

Course Syllabi: UEE303 Power Generation and Associated Economics (L:T:P::3:1:0)

1. **Course number and name:** UEE303; Power Generation and Associated Economics

2. **Credits and contact hours:** Credits: 3.5; Hours: 4

3. **Text book, title, author, and year**

- *Arora, S.C and Domkundawar, S., a course in Power Plant Engineering, Dhanpat Rai (2002) 2nd ed.*
- *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).

Steam Power Plant: General developing trends, Essentials, Plant layout, Coal–its storage, Preparation, Handling, Feeding and burning, Ash handling, Dust collection, High pressure boilers and steam turbines, their main components like super heaters, Economizers, Pre–heaters etc., Fuel efficiency/heat balance.

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, Thermo-electric conversion system, Fuel cells, Magneto Hydro dynamic system.

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, Methods to meet variable load, Load forecasting, electric tariffs. Theory of peak load pricing, Theory and issues of real time pricing comparison of public supply and private generating units.

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

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.
- 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
- Steam power plants
- Gas turbine power plants
- Nuclear power plants
- Non-Conventional Power Generation
- Power Plant Economics
- Cogeneration