

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN MECHANICAL ENGINEERING
SEMESTER- VI

Subject Name: **Power Plant Engineering. (Elective-II)**

Subject Code: **2361919**

Sr. No.	Subject Content	Hrs.
1	<p>INTRODUCTION TO POWER PLANT ENGINEERING (PPE).</p> <p>1.1 Know the objectives of learning this subject. 1.2 Need, Scope & importance of PPE in industries. 1.3 Need of attitude, knowledge & skill required for application of PPE. 1.4 Sources of energy. 1.5 Power plants-concept, types and energy conversion in each type. 1.6 Central and captive power plants. 1.7 National grid. 1.8 Basic elements of various power plants (Steam power plant,diesel engine power plant, Gas turbine power plant.) 1.9 Technical data of basic elements of different power plants and over all specifications of power plant.</p>	2
2	<p>STEAM POWER PLANT CYCLES.</p> <p>2.1 Parameters of power cycles and their importance(such as thermal efficiency, work ratio, mean effective pressure,specific steam consumption). 2.2 Carnot cycle for gas and vapour as working fluid. 2.3 Simple Rankine cycle. 2.4 Methods of improving Rankine cycle efficiency. 2.5 Reheat cycle and Regenerative cycle.</p> <p style="text-align: center;">Note : Problem questions (application type) of 4-6 marks out of 70.</p>	4
3	<p>STEAM GENERATING UNIT.</p> <p>3.1 Schematic diagram of modern thermal power plant. 3.2 Various circuits of modern thermal power plant. 3.3 High pressure boilers such as Lamount boiler, Benson boiler, Loeffler boiler, Schmidt</p>	4

	<p>Hartman boiler.</p> <p>3.4 Super heaters, air pre heaters.</p> <p>3.5 Boiler furnaces.</p> <p>3.6 Pulverized fuel system.</p> <p>3.7 Different types of draft system in boilers.</p> <p>3.8 Parameters related to power plant performance.</p>	
4	<p>STEAM PRIMEMOVERS.</p> <p>4.1 Concept of prime mover and steam turbine.</p> <p>4.2 Governing of steam turbine.</p> <p>4.3 Starting and stopping procedure of steam turbine.</p> <p>4.4 Performance of steam turbine.</p> <p>Note : Problem questions (application type) of 3-5 marks out of 70.</p>	3
5	<p>STEAM CONDENSERS AND COOLING TOWERS.</p> <p>5.1 Working principle of surface condenser.</p> <p>5.2 Parameters for condenser performance.</p> <p>5.3 Purpose and working of cooling towers.</p> <p>Note : Problem questions (application type) of 3-5 marks out of 70.</p>	3
6	<p>STEAM POWER STATION CONTROLS.</p> <p>6.1 Effect of load variation in steam plant.</p> <p>6.2 Area control system and Centralized control system.</p> <p>6.3 Basic elements & requirement of control system.</p> <p>6.4 Compressed air control system and electrical control system.</p> <p>6.5 Various control parameters and instruments used in modern station control room.</p> <p>6.6 Feed water control system in modern power station.</p> <p>6.7 Steam temperature control.</p> <p>6.8 Purpose of various records maintained in steam power plant.</p> <p>Note : Question/s (application type) of 4-6 marks out of 70.</p>	4
7	<p>DIESEL ENGINE POWER PLANT.</p> <p>7.1 Application of I.C. engine.</p> <p>7.2 Advantages and disadvantages of diesel engine as a prime mover.</p> <p>7.3 Essential elements of diesel power plant and their function.</p> <p>7.4 Explanation of various systems of diesel power plant.</p>	4

8	<p>GAS TURBINE POWER PLANT.</p> <p>8.1 Concept of Brayton cycle. 8.2 Advantages of gas turbine over diesel engine as prime mover. 8.3 Methods of improving performance of gas turbine plant. 8.4 Important components of gas turbine power plant and their functions. 8.5 Essential auxiliaries of gas turbine power plant. 8.6 Governing system. 8.7 Fuel supply system of gas turbine plant.</p> <p>Note : Question/s (application type) of 4-6 marks out of 70.</p>	4
9	<p>NUCLEAR POWER PLANT.</p> <p>9.1 Basic nuclear physics fundamentals. 9.2 Nuclear fuels. 9.3 Basic elements of a nuclear reactor. 9.4 Classification of nuclear reactor. 9.5 Schematic diagrams and working and comparison of pressurized water reactor, Boiling water reactor, CANDU type reactor. 9.6 Criteria for location of nuclear power plant. 9.7 Comparison of nuclear plant with steam power plant. 9.8 Units of radiation. 9.9 Safe dose of radiation recommended by physicists. 9.10 Effect of radiation. 9.11 Disposal of nuclear waste. 9.12 Technical details of nuclear power plants in India.</p> <p>Note : Question/s (application type) of 4-6 marks out of 70.</p>	8
10	<p>HYDEL POWER PLANT.</p> <p>10.1 Purpose of multi-purpose hydro project. 10.2 Advantages and disadvantages of hydro power station considering the economic factor. 10.3 Basic elements of hydro power plant. 10.4 Classification of Hydro-electric power plant. 10.5 Water turbine used in Hydro power plant. 10.6 Factors for selecting hydraulic turbines. 10.7 Auxiliaries attached with Hydro-power plant. 10.8 Governing of water turbine. 10.9 Stages of starting and stopping of turbine of hydro-electric power station.</p>	3

11	POWER PLANT ECONOMICS. 11.1 Cost of power. 11.2 Economics of power generation and distribution. 11.3 Economics in plant selection.	3
	Total	42

Notes:

A. FOR STUDENTS.

- a. It is advised that student download this copy of syllabus and plan to achieve the objectives of learning this subject.

B. FOR PAPER SETTER/MODERATOR.

- a. Refer GTU syllabus and do not take reference of previous TEB question papers.
b. Ask the questions from each topic having marks weightage proportionate to hours allotted to that topic.
c. Optional questions must be asked from the same topic. That is weightage of compulsory attendance part of questions will be equal to proportionate to hours allotted to each topic.
d. Marks ratio of knowledge: comprehension: application types questions must be 30:30:40 respectively.
e. Submit solution / answer keys along with distribution of marks in each question for the paper being submitted.

Reference Books:

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|---|--|---|
| 1 | A course in power plant engineering | S.C.Arora ,S.Domkundwar
Dhanpatrai & sons, N. Delhi. |
| 2 | Power plant engineering | H.B.Keswani STD Book
House Delhi |
| 3 | Power plant engineering | P.C.Sharma. |
| 4 | Power plant engineering | Mahesh Verma Metro Book ,New
Delhi |
| 5 | Power plant engineering | M.M.Wakil Mc Graw Hill
Publication |
| 6 | Course material in power plant engineering | (D.L.Mode)-LRDC Gujarat. |

Additional Reference Books:

1. Power plant engineering
2. Power plant Technology
3. Nuclear Power plant

F.T.Morse Attiliated East
West press,New Delhi.

G.D.Rai --

Lofftness D.Van Nostrand,Co.Inc
N. York.