Advanced Equipment Diagnostics in Manufacturing Training Course

Professional Development Training Course Outline

Category	Manufacturing	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Advanced Equipment Diagnostics in Manufacturing is a cutting-edge training program designed to equip engineers, technicians, and maintenance professionals with the skills to identify, analyze, and resolve complex machinery faults using predictive maintenance, AI-driven diagnostics, IoT-enabled monitoring, and real-time condition monitoring systems. In today's Industry 4.0 ecosystem, manufacturers are increasingly dependent on smart factories, automated production lines, and data-driven maintenance strategies to ensure operational excellence, minimize downtime, and maximize asset performance.

Advanced Equipment Diagnostics in Manufacturing Training Course provides an in-depth understanding of modern diagnostic technologies such as vibration analysis, thermal imaging, SCADA systems, machine learning-based fault detection, and digital twins. Participants will gain hands-on expertise in troubleshooting critical manufacturing equipment, improving Overall Equipment Effectiveness (OEE), reducing unplanned breakdowns, and implementing proactive maintenance frameworks that align with global smart manufacturing standards

Programme Curriculum

Advanced Equipment Diagnostics in Manufacturing Training Course

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Course Objectives

1. Master predictive maintenance strategies for industrial machinery
2. Understand vibration analysis and condition monitoring techniques
3. Apply AI-powered fault detection systems in manufacturing
4. Enhance equipment reliability and lifecycle management
5. Implement IoT-based industrial monitoring solutions
6. Reduce downtime using root cause failure analysis (RCFA)
7. Improve Overall Equipment Effectiveness (OEE)
8. Develop expertise in SCADA and PLC diagnostics
9. Utilize thermal imaging for equipment inspection
10. Apply machine learning for predictive analytics
11. Strengthen skills in hydraulic and pneumatic system diagnostics
12. Optimize maintenance planning using digital twin technology
13. Build capability in smart factory troubleshooting and automation systems

Target Audience

- Maintenance Engineers
- Mechanical Engineers
- Electrical Engineers
- Manufacturing Technicians
- Industrial Automation Specialists
- Reliability Engineers
- Plant Supervisors & Managers
- Industry 4.0 Transformation Teams

Course Modules

Module 1: Fundamentals of Equipment Diagnostics

- Basics of industrial diagnostics systems
- Types of equipment failures
- Maintenance evolution: reactive to predictive
- Introduction to Industry 4.0 diagnostics
- Diagnostic workflow frameworks
- **Case Study:** Factory downtime reduction through basic fault identification system

Module 2: Predictive Maintenance Systems

- Predictive vs preventive maintenance

- Sensor-based monitoring systems
- Data-driven maintenance planning
- AI integration in predictive maintenance
- Failure forecasting models
- **Case Study:** Predictive maintenance in automotive assembly plant

Module 3: Vibration Analysis Techniques

- Vibration measurement principles
- Fault detection using frequency patterns
- Bearing and motor fault identification
- Signal processing techniques
- Vibration diagnostic tools
- **Case Study:** Rotating machinery failure prevention in steel plant

Module 4: Thermal Imaging & Infrared Diagnostics

- Infrared thermography fundamentals
- Overheating detection methods
- Electrical fault identification
- Heat signature analysis
- Industrial thermal cameras usage
- **Case Study:** Electrical panel failure prevention in FMCG factory

Module 5: SCADA-Based Diagnostics

- SCADA architecture overview
- Real-time data acquisition
- Alarm and event analysis
- Remote monitoring systems
- Fault detection dashboards
- **Case Study:** SCADA optimization in chemical processing plant

Module 6: PLC System Troubleshooting

- PLC programming basics
- Input/output diagnostics
- Logic error detection
- Signal flow analysis
- PLC fault recovery techniques
- **Case Study:** Conveyor system failure resolution in packaging plant

Module 7: IoT in Equipment Monitoring

- Industrial IoT architecture
- Smart sensors integration
- Cloud-based monitoring systems
- Edge computing in diagnostics
- Real-time alerts and analytics
- **Case Study:** IoT deployment in smart manufacturing unit

Module 8: Machine Learning for Fault Detection

- ML algorithms for diagnostics
- Pattern recognition systems
- Predictive fault classification
- Data training models
- AI anomaly detection
- **Case Study:** AI-based defect detection in electronics manufacturing

Module 9: Hydraulic System Diagnostics

- Hydraulic system components
- Pressure and flow analysis
- Leakage detection methods
- Valve and actuator troubleshooting
- System efficiency optimization
- **Case Study:** Hydraulic press failure reduction in heavy industry

Module 10: Pneumatic System Troubleshooting

- Pneumatic circuit fundamentals
- Air compressor diagnostics
- Valve malfunction detection
- Pressure regulation issues
- System optimization techniques
- **Case Study:** Pneumatic assembly line optimization in auto plant

Module 11: Root Cause Failure Analysis (RCFA)

- Failure analysis methodology
- Data collection techniques
- Fishbone and 5-Why analysis
- Fault pattern identification
- Corrective action planning
- **Case Study:** Chronic machine failure elimination in textile industry

Module 12: Digital Twin Technology

- Digital twin concepts
- Virtual equipment simulation
- Real-time system replication
- Predictive modeling techniques
- Performance optimization
- **Case Study:** Digital twin implementation in aerospace manufacturing

Module 13: Reliability Engineering in Manufacturing

- Equipment reliability metrics
- Failure rate analysis
- MTBF and MTTR optimization
- Reliability-centered maintenance (RCM)
- Asset performance strategies
- **Case Study:** Reliability improvement in semiconductor plant

Module 14: Smart Factory Diagnostics

- Smart manufacturing ecosystems
- Automated fault detection systems
- Cyber-physical systems integration
- Data-driven decision systems
- Industry 4.0 connectivity
- **Case Study:** Smart factory transformation in electronics industry

Module 15: Advanced Troubleshooting & Optimization

- Complex system diagnostics
- Multi-layer fault analysis
- Performance optimization techniques
- Energy efficiency improvement
- Continuous improvement strategies
- **Case Study:** End-to-end optimization in high-speed production line

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
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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

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