filtration strategies
- Wear mechanisms and surface degradation analysis
- Lubrication route optimization programs
- Case Study: Cement plant extended bearing life by 35% via lubrication program redesign

Module 7: Failure Modes, Effects & Criticality Analysis (FMECA)

- Structured FMEA and FMECA methodology
- Risk Priority Number (RPN) evaluation
- Critical asset identification techniques
- Maintenance strategy alignment with risk
- Case Study: Automotive plant reduced critical downtime by 28% using FMECA

Module 8: Digital Reliability & Industry 4.0 Integration

- AI and machine learning in predictive analytics
- Digital twins for equipment simulation
- IIoT architecture for smart factories
- Real-time dashboards and predictive alerts
- Case Study: Smart factory achieved 30% reduction in unplanned downtime using AI monitoring

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:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com