MECCI ENGINEERS
Institute of Engineering Design & Research
(An ISO 9001:2008 Certified EPC Consulting, Engineering Projects and Related Training Company)

JAS-ANZ
ISO 9001:2008 CERTIFIED

COURSES MODULE For POWER PLANT ENGINEERING

Course Outline

- 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

CERTIFICATION & PG DIPLOMA COURSES FOR Oil & Gas / Chemicals/ Energy & Power industries.

Power Plant Engineering

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 and 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