MAWA EVENTS

Address: No. 857, Block A2. Leisure Commerce Square - No 9., 46150 Petaling Jaya, Selangor, Malaysia

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GAS TURBINES - OPERATION, INSPECTION, MAINTENANCE & TROUBLESHOOTING

"Maximizing Efficiency, Reliability, and Safety in Gas Turbine Systems through Best Practices in Operation and Maintenance"

Schedule

Date	Venue	Fees
23 – 27 Feb 2026	Kuala Lumpur, Malaysia	USD 3495 per delegate
21 – 25 Jun 2026	Doha, Qatar	USD 3495 per delegate
12 – 16 Oct 2026	Dubai, UAE	USD 3495 per delegate

► **Available delivery methods:** Face-to-Face & Online Training

Introduction

Gas turbines are critical components in power generation and industrial operations, where high efficiency, operational reliability, and safety are non-negotiable. Improper operation or inadequate maintenance can lead to costly failures, extended downtime, and safety risks. This in-depth training course is designed to provide technical professionals with a comprehensive understanding of gas turbine systems, including their components, working principles, inspection methods, maintenance planning, and troubleshooting strategies.

Through real-world case studies, hands-on exercises, and detailed engineering analysis, participants will gain the knowledge and confidence needed to ensure optimal performance and reliability of gas turbines in their facilities.

Objectives

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

- Understand the principles of gas turbine operation and thermodynamic cycles
- Identify the functions and design of key turbine components and auxiliary systems
- Plan and execute inspection and preventive maintenance activities effectively
- Analyze common operational problems and implement troubleshooting strategies
- Enhance equipment performance and reduce unplanned shutdowns through reliability practices

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Why Attend

- Gain in-depth technical expertise on gas turbine systems and subsystems
- Improve plant availability and efficiency through proper maintenance planning
- Reduce unplanned outages and failure rates with structured troubleshooting
- Learn from real-world issues and case-based diagnostics
- Apply inspection standards, root cause analysis, and performance monitoring techniques

Target Audience

This program is designed for:

- Mechanical, electrical, and maintenance engineers
- Turbine and rotating equipment technicians
- Plant supervisors and technical managers
- Reliability and inspection engineers
- Anyone involved in the operation, maintenance, or overhaul of gas turbines

Individual Benefits

Key competencies that will be developed include:

- Proficiency in gas turbine operating cycles and performance factors
- Ability to interpret performance data and operational trends
- Skills in executing inspections and identifying early failure indicators
- Understanding of OEM maintenance guidelines and best practices
- Troubleshooting logic and condition monitoring interpretation

Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Improved uptime and reduced maintenance costs
- Better compliance with OEM standards and safety protocols
- Enhanced team capacity for preventive and predictive maintenance
- Reduced turbine-related incidents and faster recovery from failures
- More efficient planning of outages, inspections, and overhaul activities

Instructional Methodology

The course follows a blended learning approach combining theory with practice:

- Strategy Briefings – Thermodynamic cycles, system design, and operational control
- Case Studies – Failure analysis and maintenance planning from the field
- Workshops – Interactive exercises in inspection, fault tracing, and troubleshooting
- Peer Exchange – Discussion of lessons learned and operational best practices
- Tools – Templates for maintenance schedules, inspection checklists, and troubleshooting logs

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Course Outline

DETAILED 5-DAY COURSE OUTLINE

Training Hours: 7:30 AM – 3:30 PM **Daily Format:** 3–4 Learning Modules | Coffee breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 – 02:00

Day 1: Fundamentals of Gas Turbine Operation

- Module 1: Overview of Gas Turbine Systems (07:30 – 09:30) • Operating principles and thermodynamic cycles (Brayton cycle) • Types of gas turbines: industrial, aero-derivative, power generation • Key operational parameters and terminology
- Module 2: Gas Turbine Components and Flow Path (09:45 – 11:15) • Compressor, combustion chamber, turbine stages • Bearings, seals, and cooling systems • Auxiliary systems and control logic
- Module 3: Startup, Operation, and Shutdown Procedures (11:30 – 01:00) • Operating modes and load control • Best practices in ramp-up and ramp-down • Operator responsibilities and system monitoring
- Module 4: Workshop – Operational Risk Scenarios (02:00 – 03:30) • Group simulation: identifying risks during startup and shutdown

