



Training Program:

Industrial Gas Turbine Generator

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Introduction:

This course provides a thorough understanding of steam power plants, gas turbines, co-generation, combined cycle plants, wind and solar power generating plants. Each of the components such as compressors, gas and steam turbines, heat recovery steam generators, deaerators, condensers, lubricating systems, instrumentation, control systems, transformers, and generators are covered in detail. The design, selection considerations, operation, maintenance, pay-back period, and economics of co-generation plants and combined cycles as well as emission limits, reliability, monitoring and governing systems will also be covered thoroughly. All the significant improvements that were made to co-generation, combined cycles plants, wind and solar power generating plants during the last two decades will also be explained.

Who Should Attend?

Power Generation Engineers, Power Generation Technicians, Power Generation Operators, Maintenance personnel , Other technical individuals

Course Objectives:

By the end of this course delegates will be able to:

- Gain a thorough understanding of computer simulation of gas turbines, co-generation, and combined cycle plants
- Learn about all components and subsystems of the various types of gas turbines, steam power plants, cogeneration, and combined cycle plants

- Examine the advantages, applications, performance and economics of co-generation, combined cycle plants, wind turbines and generators, wind turbine farms, and solar power generation
- Learn about various equipment including compressors, turbines, governing systems, combustors, deaerators, feed water heaters, transformers, generators and auxiliaries, wind turbines and generators, wind turbine farms, and solar power generating plants
- Discover the maintenance required for gas turbines, steam power plants, combined cycles, generators, wind turbines and generators, and wind turbine farms to minimize their operating cost and maximize their efficiency, reliability, and longevity
- Learn about the monitoring and control of environmental emissions
- Discover the latest instrumentation and control systems of gas turbines and combined cycles
- Increase your knowledge of predictive and preventive maintenance, reliability and testing
- Gain a thorough understanding of the selection considerations and applications of co-generation, combined cycle plants, wind turbines and generators, wind turbine farms, and solar power generation

Course Outline

Gas Turbines

- Gas Turbine Fundamentals
- Modes of operation
- Typical process systems that form part of plant
- Key transducers to monitor operation
- Events/alarms, etc.

- Overview of Gas Turbines
- Gas Turbine Design
- Gas Turbine Calculations
- Gas Turbine Compressors
- Gas Turbine Maintenance
- Overview of the equipment
- Dynamic Compressors Technology
- Compressors Auxiliaries
- Off-Design Performance
- Stall, and Surge
- Centrifugal Compressors – Components
- Performance Characteristics
- Balancing, Surge Prevention Systems and Testing
- Dynamic Compressors Performance
- Compressor Seal Systems
- Dry Seals
- Advanced Sealing Mechanisms and Magnetic Bearings

Gas Turbine Components and Auxiliaries

- Gas Turbine Combustors
- Axial-Flow Turbines
- Gas Turbine Materials
- Gas Turbine Lubrication and Fuel Systems
- Gas Turbine Bearing and Seals

- Gas Turbine Instrumentation and Control
- Gas Turbine Performance Characteristics
- Gas Turbine Operating and Maintenance Considerations
- Gas Turbine Emission Guidelines and Control Systems

Steam Power Plants

- Review of Thermodynamics Principles
- Steam Power Plants
- Steam Generators
- Steam Turbines
- Re-heaters
- Condensers
- Feed-water Heaters
- Efficiency and Heat Rate
- Supercritical Plants
- Co-generation Plants
- Arrangement of Co-generation plants
- Economics

Steam Generators and Steam Turbines

- The Fire-Tube Boiler
- The Water-Tube Boiler
- The Steam Drum
- Super heaters and Re-heaters

- Once-Through Boilers
- Economizers
- Fans
- The Stack
- Steam Generator Control
- Feed-water and Drum-Level Control
- Steam-Pressure Control
- Steam-Temperature Control
- Mechanisms of Energy Conversion
- Turbine components
- Rotating and Stationary blades
- Thrust bearings
- Labyrinth seals
- Turbine controls
- Testing of Turbine blades
- Quality Assurance of Turbine Generator
- Assembly and testing of turbine components

Steam Turbines and Auxiliaries

- Turbine Types
- Compound Turbines
- Turbine Control Systems
- Maintenance
- Steam Generators

- Heat Exchangers and Condensers
- Power Station Performance Monitoring
- The Turbine Governing System
- Steam Chests and Valves
- Turbine Protective Devices
- Turbine Instrumentation
- Lubrication Systems
- Gland Sealing System
- Frequently Asked Questions about Turbine-Generator Balancing
- Vibration Analysis and Maintenance
- Features Enhancing the Reliability and Maintainability of Steam Turbines

Combined Cycles

- Combined Cycles
- Integrated Gasification Combined Cycles
- Single-Shaft Combined Cycle Power Generating Plants
- Turbine Selection for Combined Cycle Power Systems
- Absorption Chillers
- Selection of the Best Power Enhancement Option for Combined Cycle Plants

Transformers

- Fundamentals of Electric Systems
- Introduction to Machinery Principles
- Transformers

- Transformers Components and Maintenance

Generators

Steam Turbine Maintenance

Power Station Performance Monitoring

Accreditation:

BTS attendance certificate will be issued to all attendees completing a minimum of 80% of the total course duration.