



Predictive Maintenance and Asset Performance Management Training



AGILE LEADERS
Training Center



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Course Overview:

The Predictive Maintenance and Asset Performance Management Training is a practical four-day program designed to help participants improve equipment reliability, reduce unplanned downtime, optimize maintenance resources, and maximize asset value throughout the operational lifecycle.

The course begins by examining the evolution from reactive and preventive maintenance to predictive and prescriptive maintenance. Participants will explore Asset Performance Management principles, asset lifecycle management, criticality assessment, and the business value of predictive maintenance.

The program covers Industrial IoT architecture, smart sensors, condition-monitoring technologies, maintenance data management, artificial intelligence, machine learning, anomaly detection, and remaining useful life estimation. It also examines digital twins, cloud and edge computing, Computerized Maintenance Management Systems, and the integration of IoT, CMMS, and APM platforms.

Reliability engineering topics include Root Cause Analysis, Failure Mode and Effects Analysis, risk-based maintenance, scheduling, resource allocation, and cost-benefit analysis. Participants will also develop maintenance KPIs, address industrial cybersecurity and IT/OT convergence, and integrate sustainability into asset management.

The course concludes with an enterprise implementation strategy and an integrated predictive maintenance and APM capstone roadmap.

Target Audience:

- Maintenance Managers and Supervisors
- Asset Management Professionals
- Reliability Engineers
- Maintenance Engineers
- Operations Engineers
- Plant and Facility Managers
- Condition-Monitoring Specialists
- Mechanical and Electrical Engineers
- Industrial Automation Engineers
- Digital Transformation Managers
- Industrial IoT Specialists



Targeted Organizational Departments:

- Maintenance and Reliability
- Asset Management
- Engineering and Technical Services
- Plant and Production Operations
- Condition Monitoring and Inspection
- Industrial Automation
- Digital Transformation
- Information Technology
- Operational Technology
- Data Analytics and Artificial Intelligence

Targeted Industries:

- Manufacturing and Industrial Production
- Mining and Heavy Industry
- Energy and Utilities
- Oil and Gas
- Pharmaceuticals
- Logistics and Transportation
- Process Industries
- Asset-Intensive Organizations

Course Offerings:

By the end of this course, participants will be able to:

- Differentiate reactive, preventive, predictive, and prescriptive maintenance.
- Explain Asset Performance Management principles and objectives.
- Conduct asset lifecycle and criticality assessments.
- Evaluate the benefits and ROI of predictive maintenance.
- Identify suitable Industrial IoT and sensor architectures.
- Select appropriate condition-monitoring technologies.
- Prepare maintenance data for advanced analytics.
- Explain how AI and machine learning support failure prediction.
- Apply anomaly detection and remaining useful life concepts.
- Evaluate digital twin, cloud, edge, CMMS, and APM integration.
- Apply Root Cause Analysis and Failure Mode and Effects Analysis.

Training Methodology:

This course uses a practical, application-focused methodology designed for professionals responsible for maintenance, reliability, operations, engineering, and asset performance. The program combines instructor-led explanations, industrial examples, group discussions, case studies, analytical activities, and implementation-planning exercises.

Participants will examine the full predictive maintenance process, beginning with maintenance strategy and asset criticality, then progressing through sensors, condition monitoring, data analytics, artificial intelligence, digital twins, CMMS integration, reliability analysis, and performance measurement.

Practical activities include selecting condition-monitoring techniques, assessing maintenance data requirements, applying RCA and FMEA principles, developing maintenance KPIs, evaluating investment value, and identifying implementation risks. The final capstone integrates the course concepts into a predictive maintenance and Asset Performance Management roadmap.

Course Toolbox:

- Four-day instructor-led training program
- Maintenance strategy selection activities
- Asset criticality assessment exercises
- Condition-monitoring technology selection activities
- Industrial IoT and sensor integration examples
- Maintenance data and AI analytics demonstrations
- Root Cause Analysis and FMEA activities
- Risk-based maintenance planning exercises
- CMMS, digital twin, and APM integration case studies
- Maintenance KPI dashboard development activities

Course Agenda:

Day 1: Predictive Maintenance, APM, and Condition Monitoring

- **Topic 1:** Reactive, Preventive, Predictive, and Prescriptive Maintenance
- **Topic 2:** Asset Performance Management Principles and Objectives
- **Topic 3:** Asset Lifecycle Management and Criticality Assessment
- **Topic 4:** Predictive Maintenance Business Value, ROI, and Digital Transformation Trends
- **Topic 5:** Industrial IoT Architecture, Smart Sensors, Connectivity, Data Acquisition, and Legacy Integration
- **Topic 6:** Wired and Wireless Monitoring, Vibration, Thermography, Ultrasonics, Lubricant Analysis, and Acoustic Emission
- **Reflection & Review:** Review maintenance strategies, APM principles, and condition-monitoring technologies.

