ICTD
المركز العالمي للتدريب والتطوير
International Centre For Training & Development

MUE120

Gas Turbine Technology:

Design, Operation, Control, Inspection, Troubleshooting & Maintenance

Course Introduction:

The use of gas turbines in the petrochemical, power generation and offshore industries has increased considerably during the past few years.

The course will cover the design, installation, operation and maintenance of these machines by highlighting characteristics features, efficiencies, reliability and maintenance implications. Upon completion of this course, participants will gain a complete and up-to-date overview of the Gas Turbine Technology.

Course Objectives:

This course will provide an excellent opportunity to learn and understand the operations, the constructions and maintenance and problem solving in gas turbines. Moreover people are becoming increasingly aware on causes and how to diagnose the reason behind some gas turbines problems and how to solve them. After studying this course, delegates should be able to:

- ✓ Understand the major aspects of GT
- ✓ Be able to identify GT Problems and how to prevent them
- ✓ Be able to do basic calculations
- ✓ Be able to use equipment on maintenance
- ✓ Understand the importance of solving the vibration problem
- ✓ Plus more knowledge and understanding on; Mechanical design principles; Theoretical design principles; Compression; Combustion; Performance and Control; Environmental problems.

Who Should Attend?

The course primarily intended for the engineering graduate and technician who is being exposed to the turbo machinery field. Experienced specialists involved in the operation and maintenance of gas turbines will definitely profit from attending this course.

Throughout the course participant will have ample opportunity to have gas turbine related questions answered by the course director.

Course Outline:

Day 1:

OVERVIEW OF GAS TURBINES

- Industrial heavy duty gas turbines

- Aircraft-derivative gas turbines
- Medium range gas turbines
- Major gas turbines components

FUNDAMENTAL THERMODYNAMICS

- Reversible cycles with ideal gases
- Actual gas turbine cycle
- Combustion air compressor performance characteristics
- Combustion processes
- Gas turbine performance calculation
- Comparison of basic specifications

MECHANICAL EQUIPMENT STANDARDS

- Application API standards
- AINSI PTC22
- International standards (ISO) & NBSP; specification

Day 2:

GAS TURBINE COMPONENTS

- Axial-flow compressor
- Radial-inflow turbines
- Combustors, construction types
- Igniters
- Fuel nozzles
- Hot path components
- Firing concept and emission control

MATERIAL AND CONSTRUCTION

- General metallurgical behavior
- Gas turbine blade materials
- Turbine wheel alloys
- Corrosion problem
- Future materials
- Coating technology

BEARING AND SEALS

- Bearing design principal
- Bearing materials
- Non-contacting seals
- Mechanical seals

Day 3:

LUBRICATION SYSTEM

- Basic components
- Oil cooling/warning
- Oil cleaning and conditioning
- Lube oil selection

FUELS AND FUELS SUPPLY SYSTEM

- Fuel specification
- Fuel properties
- Fuel treatment
- Heavy fuels
- Fuel measurement
- Fuel supply system
- Cleaning of turbine components

COMBUSTION AIR FILTERS

- Combustion air quality requirements
- Function of gas turbine air filters
- Environment of type of inlet filters
- Selection principal
- Operation and maintenance

Day 4:

EXHAUST SYSTEMS

- Sound abatement
- Inspection openings
- Chimneys

AUXILIARY COMPONENTS AND SYSTEMS

- Starting systems
- Washing systems
- Gear boxes
- Coupling

CONTROL SYSTEM AND INSTRUMENT

- Pressure measurement
- Temperature measurement
- Vibration measurement
- Performance measurement
- Control systems
- Monitoring and diagnostic systems

Day 5:

GAS TURBINE OPERATION AND MAINTENANCE

- Operating philosophies
- Analytical on-line condition monitoring
- Modern bores copy
- Selecting maintenance approaches
- Maintenance planning
- Spare parts and special tools
- Inspection, overhaul and repair
- Maintenance control and documentation
- Evaluation
- Gas turbine maintenance effectiveness
- Establishing and tracking performance indices

GAS TURBINE ECONOMICS

- Screening turbine applications
- Life cycle cost optimization
- Evaluation of upgrading/replacement projects
- Insurance for gas turbines

Course Certificate:

International Center for Training & Development (**ICTD**) will award an internationally recognized certificate(s) for each delegate on completion of training.

Course Methodology:

A variety of methodologies will be used during the course that includes:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionaires
- Group Work
- Discussion
- Presentation

Course Fees:

To be advised as per the course location. This rate includes participant's manual, and-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Timings:

Daily Course Timings:

08:00 - 08:20	Morning Coffee/Tea
08:20 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Coffee/Tea/Snacks)
13:30 - 15:00	Last Session