

Devi Ahilya University, Indore, India Institute of Engineering & Technology				IV Year B.E. (Mechanical Engg.) (Full Time)			
Subject Code & Name	Instructions Hours per Week			Credits			
MER8E4 POWER PLANT ENGINEERING	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	3	1	2	3	1	1	5

Course Objectives:

1. The objective of the subject is to acquaint the students about the new and advanced technologies of power generation.
2. The objective of the subject is to acquaint the students about the new and advanced technologies of energy scenario.

Pre requisite(s): Steam Engineering, Thermodynamic Power Cycles.

COURSE CONTENTS

UNIT-I

Introduction

Review of world and Indian energy situation in respect of demand, supply and resources in the historic context. Primary and secondary energy sources, their interconvertibility Merits and Demerits and Criterion for selection of power plants.

UNIT-II

Steam Power Plant

Basic principles of siting and station design, Effect of climatic factors on station and equipment design, Choice of steam cycle and main equipment, Recent trends in turbine and boiler sizes and steam conditions, plant design and layout, Outdoor and indoor plant, System components, Fuel handling, Burning systems, Element of feed water treatment plant, Condensing plant and circulating water systems, Cooling towers, Turbine room and auxiliary plant equipment., Instrumentation, Testing and plant heat balance.

UNIT-III

Nuclear Power Plant

Importance of nuclear power development in the world and Indian context, Review of atomic structure and radio activity, Binding energy concept, Fission and fusion reaction, Fissionable and fertile materials, Thermal neutron fission, Important nuclear fuels, Moderators and coolants, their relative merits, Thermal and fast breeder reactors, Principles of reactor control, Safety and reliability features.

UNIT-IV

Hydro-Power Plant: Elements of Hydrological computations, Rainfall run off, Flow and power duration curves, Mass curves, Storage capacity, Salient features of various types of hydro stations, Component such as dams, Spillways, Intake systems, Head works, Pressure tunnels, Penstocks, Reservoir, Balancing reservoirs, Selection of hydraulic turbines for power stations, Selection of site.

UNIT-V

Diesel Engine and gas turbine power plants: Applications of diesel engines in power field, Types of diesel plants, Layout of a diesel engine power plant, Components of gas turbine plant, Gas turbine fuels, Gas turbine materials, Performance of gas turbine power plants.

Course Outcomes:

Upon Completing the Course, Student will able to:

- CO1. Understand the phenomenon of compressible liquids.
- CO2. Understand the phenomenon of flow through nozzles & diffusers.
- CO3. Understand the phenomenon of sound waves.
- CO4. Understand the phenomenon of shock waves.
- CO5. Understand the principles of Flow in constant area ducts with friction.

BOOKS RECOMMENDED:

- [1] Nag, P.K., Power Plant Engineering, Tata McGraw Hill Publishing Co Ltd, New Delhi, 2008.
- [2] Arora and Domkundwar, A course in power Plant Engineering, Dhanpat Rai and CO, 2005.
- [3] EMI Wakil, Power Plant Technology, Tata McGraw Hill Publishing Co Ltd, New Delhi, 2005.
- [4] Sharma PC, Power plant Engineering, Kataria and sons, Delhi.

LIST OF PRACTICAL ASSIGNMENTS

1. Study of Steam Power Plant.
2. Study of Nuclear Power Plant.
3. Study of Hydro-Power Plant.
4. Study of Gas Turbine Power Plants.
5. Study of Diesel Engine Power Plant.

Course Objective:

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2. The objective of the subject is to acquaint the students about the new and advanced technologies of energy scenario.

Course Outcome:

Students earned credits will develop ability to

CO. No.	CO	PO
CO1	Understand the phenomenon of compressible liquids.	PO1, PO2
CO2	Understand the phenomenon of flow through nozzles & diffusers.	PO1, PO3
CO3	Understand the phenomenon of sound waves.	PO1, PO3 ,PO4
CO4	Understand the phenomenon of shock waves.	PO1, PO3, PO5
CO5	Understand the principles of Flow in constant area ducts with friction.	PO1, PO2, PO4

CO-PO Relationship

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO1	3	3										
CO2	3		3									
CO3	3		3	3								
CO4	3		3		3							
CO5	3	3		3								

* CO (rows) mention nil/very small/insignificant contribution to the PO (column)

1 → relevant and small significance 2 → medium or moderate and 3 →strong