

SmartBrains

Engineers & Technologist Pvt. Ltd.



THERMAL POWER PLANT

Engineering - Design - Operation & Maintenance - Hazards



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About SmartBrains:

SmartBrains is a leading Training provider for In-house and public courses to the upstream, midstream and downstream sectors of the Oil & Gas Industry, and offers numbers of courses throughout the year in India. Our course subject matter spans technical engineering and geoscience, business and commercial, leadership, communications and management training, ranging from basic awareness to skilled application level.

Our instructors are among the oil & gas industry's most respected and knowledgeable in their field. In the ever-evolving Oil & energy industry, where training and upgrading skills of professionals have been more important, SmartBrains plays a key role in helping fulfil your training and skill development needs.

Why

SmartBrains?

- Delivered training covering Engineering, procurement construction, commissioning, operation & maintenance, business, financial management along with human resource and personal development for Oil & Energy Industry.
- Trained thousands of participants every year from over 20 countries.
- Performed numerous tailor-made short and long training programs for national and International clients.
- Guided by the industry's renowned professionals with unprecedented knowledge of the Oil and energy industry.
- A comprehensive spectrum of technical programs for the whole Oil & Energy Industry.
- Highly interactive program with practical and relevant case studies.
- Training by extensively researched self developed cutting edge techniques.
- Skill development techniques with comprehensive set of documentation, practical skills and tools used in the Industry.
- The perfect opportunity to develop network and experiences with knowledge sharing.
- Designed for both Fresh engineers and working professionals to attain growth in oil and energy industry.

WE PROVIDE:

**500 TRAINING SESSIONS PER YEAR,
50+ TRAINING COURSES,
20 PERMANENT
INSTRUCTORS AND
A NETWORK OF 100 CONSULTANTS**

TO:

**MORE THAN 50 CLIENTS
5000 TRAINEES PAR YEAR
FROM 20 COUNTRIES**

Certificate: A certificate of completion is awarded to each participant who satisfactorily completes the course

THERMAL POWER PLANT

Engineering - Design - Operation & Maintenance - Hazards

Course

STRUCTURE

PURPOSE

To provide a comprehensive study involved in power plants engineering, design, construction, operation & maintenance & hazards complemented with equipment use in Power Plants .

AUDIENCE

This course will familiarize participants with the basic technology, Engineering and equipment used in Power plant. This course is ideally suited to mechanical & Electrical engineers, other involved in engineering and construction, and for professionals involved in other areas of the power industry who require a comprehensive overview of the Power plants

LEARNING OBJECTIVES

Introduction to modern power plant
Indian Energy Resources & Policy
Thermodynamic Principles
Boilers and Auxiliaries
Combustion Turbines
Steam Turbines & Auxiliaries
Heat Recovery Steam Generators(HRSG)
Electrical Generators Operation
Balance of Plant Systems
-Coal Handling System
-Ash Handling System
-Fuel Oil Systems
-Water Treatment System
-Cooling Water System
Power plant O & M
Industrial Safety
Power plant Performance

Power Plant: Fundamentals

Concept of Modern Thermal Station: Choice of Location of Large Thermal Station, Plant Layout, Machine arrangements, Equipment Layouts, Switchyard and Auxiliary Arrangements

Thermodynamic Principles: Types of Energy,

Laws of Thermodynamics: First & Second Laws, T/S Diagrams

Water and Steam: Properties of Water, Steam Tables, Mollier Diagrams

Heat Transfer: Conduction, Convection, Radiation, Energy Balance & Heat Transfer

Combustion Theory: Principles of Combustion, Requirements for Complete Combustion, Combustion Products, Fuel Heating Value

Boiler & Auxiliaries:

Boilers Type: water tube and fire tube boilers, Cast Iron Boilers, High Pressure & Low Pressure Boilers, Steam Boilers, Super critical boilers

Design and operation features: The combustion process. Emissions and its control

Burner Operation and Control: Gas Train, Oil Train, Standard Burner, High Turndown Burner, Low Nox Burners, Burner designs, Burner Controls.

high pressure piping: Metallurgical properties of HP piping- pipe supports- constant load supports and its maintenance

Fabrication and erection of Boilers. Site installation process.

Boiler operation importance of water chemistry

Boiler control & safety features

Combustion Turbines

Turbine fundamentals: principles of turbine, Introduction & overview

Component Description: Turbine Flow, Air Inlet Equipment, Compressor Section, Combustion Section, Turbine Section, Exhaust Section, Bearings, Compressor Rotor, Turbine Rotor

Combustion Turbine Systems: Lube Oil System, Hydraulic Supply, Cooling and Sealing Air, Fuel Gas System, Fuel Oil System, Fuel Forwarding System, NOx Control System, Atomizing Air System, Inlet Guide Vane System, Compressor Cleaning System., Inlet System, Starting System, Protection System, HVAC System
Electrical Distribution

Gas Turbine Operations: Pre Start Inspections, Normal Start Up, Normal Operation Checks, Normal Shutdown, Emergency. Procedures

Electrical Generators

Electrical Fundamentals

AC Generators

Generator Construction

Generator Operations: Pre-Start Insp., Synchronizing, Normal Ops. Checks
Normal Shutdown, Abnormal Operation

Steam Turbines

Turbine Principles: Nozzles, Buckets/Blades

Turbine Construction: Turbine Casings, Stationary Blades and Diaphragms, Turbine Seals

Turbine Rotors/Spindles, Turbine Buckets/Blades, Pedestals/Standards, Bearings

Main Steam Valves

Turbine Systems: Lube Oil System, Steam/Gland Seal System, EHC Hydraulic System

Steam Turbine Operations: Pre Start Inspections, Normal Start Up, Normal

Operation Checks, Normal Shutdown, Emergency. Procedures

Heat Recovery Steam Generators (HRSG)

Overview of HRSG

Water and Steam Circuits: Pressure Systems, Gas Flow Path

Major Components of HRSG

Auxiliary Equipment: Deaerator, Safety Valves, Water Gauges and Indicators

System Controls: Drum Level Controllers, Steam Temp. Control.

Operational Procedures: Pre-Ops. Checkout, Initial filling, Cold Start-up, Warm Start-up, Shutdown

Balance of Plant Systems:

Coal Handling System, Fuel Oil Systems, Ash Handling System, Water Treatment System

Cooling Water System, Feed water System, Circulating Water System, Compressed Air System, Fuel Gas Supply System

Plant Operations and maintenance

Operations: Competent, safe and reliable operation of plant, Plant efficiency, Abnormal plant and process conditions, Fault finding and troubleshooting, Sequences

Operating procedures, Hazards and the appropriate precaution, Protection systems.

Maintenance: essential maintenance Vs deferred maintenance, Condition monitoring,

Typical operational issues, Plant history and engineering solutions

Maintenance priorities Vs load dispatch

Power Plant Performance

Performance Calculations

Performance Monitoring & Trending

Performance Optimization

