

Course Syllabi: UEE632: Power Generation and Economics (L : T : P :: 3 : 0 : 0)

1. **Course number and name:** UEE632: Power Generation and Economics
2. **Credits and contact hours:** 3.0 and 3
3. **Text book, title, author, and year**

Text Books / Reference Books

- Chakrabarti, A., Soni, M.L., Gupta, P.V. and Bhatnagar, U.S., *a Text Book on Arora, S.C and Domkundawar, S., a course in Power Plant Engineering, DhanpatRai (2002).*
- Deshpande, M.V., *Power Plant Engineering, Tata McGraw Hill (2004).*
- Gupta, B.R., *Generation of Electrical Energy, S. Chand (1998).*
- Deshpande, M.V., *Electrical Power System Design, McGraw Hill (2004).*
- Wood, A.J. and Wollenberg, B.F., *Power Generation and Control, John Wiley (2004).*

- a. Other supplemental materials
 - Nil

4. Specific course information

- a. Brief description of the content of the course (catalog description)

Introduction: Energy sources and their availability, Principle types of power plants, their special features and applications, Present status and future trends.

Hydro Electric Power Plants: Essentials, Classifications, Hydroelectric survey, Rainfall run-off, Hydrograph, Flow duration curve, Mass curve, Storage capacity, Site selection, Plant layout, various components, Types of turbines, Governor and speed regulation, Pumped storage, Small scale hydro–electric plants (mini and micro).

Thermal Power Plant: General developing trends, Essentials, Plant layout, Coal–its storage, Preparation, Handling, Feeding and burning, Cooling towers, Ash handling, Water treatment plant, High pressure boilers and steam turbines, Components of thermal power plant.

Gas Turbine Power Plants: Field of use, Components, Plant layout, Comparison with steam power plants, combined steam and gas power plants.

Nuclear Power Plant: Nuclear fuels, Nuclear energy, Main components of nuclear power plant, Nuclear reactors types and applications, Radiation shielding, Radioactive and waste disposal safety aspect.

Non-Conventional Power Generation: Geothermal power plants, Electricity from biomass, Direct energy conversion systems (Solar and Wind), Thermo-electric conversion system, Fuel cells, Magneto-Hydro dynamic system.

Cogeneration: Definition and scope, Cogeneration technologies, Allocation of costs, Sale of electricity and impact on cogeneration.

Power Plant Economics: Cost of electrical energy, Selection of type of generation and generation equipment, Performance and operating characteristics of power plants, Economic scheduling principle, Load curves, Effect of load on power plant design, Load forecasting, electric tariffs, Peak load pricing.

5. Specific goals for the course

After the completion of the course, the students will be able to:

- Apply knowledge of India’s power scenario, power system structure and related agencies.
- Explain about various types of power plants i.e., hydro, thermal, gas and nuclear.

- Harness power from conventional and renewable sources.
- Select the methods and size of plant generating power for overall economy.
- Decide the tariff structure for different type of users.

6. Brief list of topics to be covered

- Hydro Electric Power Plants
- Thermal Power Plant
- Gas Turbine Power Plants
- Nuclear Power Plant
- Non-Conventional Power Generation
- Cogeneration
- Power Plant Economics