

## **BASIC MECHANICAL ENGINEERING**

(Only for CE during I B.Tech., I Semester)

**Course Code: CE1T6**

**Credits: 3**

**Lecture: 3 periods/week**

**Internal assessment: 30 marks**

**Tutorial/Interaction Session: 1 period/week**

**Semester end examination: 70 marks**

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### **COURSE OBJECTIVES**

1. To introduce basic knowledge about special casting, molding procedures and different welding techniques used in industry.
2. To teach the working principle of Internal Combustion Engines.
3. To introduce basic knowledge on Refrigeration & Air Conditioning
4. To impart basic knowledge on simple stresses & strains, Properties of materials.
5. To impart basic knowledge on power transmission through belt drives and gear drives.

### **COURSE OUTCOMES**

1. Familiarize students with some of the special casting and molding procedures used in industry and different welding techniques with their respective applications.
2. Imparted knowledge about IC Engines, External combustion Engines.
3. Knowledge of Refrigeration and air conditioning systems, which is playing prominent role in the present day industry.
4. Acquainted the students regarding simple stress and strains and their material properties.
5. Attain basic knowledge on Awareness on power transmission through belt drives and gear drives.

### **UNIT-I**

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

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

### **UNIT-II**

**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-III

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

### UNIT-IV

**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.

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

### UNIT-V

**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).

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

## 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.

**e-learning resources:**

<http://nptel.ac.in/courses.php>

<http://jntuk-coeerd.in/>