## 1/4 B.Tech. FIRST SEMESTER

**CE1T5 BASIC MECHANICAL ENGINEERING Credits: 3**

**Lecture: 3 periods/week** **Internal assessment: 30 marks**
**Tutorial: 1 period /week** **Semester end examination: 70 marks**

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**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 by Sawheny, G.S. ($2^{nd}$ edition), Prentice-Hall Of India Pvt. Limited, New Delhi, 2009.
2. An Integrated Course in Mechanical Engineering by Rajput, R.K., ($3^{rd}$ edition), Birla Publications, 2003.
3. I.C. Engines, ($3^{rd}$ edition) by Ganesan,V., Tata McGraw-Hill, New Delhi, 2007.


**Reference books:**


1. Strength of Materials, ($5^{th}$ edition) by Rajput, R.K., S. Chand & Company, 2012.
2. Thermal Engineering, ($6^{th}$ edition) by Rajput, R.K., Lakshmi Publications, 2006.
3. Thermodynamics and Heat Engines, ($7^{th}$ edition) by Yadav, R. Central Book Depot, 1999.
4. Strength of Materials, ($4^{th}$ edition) by Bansal, R.K., Laxmi Publishers, 2009.


**Web Reference:**

1. www.engiblogger.com/mechanical/mechan
2. www.indiastudychannel.com/resources/5...