Training Program:

The Complete Course On Power Generation

Introduction:

This course provides an in-depth understanding of all the equipment and systems used in steam power plants, gas turbines, co-generation, combined cycle plants, wind farms, and solar power generating plants. Computer simulation, design, selection considerations, operation, testing, maintenance and economics of all these power generating plants as well as emission limits, monitoring and governing systems will also be covered thoroughly. This course examines the advantages and disadvantages of each type of power generating plants. The reliability, life cycle cost, profitability, refurbishment, and life extension methods of each type of power generating plants are also covered in detail.

Who Should Attend?

Electrical Engineers, Power Generation Engineers, Power System Protection Engineers, Process Control Engineers & Personnel, Electrical and Instrumentation Technicians & Design Engineers, Maintenance Technicians & Supervisors, Plant Operators & Technicians, Oil & Gas Industry Personnel

Course Objectives:

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

- Learn about all components and subsystems of the various types of gas turbines, steam power plants, co-generation, combined cycle plants, wind turbines and generators, wind turbine farms and solar power generation
- 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
- 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 computer simulation of gas turbines, co-generation and combined cycle plants

Accreditation:

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

Course Outline

Steam Power Plants, Steam Generators and Steam Turbines

- Review of Thermodynamics Principles
- Steam Power Plants
- Steam Generators & Steam Turbines
- Reheaters

- Condensers
- Feedwater Heaters
- Efficiency and Heat Rate & Supercritical Plants
- Co-generation Plants
- Arrangement of Co-generation plants
- Economics of Co-generation Plants
- The Fire -Tube Boiler
- The Water-Tube Boiler
- The Steam Drum & Superheaters and Reheaters
- Once-Through Boilers
- Economizers
- Fans
- The Stack
- Steam Generator Control
- Feedwater and Drum-Level Control
- Steam-Pressure Control
- Steam-Temperature Control
- Mechanisms of Energy Conversion in a Steam Turbine
- Turbine components
- Rotating and Stationary blades
- Thrust bearings
- Labyrinth seals
- Turbine controls

- Testing of Turbine blades
- Quality Assurance of Turbine Generator Components
- Assembly and testing of turbine components

Steam Turbines and Auxiliaries and Gas Turbines

- Turbine Types
- Compound Turbines
- Turbine Control Systems
- Steam Turbine Maintenance
- Steam Generators
- Heat Exchangers, and Condensers
- Power Station Performance Monitoring
- The Turbine Governing Systems
- Steam Chests and Valves
- Turbine Protective Devices
- Turbine Instrumentation
- Lubrication Systems
- Gland Sealing System
- Turbine-Generator Balancing
- Vibration Analysis and Maintenance
- Features Enhancing the Reliability and Maintainability of Steam Turbines
- Gas Turbine Fundamentals
- Overview of Gas Turbines

- Gas Turbine Design
- Gas Turbine Calculations
- Gas Turbine Compressors
- 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, Computer Simulation of Gas Turbines

- 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 Systems

- Gas Turbine Performance Characteristics
- Gas Turbine Operating and Maintenance Considerations
- Gas Turbine Emission Guidelines and Control Systems
- Effects of ambient temperature and pressure on gas turbine performance
- Simulation of effects of component deterioration on engine performance
- Power Augmentation
- Simulation of engine control system performance
- Profits, Revenue and Life Cycle Cost Analysis
- Non-Dimensional Analysis
- Computer Simulation Applications

Combined Cycles, Co-generation Plants, Wind and Solar Power Generation

- Combined Cycles
- Integrated Gasification Combined Cycles
- Single-Shaft Combined Cycle Power Generating Plants
- Steam Turbine Selection for Combined Cycle Power Systems
- Absorption Chillers
- Selection of the Best Power Enhancement Option for Combined Cycle Plants
- Economic and Technical Considerations for Combined Cycle Performance Enhancement Options
- Applications of Co-generation and Combined Cycle Plants
- Selection Considerations of Combined Cycles and Co-generation Plants
- Co-generation Application Considerations
- Economics of Combined Cycles Co-generation Plants

- Wind Power Turbine Generators
- Solar Power Systems

Transformers and Generators

- Fundamentals of Electric Systems
- Machinery Principles
- Transformers
- Transformers Components and Maintenance
- AC Machine Fundamentals
- Synchronous Generators
- Generator Components
- Auxiliaries, and Excitation
- Generator Testing
- Inspection and Maintenance