ENGINEERING TRAINER

Gas Turbines: Operation, Maintenance and Troubleshooting

This gas-turbine course follows the gas path from inlet and compressor through combustion and the power turbine. It connects mechanical design with auxiliary systems, controls, protection, inspections, failure modes, troubleshooting and maintenance decisions in power plants. This self-paced online course includes video lectures and a completion certificate with PDH credits.

Buy This Course

Request a Quote or Invoice

ONLINE	SELF-PACED	1-YEAR ACCESS
8 MODULES	10.5 PDH	10.5 HOURS

TRUSTED BY ENGINEERING TEAMS WORLDWIDE

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What you'll learn

Gas turbines used in power plants require engineers to understand both the mechanical design of the machine and the operating logic that protects it. This course, led by Dimitris Antoniadis, follows the gas turbine gas path from the inlet duct and filter system through the compressor, combustion chamber and power turbine.

The course explains the technical role of major components and design features, including bleed heat, compressor rotor assemblies, inlet guide vane control, surge control, flame monitoring, emissions behaviour, turbine blade and nozzle thermodynamics, sealing diaphragms and shroud blocks. Auxiliary and control systems are also covered in detail. Students will review fuel gas and fuel oil systems, lubrication and hydraulic oil systems, purge air, fire detection, gas turbine controllers, start-up sequences, speed/load control, fuel control and protection functions for vibration, overtemperature and compressor surge.

The maintenance section focuses on inspection requirements, inspection frequency, repair cases and practical troubleshooting. Examples include turbine blade damage, blade pinning, fault identification during operation and the use of vibration analysis to diagnose common gas turbine failure modes.

Skills you'll gain

- ✓ will be familiar with the main gas turbine components, including the inlet duct, compressor, combustion chamber, power turbine, sealing systems, diaphragms and shroud blocks
- ✓ understand how compressor thermodynamics, rotor assembly, inlet guide vane control and surge protection influence stable gas turbine operation
- ✓ are able to interpret combustion chamber operating points, flame monitoring signals and the relationship between emissions and combustion conditions
- ✓ can describe the function of key auxiliary systems, including fuel gas, fuel oil, lubrication oil, hydraulic oil, purge air and fire detection systems
- ✓ understand gas turbine control functions, including start-up control, speed and load control, inlet guide vane control, fuel control and protection logic
- ✓ are better able to troubleshoot common gas turbine failure modes using operating trends, inspection results and vibration analysis

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About the instructor

Dimitris Antoniadis

Power Plant Maintenance Manager

Who this course is for

- ✓ Gas-turbine operations engineers
- ✓ Gas-turbine maintenance engineers
- ✓ Rotating-equipment engineers responsible for gas turbines
- ✓ Power-plant technicians working with gas-turbine systems
- ✓ Petrochemical-plant technicians supporting gas turbines
- ✓ Troubleshooting engineers investigating gas-turbine performance or failures

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Course content

Introduction to Gas Turbines

- Gas Turbine Configurations
- Industry Standards and Best Practices
- ISO Conditions
- External Factors Affecting Gas Turbine Performance
- Procurement, Construction and Commissing

Main Gas Turbine Systems Part 1

- Thermodynamic Cycle
- Inlet Duct and Filters
- Axial Flow Compressors
- Compressor Surge, Stall and Fouling
- Compressor Cleaning

Main Gas Turbine Systems Part 2

- Combustors
- Flames and Fuel Quality
- Power Turbine
- Seals
- Bearings and Shaft Configurations
- Combustor Op. Point vs. Emissions

Auxiliary Systems

- Fuel Gas and Fuel Oil Systems
- Lubrication and Hydraulic Oil Systems
- Oil Inspection
- Purge Air
- Fire Detection
- Extinguishing Systems

Control and Protection

- Control Systems
- Gas Turbine Controller
- Start Up Control
- Speed/Load Control
- Temperature Control
- Fuel Control
- Inlet Guide Vane Control
- Protection
- Operation and Availability

Inspections

- Combustion Inspections
- Hot Gas Path Inspections
- Major Inspections
- Borescope Inspections
- Inspections using NDT
- Intervals and Schedules

Failure Modes and Troubleshooting

- Failure Modes
- Monitoring and Diagnostic Systems
- Vibration Monitoring System
- Monitoring Locations
- Transient Analysis
- Malfunction Identification
- Oil Whip and Oil Whirl
- Gears
- Standards and Manufacturer Guidelines

Maintenance

- Major Factors Influencing the Maintenance Schedule
- Blade repair: Machining, Re-blading and Testing
- Bearings and Casings
- Rotor Balancing and Rotor Repair
- Hot Parts Life Evaluation
- Thermal Barrier Coatings
- Rotor Life
- Repair or Replace
- Standards and Manufacturer Guidelines