Day 2: Maintenance Data, AI, Digital Twins, and CMMS Integration

- **Topic 1:** Maintenance Data Sources, Preprocessing, and Quality Management
- **Topic 2:** Descriptive, Diagnostic, Predictive, and Prescriptive Analytics
- **Topic 3:** Machine Learning Algorithms for Equipment Failure Prediction
- **Topic 4:** AI-Driven Anomaly Detection, RUL Estimation, and Python Applications
- **Topic 5:** Digital Twin Concepts and Digital Replicas of Critical Assets
- **Topic 6:** Cloud and Edge Computing, CMMS and APM Integration, Data Governance, Interoperability, and Scalability
- **Reflection & Review:** Review maintenance analytics and integrated digital maintenance architecture.



Day 3: Reliability Engineering, Risk-Based Maintenance, and Performance

- **Topic 1:** Root Cause Analysis Methodologies
- **Topic 2:** Failure Mode and Effects Analysis
- **Topic 3:** Failure Data Collection and Reliability Analysis
- **Topic 4:** Risk-Based Maintenance Planning and Asset Prioritization
- **Topic 5:** Maintenance Scheduling, Resource Optimization, and Cost-Benefit Analysis
- **Topic 6:** Asset Performance KPIs: MTBF, MTTR, OEE, Availability, Dashboards, and Reporting
- **Reflection & Review:** Review failure analysis, maintenance priorities, and asset performance measurement.

Day 4: Sustainable Implementation and Integrated APM Capstone

- **Topic 1:** Connected Asset Cybersecurity, IT/OT Convergence, and Industrial Best Practices
- **Topic 2:** Sustainable Maintenance, Energy Efficiency, Circular Economy, and Environmental Impact
- **Topic 3:** Predictive Maintenance Roadmaps, Project Planning, Stakeholder Engagement, and Agile Implementation
- **Topic 4:** Budgeting, Investment Justification, ROI Evaluation, Change Management, and Workforce Readiness
- **Topic 5:** Enterprise Scaling and End-to-End Integration of IoT, AI, Digital Twins, Cloud, CMMS, and APM
- **Topic 6:** Industry Applications, Implementation Challenges, Future Trends, Autonomous Maintenance, and Capstone Roadmap
- **Reflection & Review:** Review key lessons and finalize the predictive maintenance and APM implementation roadmap.

FAQ:

What specific qualifications or prerequisites are needed before enrolling in the course?

Participants should have a basic understanding of industrial maintenance, equipment operation, engineering, asset management, reliability, automation, or industrial technology. Previous experience in maintenance, operations, engineering, condition monitoring, CMMS, Industrial IoT, or data analytics is beneficial but not mandatory.

The course is suitable for professionals who want to understand how maintenance data, condition monitoring, reliability engineering, and digital technologies can improve asset performance.



How long is each day's session, and what is the total course duration?

Each training day is generally structured to last approximately five to six hours, including breaks, discussions, case studies, demonstrations, and practical activities. The complete program spans four days, providing approximately 20–24 hours of instruction.

How This Course is Different from Other Predictive Maintenance Courses:

This course provides an integrated approach that connects predictive maintenance technologies with Asset Performance Management, reliability engineering, financial value, cybersecurity, sustainability, and implementation planning.

Rather than focusing exclusively on sensors or condition monitoring, the program covers the complete predictive maintenance environment: asset criticality, Industrial IoT, maintenance data, AI, machine learning, digital twins, cloud and edge computing, CMMS integration, RCA, FMEA, KPIs, cybersecurity, and enterprise scalability.

The final capstone helps participants translate these technical concepts into a structured implementation roadmap aligned with operational priorities, available resources, stakeholder expectations, investment requirements, and workforce readiness.



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IT Security Training & IT Training Courses

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Secretarial and Administration Training Courses



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