

THE HR ESSENTIAL SKILLS

“Building a High-Impact HR Foundation through Practical Tools and Core Competencies”

Schedule

Date	Venue	Fees (Face-to-Face)
16 – 20 Feb 2025	Kuwait	USD 3495 per delegate
03 – 07 Mar 2025	Dubai, UAE	USD 3495 per delegate

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

Introduction

Steam turbines remain the backbone of power generation and process industries around the world. Their efficient and reliable operation is vital to ensure uninterrupted production, energy efficiency, and plant safety. This 5-day advanced training course is designed to provide engineers and technicians with an in-depth understanding of turbine systems, from operational principles to maintenance and troubleshooting.

Special focus is placed on governing systems, vibration monitoring, condition-based maintenance, and failure prevention. This hands-on course incorporates real-world scenarios and diagnostics to equip participants with the knowledge and tools to maximize turbine performance and lifespan.

Objectives

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

- Understand the principles of steam turbine operation and governing
- Identify turbine components, systems, and flow dynamics
- Diagnose and troubleshoot performance and mechanical issues
- Implement best practices in maintenance, inspection, and alignment
- Apply vibration and temperature monitoring for predictive maintenance
- Ensure safe operation, trip systems management, and emergency response

Why Attend

- Boost operational reliability and efficiency of steam turbines
- Prevent costly turbine failures and downtime
- Learn from real industry cases in power plants and process industries
- Build technical confidence in handling trip systems and governing mechanisms
- Gain immediate skills in turbine diagnostics and servicing

Target Audience

This program is designed for:

- Turbine engineers and maintenance technicians
- Power plant operators and shift engineers
- Rotating equipment specialists
- Reliability and condition monitoring engineers
- Maintenance supervisors and asset managers

Individual Benefits

Key competencies that will be developed include:

- Turbine component inspection and alignment
- Trip system and governing system understanding
- Root cause analysis of vibration and heat issues
- Maintenance strategy development (PM/PdM/CBM)
- Safety and start-up/shutdown protocols

Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Reduced turbine failure rates and repair costs
- Higher turbine availability and power output
- Improved safety through proper trip and emergency handling
- Structured maintenance schedules and optimized spare parts usage
- Better compliance with operational standards and audits

Instructional Methodology

- Strategy Briefings - Turbine types, governing system logic, and operation theory
- Hands-On Exercises - Alignment planning, checklist reviews, troubleshooting simulations
- Case Studies - Failure analysis, vibration fault diagnosis, trip activation incidents
- Workshops - Maintenance planning, monitoring route setup, and inspection templates
- Peer Exchange - Best practice sharing from participants in power and process industries
- Tools - Trip logic schematics, oil analysis guidelines, thermal expansion records

MAWA EVENTS

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Course Outline

Detailed 2-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 - Turbine Fundamentals & System Overview

- **Module 1: Basics of Steam Turbine Operation (07:30 - 09:30)**
 - Thermodynamics and energy conversion
 - Impulse and reaction turbine designs
 - Critical parameters: pressure, temperature, velocity
- **Module 2: Turbine Components and Flow Path (09:45 - 11:15)**
 - Casings, rotors, blades, diaphragms
 - Bearings, shaft seals, labyrinths
 - Steam flow, expansion, and energy transfer
- **Module 3: Lubrication and Oil Systems (11:30 - 01:00)**
 - Oil pump systems and filtration
 - Lube oil specifications and contamination
 - Bearing cooling and oil circulation
- **Module 4: Workshop - System Diagram Identification (02:00 - 03:30)**
 - Annotated system diagram walkthrough and discussion

Day 2 - Governing Systems and Control Mechanisms

- **Module 5: Turbine Governing Principles (07:30 - 09:30)**
 - Speed control, load sharing, and frequency regulation
 - Droop vs. isochronous control
 - Mechanical and electronic governors
- **Module 6: Trip and Protection Systems (09:45 - 11:15)**
 - Overspeed, low oil pressure, high vibration
 - Emergency stop valves, trip oil circuits
 - Interlocks and permissive logic
- **Module 7: Control System Integration (11:30 - 01:00)**
 - Turbine control panels and DCS
 - Interface with electrical systems
 - Safety instrumented functions
- **Module 8: Simulation - Trip Event Scenario (02:00 - 03:30)**
 - Diagnosing a trip incident with mock data and alarms

Day 3 - Maintenance Best Practices

- **Module 9: Maintenance Planning and Inspection (07:30 - 09:30)**
 - PM, PdM, and CBM approaches
 - Routine checks and overhauls
 - Clearance, alignment, and bolt torquing
- **Module 10: Rotor and Blade Maintenance (09:45 - 11:15)**
 - Blade wear, crack detection, and replacement
 - Rotor balancing and shaft inspection
 - Nozzle and diaphragm issues
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Module 11: Sealing and Bearing Systems (11:30 - 01:00)

- Gland steam and sealing performance
- Bearing alignment and clearance management
- Journal bearing failure case studies

Module 12: Workshop - Maintenance Scheduling Exercise (02:00 - 03:30)

- Participants draft an annual maintenance plan for a mid-sized steam turbine

Day 4 - Vibration, Monitoring & Performance Optimization**Module 13: Condition Monitoring & Vibration Analysis (07:30 - 09:30)**

- Sensor placement and data interpretation
- Typical vibration signatures and imbalance diagnosis
- Spectrum analysis tools and thresholds

Module 14: Temperature & Oil Analysis (09:45 - 11:15)

- Oil sampling methods and analysis interpretation
- Infrared thermography and hot spot detection
- Alarm management and trip thresholds

Module 15: Efficiency Improvement & Upgrades (11:30 - 01:00)

- Flow path upgrades and retrofits
- Seal design improvements
- Blade material innovations and lifecycle extension

Module 16: Case Study - Performance Recovery Strategy (02:00 - 03:30)

- Analysis of degraded turbine performance and recovery actions

Day 5 - Reliability & Operational Excellence**Module 17: Start-Up and Shutdown Protocols (07:30 - 09:30)**

- Warm-up, roll-up, synchronization
- Emergency shutdown, cooldown, and purge
- Operator checklists and SOPs

Module 18: Root Cause Failure Analysis (09:45 - 11:15)

- Fault tree analysis (FTA)
- Vibration-triggered trip events
- Documentation and lessons learned

Module 19: Regulatory & Safety Compliance (11:30 - 01:00)

- OSHA, API, ASME, and OEM compliance
- Safety culture and permit-to-work systems
- Audit preparation and reporting

Module 20: Final Workshop - Turbine Operations Readiness Assessment (02:00 - 03:30)

- Participants assess their turbine operation environment and improvement needs

Certification

Participants will receive a **Certificate of Completion in Steam Turbines & Governing System - Turbine Maintenance & Turbine Operation**, validating their competence in managing, troubleshooting, and optimizing steam turbine performance safely and effectively.

Why Choose MAWA Events

- **Global Expertise:** More than 17 years of experience in professional training and consulting.
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