



## **C.U.SHAH UNIVERSITY – WADHWANCITY**

**FACULTY OF:** - Technology and Engineering (Diploma Engineering)

**DEPARTMENT OF:** - Mechanical Engineering

**SEMESTER:** -VI

**CODE:** 2TE06PPE1

**NAME OF SUBJECT:** - Power Plant Engineering

### **Teaching & Evaluation Scheme:-**

Subject Code	Name of the Subject	Teaching Scheme				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hours	Marks	Hours	Pr/Viva	TW	Pr	
<u>2TE06PPE1</u>	Power Plant Engineering	3	0	2	5	4	30	1.5	70	3	--	20	30	150

### **Objectives:**

Students should be able to know about, Get familiar with present and future power scenario of India, Calculate efficiency of power generation cycles, Understand working of high pressure boilers, coal and ash handling systems of power plant, Draw layout, understand the working and compare different power plants, Enlist sources of waste heat and explain method of heat recovery, Explain constructional features of non conventional energy source devices, Appreciate economical and operational aspects of power plants.

### **Course outline:-**

Sr. No.	Course Contents	Number of Hours
<b>1</b>	<b>Introduction to power plant:</b> Power scenario in India, Introduction to power plants & their importance, power plants concepts, types and energy conversion in each type, National Grids Hydro power plant: General arrangement & its operation, classification, advantages and disadvantages, technical data of hydro power plants in Gujarat, Diesel power plant: General arrangement & its operation, classification, advantages and disadvantages, technical data of diesel engine power plants in Gujarat, Nuclear power plant: general arrangement & its operation, classification, basic nuclear physics fundamentals, criteria for selection of installation of nuclear power plant, advantages and disadvantages, technical data of nuclear power plants in Gujarat, safe disposal of nuclear waste.	<b>05</b>
<b>2</b>	<b>Steam power plant:</b> Layout of steam power plant, general features of selection of site, High pressure boilers – Construction and working of Sub-critical and Super-critical boilers, Coal and ash handling system- equipments for in plant handling of coal such as belt conveyor, screw conveyor, bucket elevator, Coal crushing, Pulverized fuel handling system, Ball mill, Pulverized fuel and their advantages, Multi retort stoker, Pulverized fuel burner, Hydraulic and pneumatic ash handling, Electrostatic precipitator, Boiler Feed water treatment, Environmental aspects of steam power plant water pollution, air pollution, emission standard and its control	<b>10</b>
<b>3</b>	<b>Nuclear power plant:</b> Fusion and fission reaction, general criteria for selection of site, Elements of nuclear power station, layout, types of nuclear reactors, Nuclear fuels, coolant & moderators, Working of PWR, BWR, CANDU, BREEDER type reactor, Safety precautions and waste disposals.	<b>06</b>
<b>4</b>	<b>Gas turbine power plant:</b> Introduction to gas turbine power plant, Concept of Brayton cycle, Arrangement of open and close cycle with constant pressure gas turbine power plant. Components of gas turbine	<b>07</b>

	thermal efficiency of a simple open cycle constant pressure gas turbine power plant (No derivation), Simple numerical based on above, Advantages of gas turbine power plant over others.	
<b>5</b>	<b>Diesel Power Plants:</b> Elements of a diesel power plant, Building and general layout, Use of diesel engine with steam power plants, Applications of diesel power plants, Limitation of diesel power plants	<b>06</b>
<b>6</b>	<b>Non conventional power generation plants:</b> Geothermal power plant- types, economical justification, Tidal power plant- factors affecting suitability of site, working of different tidal power plants, advantages and disadvantages, Wind power plant- different types, advantages and Disadvantages, Solar power plant, Magneto Hydro dynamics power plant, Introduction to Plasma technology.	<b>06</b>
<b>7</b>	<b>Hydro power plants</b> Hydro power station: Schematic arrangement, advantages and disadvantages, choice of site constituents of hydro power plant, Environmental aspects for selecting the sites and locations of hydro power stations	<b>02</b>

#### **List of Experiments:-**

- Study About Steam power plant.
- Study about nuclear power plant.
- Study about Gas turbine power plant.
- Study about Diesel power plant.
- Study about tidal power plant.
- Study about wind power plant.
- Study about solar power plant
- Study about Hydro power plant.
- Industrial visit:  
Arrange industrial visit on any of the power plant and prepare report on visit. Report should include specification of plant, circuit diagram, working principle of major components, etc.

#### **Books Recommended:**

1. Power plant engineering By P. K. Nag, TataMcGraw Hill.
2. A course in power Plant engineering By Arora & Domkundwar, Dhanpat Rai & Co.
3. Power Plant Engineering. By Dr. P C Sharma, S. K. Kataria.
4. A Text Book of Power Plant Engineering By R K Rajput, Laxmi Publications.
5. Steam power plant engineering By Louis Allen Harding, J. Wiley & Sons, Inc.
6. A text book of Power System Engineering By A. Chkrabarti and M. L. Soni, Dhanpat Rai and Co.
7. Power plant engineering By Fredrick T. Mosse, East-West press.