

Lecture: 4 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

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**Course Objectives:**

- To acquire fundamental knowledge of mechanical engineering

**Learning outcomes:**

At the end of the course the students have:

- Gained fundamental knowledge about the basics of manufacturing methods.
- Understood the principle of operation of different I. C. engines.
- Knowledge to describe the performance of different types of refrigeration systems.
- Learned about gear nomenclature, and the simple calculations in transmission of Power.

**UNIT-I**

**Casting:** Introduction, General method in making a Casting, pattern: types, materials and allowances. Moulding materials and equipment, Preparation, properties of moulding sands.

**UNIT-II**

**Welding:** Principles of gas welding and arc welding, Soldering and Brazing;

**Lathe:** Description of basic machine tool- Lathe – operations – turning, threading, taper turning and drilling;

**UNIT-III**

**Power Transmission:** Introduction to belt and gears drives, types of gears, Difference between open belts and cross belts, power transmission by belt drives; (theoretical treatment only).

**UNIT – IV**

**Power Plants:** Introduction, working principle of hydro electric power plant and steam power plant, Alternate sources of energy – solar, wind and tidal power;

**UNIT-V**

**Refrigeration & Air Conditioning:** Definition – COP, Unit of Refrigeration, Applications of refrigeration system, vapour compression refrigeration system, simple layout of summer air conditioning system;

**UNIT-VI**

**IC Engines:** Introduction , Main components of IC engines , working of 4-stroke petrol engine and diesel engine , working of 2- stroke petrol engine and diesel engine , difference between petrol and diesel engine , difference between 4- stroke and 2- stroke engines.

**UNIT-VII**

**Simple Stress and Strains:** Elasticity and Plasticity – Types of stresses & strains – Hooke’s law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson’s ratio & volumetric strain- Elastic moduli & the relationship between them.

**UNIT-VIII**

**Properties of Materials:** Physical properties - Mechanical properties – Electrical properties, Magnetic Properties and Chemical properties.

**Learning resources**

**TEXT BOOKS:**

1. Fundamentals of Mechanical Engineering / G.S.Sawheny- PHI.
2. An Integrated Course in Mechanical Engineering / R.K.Rajput /Biral Publications.
3. I.C. Engines / V. GANESAN- TMH.
4. Strength of Materials by R.K. Rajput, S.Chand & Company.
5. Thermal Engineering / R.K. Rajput / Lakshmi Publications.

**REFERENCES:**

1. Thermodynamics and Heat Engines / R. Yadav / Central Book Depot.
2. Strength of Materials by R.K.Bansal, Laxmi Publishers.
3. Engineering Mechanics Statics and dynamics by A.K.Tayal, Umesh Publication, Delhi.
4. Fundamentals of I.C.Engines - P.W. Gill, J.H. Smith & Ziurys- IBH & Oxford pub.