

**SHRRE SATHYAM COLLEGE OF ENGINEERING
AND TECHNOLOGY**

Department of EEE

SUBJECT CODE: ME6701

SUBJECT NAME: POWER PLANT ENGINEERING

Regulation: 2013

Year and Semester: III & V

SYLLABUS

ME6701 POWER PLANT ENGINEERING L T P C3 0 0 3

OBJECTIVES:

Providing an overview of Power Plants and detailing the role of Mechanical Engineers in their operation and maintenance.

UNIT I COAL BASED THERMAL POWER PLANTS 10

Rankine cycle - improvisations, Layout of modern coal power plant, Super Critical Boilers, FBC Boilers, Turbines, Condensers, Steam & Heat rate, Subsystems of thermal power plants – Fuel and ash handling, Draught system, Feed water treatment. Binary Cycles and Cogeneration systems.

UNIT II DIESEL, GAS TURBINE AND COMBINED CYCLE POWER PLANTS 10

Otto, Diesel, Dual & Brayton Cycle - Analysis & Optimisation. Components of Diesel and Gas Turbine power plants. Combined Cycle Power Plants. Integrated Gasifier based Combined Cycle systems.

UNIT III NUCLEAR POWER PLANTS 7

Basics of Nuclear Engineering, Layout and subsystems of Nuclear Power Plants, Working of Nuclear Reactors: *Boiling Water Reactor* (BWR), *Pressurized Water Reactor* (PWR), CANada Deuterium- Uranium reactor (CANDU), Breeder, Gas Cooled and Liquid Metal Cooled Reactors. Safety measures for Nuclear Power plants.

UNIT IV POWER FROM RENEWABLE ENERGY 10

Hydro Electric Power Plants – Classification, Typical Layout and associated components including Turbines. Principle, Construction and working of Wind, Tidal, *Solar Photo Voltaic* (SPV), Solar Thermal, Geo Thermal, Biogas and Fuel Cell power systems.

UNIT V ENERGY, ECONOMIC AND ENVIRONMENTAL ISSUES OF POWER PLANTS 8

Power tariff types, Load distribution parameters, load curve, Comparison of site selection criteria, relative merits & demerits, Capital & Operating Cost of different

power plants. Pollution control technologies including Waste Disposal Options for Coal and Nuclear Power Plants.

TOTAL: 45 PERIODS

OUTCOMES:

- Upon completion of this course, the Students can able to understand different types of power plant, and its functions and their flow lines and issues related to them.
- Analyse and solve energy and economic related issues in power sectors.

TEXT BOOK:

1. P.K. Nag, Power Plant Engineering, Tata McGraw – Hill Publishing Company Ltd., ThirdEdition, 2008.

REFERENCES:

1. M.M. El-Wakil, Power Plant Technology, Tata McGraw – Hill Publishing Company Ltd., 2010.
2. Black & Veatch, Springer, Power Plant Engineering, 1996.
3. Thomas C. Elliott, Kao Chen and Robert C. Swanekamp, Standard Handbook of Power PlantEngineering, Second Edition, McGraw – Hill, 1998.
4. Godfrey Boyle, Renewable energy, Open University, Oxford University Press in association with the Open University, 2004.

1. Aim and objective of the objective

- To impart basic knowledge on Power generation.
- Providing an overview of various Power Plants
- To make students understand the fundamentals of construction of Power Plants
- To explain the component of power plant units and detailed explanation of their working principles.
- Detailing the role of Electrical Engineers in the operation and maintenance.

2. Need and Importance for the study of the subject

- The students will become familiar with fundamentals of Power generation and acquire the capability to acquire them.
- Students will be able to acquire knowledge, capability of analysing and solving technical difficulties related to power plant operation, maintenance and designing
- Ability to design and demonstrate renewable power generation.
- Ability to identify the components use in power plant cycle.
- Ability to demonstrate working principles of petrol and diesel engine.
- Ability to explain the components of nuclear power plant.

3. Industry connectivity and latest development.

- Using latest technology and advanced materials in constructing complicated and more reliable Power Plants.
- Engineering support in various power plants in the maintenance and erection sections.
- Technical support in all energy industries and supervising the assembling processes.
- Analyse and solve energy and economic related issues in power sectors.

4. Industrial Visit

- Planned to visit Pabanasam and Manimuthar dams, Tirunelveli.
- Planned to visit thermal power plant, Tuticorin.
- Planned to visit nuclear power plant, Kudankulam.

