

R16-Civil Engineering	L	T	P	C
I Year - II Semester	4	0	0	3

ELEMENTS OF MECHANICAL ENGINEERING

Learning Objectives: The content of this course shall provide the student the basic concepts of various mechanical systems and exposes the student to a wide range of equipment and their utility in a practical situation. It shall provide the fundamentals of Steam, I.C. Engines, compressors, manufacturing methods and transmission systems that usually exist in engineering.

UNIT –I:

Steam boilers: Classification of boilers, essentialities of boilers, selection of different types of boilers, study of boilers, boiler mountings and accessories. Performance of boilers. Working principle of steam turbines.

UNIT-II:

Metal joining: arc welding, resistance welding, gas welding, brazing and soldering

Metal forming: forging – operations, rolling and extrusion principles

Machine tools: lathe classification, specifications, and operations.

Casting: Steps involved in making a casting – Advantages and applications. – Patterns and Pattern making

UNIT-III:

Reciprocating and rotary air compressors: uses of compressed air, types, working principle, work done, simple problems.

Refrigeration: concepts, principle of refrigeration and types of refrigeration.

UNIT-IV:

Internal combustion engines: classification of IC engines, basic engine components and nomenclature, working principle of engines, Four strokes and two stroke petrol and diesel engines, comparison of CI and SI engines, comparison of four stroke and two stroke engines, simple problems such as indicated power, brake power, friction power, specific fuel consumption, brake thermal efficiency, indicated thermal efficiency and mechanical efficiency.

UNIT-V:

Belts –Ropes and chains: belt and rope drives, velocity ratio, slip, length of belt , open belt and cross belt drives, ratio of friction tensions, centrifugal tension in a belt, power transmitted by belts and ropes, initial tensions in the belt, simple problems.

Unit VI

Gears: classification of gears, gear ratio, law of gearing, gear profiles, applications.

Gear trains: classification of gears, gear trains velocity ratio, simple, compound and reverted gear trains and simple problems.

Outcomes:

- After completing the course, the student shall be able to understand the applications of different mechanical elements and manufacturing processes.
- The performance of components like Boiler, I.C Engine, Compressors.
- Power transmission by belt, rope, chain and gear trains.

Text Books:

1. Mechanical Engineering Science K R Gopala Krishna, Subhas publications
2. Thermal Engineering, Ballaney,P.L., Khanna Publishers, 2003
3. Elements of Mechanical Engineering, A.R.Asrani, S.M.Bhatt and P.K.Shah, B.S. Publs.
4. Elements of Mechanical Engineering, M.L.Mathur, F.S.Metha & R.P.Tiwari Jain Brothers Publs., 2009.
5. Production Technology by P.N.Rao by I & II McGraw-Hill publications

Reference Book:

1. Theory of Machines, S.S. Rattan, Tata McGraw Hil , 2004 & 2009.