

2/4 B.Tech. THIRD SEMESTER**EE3T3****THERMAL AND HYDRO PRIME MOVERS****Credits: 3****Lecture: 3 periods/week****Internal assessment: 30 marks****Tutorial: 1 period /week****Semester end examination: 70 marks****Course Objectives:**

The objectives of the course are:

- To make the students understand the various types of prime movers which can be connected to generators for power production
- To impart the knowledge of various types of pumps.

Course Outcomes:

Upon completion of this course the student will be able to:

1. Describe the basic components of steam power plants and working principles of different types of steam turbines
2. Explain the working principle of different types of gas turbines
3. Identify the main components of diesel power plant and explain the working principle of diesel engines
4. Discuss the working principle of different types of hydraulic turbines
5. Illustrate the working principle of centrifugal and reciprocating pumps

UNIT I**Steam power plants**

Boilers- Working principle of Benson boiler and Lamont boilers.

Steam Turbines: Schematic layout of steam power plant, Classification of Steam Turbines- Impulse Turbine and Reaction Turbine, Compounding in Turbines

Condensers- Working principle of jet and surface condensers.

UNIT II

Gas Turbine: Introduction, applications, types of gas turbines, working principle of open and closed cycle gas turbine. Methods to improve thermal efficiency of gas turbine, gas turbine fuels, starting of plant, comparison with diesel and steam power plants.

UNIT III

Diesel Power Plant: Introduction, diesel engine working principle, diesel fuels, diesel electric plant main components, super charging.

UNIT IV

Hydraulic Turbines: Introduction, Classification of hydraulic turbines, working principles of Pelton wheel, Francis turbine, Kaplan Turbine. Governing of Impulse & Reaction Turbine

UNIT V**Pumps:**

Centrifugal pumps-types, working principle, Multistage centrifugal pumps. Reciprocating pumps-types, working principle.

Learning Resources

Text Books:

1. Thermal Engineering-by RK Rajput, Lakshmi Publications
2. Fluid Mechanics & Hydraulic Machines – by Modi & Seth, PHI Publications.

Reference Books:

1. Gas Turbines – by V Ganesan, Tata McGraw-Hill Companies
2. Internal Combustion Engines – by V Ganesan, Tata McGraw-Hill Companies.
3. PK Nag – Power Plant Engineering, TMH publication
4. Gas turbine theory-HIH Sarvanmuttoo,H Cohen,GFC Rogers, Pearson Education India.