

ME318 DESIGN OF MACHINE ELEMENTS - II**Course Description & Objective:**

To provide enough hands on experience with the usage of design data book to design standard machine elements like bearings, gears and other elements. Students are familiarized with the design of Internal combustion engine parts to know the way how a system of elements in an engine are designed.

Course Outcomes:

1. Journal and roller bearing design and selection from the data book
2. Gear design against static and dynamic loading along with wear strength
3. Stress and load calculations along with deformations of various types of springs
4. Power screws design and curved beam application to crane hook design
5. Piston, connecting rod and crankshaft design based on maximum bending and twisting moment

UNIT - I Bearings:

Introduction – Classification of bearings – Hydrodynamic and Hydrostatic lubrication – McKee equation – Design of Journal bearings. Design of Thrust bearings. Rolling contact bearings – Classification and selection of rolling contact bearings – Advantages and limitations of rolling contact bearings – Static load carrying capacity – Dynamic load carrying capacity – Life-load relationship – Selecting the bearing using manufacturers catalogue.

UNIT - II Design of Gears:

Classification of gears – Design of spur gears – Lewis Beam strength equation – Buckingham's equation - Wear strength. Design of helical gear.

UNIT - III Design of Springs:

Introduction to springs – Classification – materials used for springs – Nomenclature in springs – Stresses and deflection of springs – Helical, torsional, Coaxial springs. Laminated springs – Stresses and deflection in Leaf springs – Applications.

UNIT - IV Design of Curved Beams:

Introduction - Stresses in curved beams – Expression for radius of neutral axis for rectangular – Circular, trapezoidal and T-Section - Design of crane hooks, C-Clamps.

Design of Power Screws : Types of thread profiles - Square, Buttress, ACME; design of square threads and nuts, design of screw jack, compound screw and differential screw.

UNIT - V Design of Engine Parts:

Design of Piston – Cylinder, Cylinder liner – Connecting rod – Stress due to whipping action on connecting rod ends – Crank and Crank shafts – Side Crank – Center Crank – Crank Pins, Crank Shafts.

DATA BOOKS :

1. B. Mahadevan, "Design Data Hand Books for Mechanical Engineers.", 4th ed., CBS Publishers, 2013.
2. P.S.G., "Design Data Book of Engineers ". 1st ed., Kalaikathir Achagam Publishers, 2011.

Note : Design data books are permitted in the Examination.

TEXT BOOKS :

1. J.E. Shiegly, "Mechanical Engineering Design", 9th ed., Tata McGraw Hill, 2013.
2. V.B. Bhandari, "Design of Machine Elements", 3rd ed., Tata McGraw Hill, 2010.

REFERENCE BOOKS :

1. Juvinell, Marshall, "Fundamentals of Machine Components", 5th ed., John Wiley & Sons, 2011.
2. R.S. Khurmi and J.K. Gupta, "Machine Design", 14th ed., S.Chand & Co., 2010.
3. R.L. Norton, "Machine Design - An Integrated Approach", 5th ed., Pearson Publication, 2013.