



C. U. SHAH UNIVERSITY
Wadhwan City

FACULTY OF:-Technology and Engineering
DEPARTMENT OF:- Mechanical Engineering
SEMESTER:- -V
CODE:- - 4TE05PPE1
NAME:- – Power Plant Engineering (PPE)

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE05PPE1	Power Plant Engineering	3	0	2	5	4	30	1.5	70	3	---	20	30	150

Objectives:

- To impart knowledge of the basic design principles and components of steam power plant, nuclear power plant alternate power plants.
- To create awareness of the economic, environmental, and regulatory issues related to power generation.

Prerequisites:

- Basic knowledge of Thermodynamics.

Course outline:

Sr. No.	Course content	Hours
1.	Power Station: Introduction, Factors affecting Selection of Site, Schematic Diagrams and relative merits of steam, Gas, Diesel, Hydro Power Plants. Present status of power generation in India.	04
2.	High Pressure Boilers & Accessories: Unique features and advantages of high pressure boilers, LaMont, Benson, Loeffler, Schmidt Hartmann, Velox, supercritical, Supercharged and fluidized bed combustion boiler. Different types of super-heaters, Re-heaters, economizers, Air pre-heaters, Methods of superheat control, Corrosion in boilers and its prevention.	07
3.	Coal & Ash Handling : Fuels for thermal power plant, Out plant and In plant handling of coal, Preparation and transfer of coal, Types of conveyors, Pulverized mills, liquid fuel burners, Pulverized fuel burners, Fluidized Bed Combustion, Necessity of ash disposal, Mechanical, Hydraulic, Pneumatic and Steam jet ash handling system, Dust collection and its disposal, Mechanical dust collector, Electrostatic precipitator.	05
4.	Draught System:	03



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	Natural draught- estimation of height of chimney, Maximum discharge, Forced, Induced and balanced draught, Power requirement by fans.	
5.	Condensers and Cooling Towers: Types of condensers, sources of air in condenser, Effects of air leakage, Methods of obtaining maximum vacuum in condenser, vacuum & condenser efficiency, Mass of cooling water required, Air pump-Edward air pump. Necessity of cooling ponds and cooling towers, Condenser water cooling systems, Types of cooling towers, cooling ponds.	05
6.	Feed Water Treatment : Water analysis, scaling corrosion, Embrittlement, Foaming and priming methods of feed water treatment, evaporators, Deaeration, cold line soda process, hot line soda softening process, Ion exchange process, Demineralising, Blowdown - feed water heater, surface heater.	03
7.	Nuclear and diesel Power Plant: Elements of nuclear power plant, nuclear reactor and its types, fuels moderators, coolants, control rod, classification of nuclear power plants, waste disposal. Diesel Power Plant: General layout, application of diesel power plant, advantages and disadvantages, component.	05
8.	Pollution and its Control: Air pollution by thermal power plants and its control, Effect of different pollutants on human health, Water pollution by thermal power plants and its control, Acid rains.	03
9.	Economics of the power plant: Load curve, load duration curve, various factors, effect of fluctuating load on operation and design of the plant, methods of meeting fluctuating load. Selection of the generating equipments, load sharing, cost of electrical energy. Tariff methods. Performance and operating characteristics of Power Plants	05
10.	Hydro- Electric Power Station: Introduction, Site selection for the Hydro-Electric Power Plant, Classification, General arrangement of Hydro-electric power plant, Advantages and disadvantages of Hydro- electric power plant	05

Learning Outcomes:

- The student will get thorough understanding of the Power Plant components and it's Economics.
- The subject helps the students to understand the latest developments in the field of Power generation.

Books Recommended:

Text Books:

1. Power Plant Engineering, **Arora & Domkundwar**, Dhanpat Rai & Co. Delhi.
2. Power Plant Engineering, **R.K. Rajput**, Laxmi Publication, Delhi

References Books:

1. Power Plant Engineering, **A.K. Raja**, New Age International, Delhi
2. Power Plant Engineering, **Dr. P.C. Sharma**, S.K. Kataria & Sons, Delhi
3. Power Plant Engineering, **P.K. Nag**, Tata McGrahill Co., Delhi
4. Power Plant Engineering, **Nagpal**, Khanna Publishers, Delhi.