

**CE402ES: BASIC MECHANICAL ENGINEERING FOR CIVIL ENGINEERS****B.Tech. II Year II Sem.****L      T/P/D C  
2 0/0/0 2****Course Objectives:** To familiarize civil engineering students with the

- Basic machine elements,
- Sources of Energy and Power Generation,
- Various manufacturing processes,
- Power transmission elements, material handling equipment.

**Course Outcome:** At the end of the course Student will able

- To understand the mechanical equipment for the usage at civil engineering systems,
- To familiarize with the general principles and requirement for refrigeration, manufacturing,
- To realize the techniques employed to construct civil engineering systems.

**UNIT - I:****Machine Elements:** Cams: Types of cams and followers**Introduction to engineering materials**-Metals, ceramics, composites-Heat treatment of metals**Riveted joints**- methods of failure of riveted joints-strength equations-efficiency of riveted joints - eccentrically loaded riveted joints.**UNIT - II:****Power Transmission Elements:** Gears terminology of spur, helical and bevel gears, gear trains. Belt drives (types). Chain drives.**Material Handling equipment:** Introduction to Belt conveyors, cranes, industrial trucks, bull dozers**UNIT - III:****Energy: Power Generation:** External and internal combustion engines (layouts, element/component description, advantages, disadvantages, applications).**Refrigeration:** Mechanical Refrigeration and types – units of refrigeration – Air Refrigeration system, details and principle of operation –calculation of COP**Modes and mechanisms of heat transfer** – Basic laws of heat transfer –General discussion about applications of heat transfer.**UNIT - IV:****Manufacturing Processes:** Sheet Metal Work: Introduction – Equipments – Tools and accessories – Various processes (applications, advantages / disadvantages).**Welding:** Types – Equipments –Techniques employed –welding positions-defects-applications, advantages / disadvantages – Gas cutting – Brazing and soldering. **Casting:** Types, equipments, applications**UNIT - V:****Machine Tools:** Introduction to lathe, drilling machine, milling machine, grinding machine-Operations performed

**TEXT BOOKS:**

1. Kumar, T., Leenus Jesu Martin and Murali, G., *Basic Mechanical Engineering*, Suma Publications, Chennai, 2007

**REFERENCE BOOKS:**

1. Prabhu, T. J., Jai Ganesh, V. and Jebaraj, S., *Basic Mechanical Engineering*, SciTech Publications, Chennai, 2000.
2. Hajra Choudhary, S.K. and Hajra Choudhary, A. K., *Elements of Workshop Technology Vols. I & II*, Indian Book Distributing Company Calcutta, 2007.
3. Nag, P.K., *Power Plant Engineering*, Tata McGraw-Hill, New Delhi, 2008.
4. Rattan, S.S., *Theory of Machines*, Tata McGraw-Hill, New Delhi, 2010.