Day 2: Inspection and Condition Assessment

- Module 1: Inspection Types and Standards (07:30 – 09:30) • Visual, dimensional, and non-destructive testing (NDT) • API and OEM inspection intervals and criteria • Critical inspection zones and tolerances
- Module 2: Vibration and Temperature Monitoring (09:45 – 11:15) • Vibration signatures and fault indicators • Bearing, blade, and casing temperature limits • Interpretation of real-time data and alarms
- Module 3: Diagnostic Tools and Remote Monitoring (11:30 – 01:00) • Thermography, oil analysis, borescope inspections • Use of digital twins and predictive analytics • Data acquisition systems and reporting
- Module 4: Workshop – Condition Assessment Exercise (02:00 – 03:30) • Evaluate mock inspection data and recommend actions

Day 3: Maintenance Planning and Strategies

- Module 1: Maintenance Classifications and Schedules (07:30 – 09:30) • Preventive vs. predictive vs. corrective maintenance • Scheduled maintenance per OEM guidelines • Long-term planning and parts lifecycle
- Module 2: Major Overhauls and Component Replacement (09:45 – 11:15) • Planning for hot gas path inspections and rotor overhauls • Replacement criteria for blades, seals, and liners • Turnaround execution and documentation
- Module 3: Spare Parts and Reliability-Centered Maintenance (11:30 – 01:00) • Parts planning and inventory optimization • Reliability-Centered Maintenance (RCM) principles • CMMS integration for turbine maintenance
- Module 4: Workshop – Develop a Maintenance Plan (02:00 – 03:30) • Participants prepare a 12-month turbine maintenance schedule

Day 4: Troubleshooting and Root Cause Analysis

- Module 1: Common Operating Problems and Symptoms (07:30 – 09:30) • Combustion instability, surge, fouling, foreign object damage (FOD) • Symptoms of misalignment, lubrication issues, and seal wear • Interpreting fault codes and system alarms
- Module 2: Troubleshooting Techniques and Logic (09:45 – 11:15) • Fault trees and cause-effect mapping • Cross-functional troubleshooting and escalation • Emergency response and trip scenarios
- Module 3: Root Cause Analysis and Documentation (11:30 – 01:00) • RCA tools: 5 Whys, Fishbone Diagram • Reporting structure and lessons learned process • Linking RCA to maintenance strategy updates
- Module 4: Workshop – Case-Based Troubleshooting (02:00 – 03:30) • Teams solve real gas turbine failure scenarios and present findings

Day 5: Performance Optimization and Best Practices

- Module 1: Performance Monitoring and KPIs (07:30 – 09:30) • Heat rate, efficiency, output vs. environmental conditions • Compressor fouling indicators and cleaning methods • KPI dashboards and trending
- Module 2: Reliability, Safety, and Environmental Considerations (09:45 – 11:15) • SIL, HAZOP, and other safety standards • Emissions control and regulatory compliance • Human error prevention in O&M
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Module 3: Final Review and Future Trends (11:30 – 01:00) • Digital transformation in gas turbine maintenance • Case study: turbine fleet performance improvement • Recap of key tools and planning models

- Module 4: Final Workshop – Performance Improvement Roadmap (02:00 – 03:30) • Participants create a 90-day reliability improvement plan • Group feedback and closing

Certification

Participants will receive a Certificate of Completion in Gas Turbines – Operation, Inspection, Maintenance & Troubleshooting, validating their competence in maintaining, monitoring, and optimizing gas turbine performance and reliability.

Why Choose MAWA Events

- **Global Expertise:** More than 17 years of experience in professional training and consulting.
- **Industry-Leading Faculty:** Courses delivered by seasoned professionals with hands-on experience.
- **Practical Insights:** Learn to turn theory into actionable strategies for real-world business impact.
- **Client-Focused Solutions:** Customized programs designed to achieve your organisation’s unique goals.

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