

Course Type	Course Code	Name of Course	L	T	P	Credit
DE	MED403	Power Plant	3	0	0	9

Course Objective
To impart knowledge regarding generation, utilization, and storage of power available from various powerplants. The course is essential to gather knowledge about the principle and operation of powerplants.
Learning Outcomes
Upon successful completion of this course, students will: <ul style="list-style-type: none"> • have a broad understanding regarding generation, utilization, and storage of power available from various powerplants. • have a good understanding of various components and their function in a given powerplant. • be able to offer ideas about how to increase the efficiency of a given powerplant. • be able to optimize the running cost and minimize the equipment required.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	MODULE I: [7L] Steam Power Plants: Classification of boilers, essentials of a good boiler, high pressure boilers, difference between sub-critical and super critical boiler, boiler mountings, boiler efficiency, methods of water treatment, steam nozzles and steam turbines, condensers, cooling pond and cooling towers and governing systems; Ash handling systems, Dust collection and controlling methods, Soot blowers; Fuels and fuel handling, Combustion of fuels.	7	Students will have a basic understanding about thermal powerplants, accessories, and operations.
2	MODULE II: [8L] Gas Turbine Power Plant: Selection of plant, Components, Layout and site selection of plant, Gas turbine fuels, gas turbine cycles, comparison with other power plants, Advantages and disadvantages. Diesel Engine Power Plants: Auxiliary equipment, supercharging and turbo charging, limitations of supercharging, waste heat recovery, comparison with other plants, Selection and location of nuclear power plant.	8	The module provides an understanding about the gas turbine and diesel engine power plants and the operations.
3	MODULE III: [5L] Nuclear Power Plants: Selection and location of nuclear power plant, Fusion and Fission principle, classifications of reactors, nuclear materials and waste disposal, Effect of nuclear radiation and safety aspects.	5	The module gives an outlay of the nuclear powerplants and the inner physics.
4	MODULE IV: [5L] Combined Cycle Power Generation: Binary vapor cycles, coupled cycles, combined cycles, gas turbine – steam, MHD – steam and thermionic – steam power plants.	6	Students will learn about coupling two or more different power plants and efficiencies.
5	MODULE V: [5L] Hydraulic Power Plants: Location of plant, classification, essential elements and layout of the plant, selection of turbine.	6	Students will learn about the operations and components.
6	MODULE VI: [4L] Solar Energy Power Plants: Types of solar collectors, performance analysis of solar collectors.	4	The module gives an understanding about the solar powerplants.

7	MODULE VII: [2L] Introduction to non-conventional power plants: Geothermal, MHD, Wind	2	The module is about the various systems.
8	MODULE VIII: [4L] Economics of Power Plants: Fixed cost, operating or running costs, economic factor, load curves, cost of generating station, energy rates.	4	The students will learn about factors affecting cost estimation.

Books: Power Plant Engineering – Nag, P.K., Mc Graw Hill Publications.