

DESIGN OF MACHINE MEMBERS-II

B.Tech. III Year II Semester

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
ME3201PC	Core	3	0	0	3	25	75	100
		Contact Classes: 52		Tutorial Classes: Nil		Practical Classes: Nil	Total Classes: 52	

Prerequisites: Study of engineering mechanics, design of machine members-I and theory of machines.

I. COURSE OVERVIEW:

The Design of machine members-II focus mainly on design of power transmitting elements like gears, Connecting rod, crankpin, crankshafts, pistons, cylinders, bearings, belts, ropes, chain's, pulleys, Power Screws and nuts.

II. COURSE OBJECTIVES:

- To gain knowledge about designing the commonly used important machine members such as bearings, engine parts, springs, belts, gears etc.
- To design the components using the data available in design data books.

III. COURSE OUTCOMES:

- Knowledge about journal bearing design using different empirical relations.
- Estimation of life of rolling element bearings and their selection for given service conditions.
- Acquaintance with design of the components as per the standard, recommended procedures which is essential in design and development of machinery in industry.

Note: Design Data Book is permitted. Design of all components should include design for strength and rigidity apart from engineering performance requirements.

IV. COURSE SYLLABUS:

UNIT-I

Sliding contact bearings: Types of Journal bearings - Lubrication - Bearing Modulus - Full and partial bearings - Clearance ratio - Heat dissipation of bearings, bearing materials - journal bearing design.

UNIT-II:

Rolling contact bearings: Ball and roller bearings - Static load - dynamic load - equivalent radial load - Design and selection of ball & roller bearings.

UNIT-III:

Engine Parts: Connecting Rod: Thrust in connecting rod - stress due to whipping action on connecting rod ends - Pistons, Forces acting on piston - Construction, Design and proportions of piston.

UNIT-IV:

Mechanical Springs: Stresses and deflections of helical springs - Extension and compression springs - Design of springs for fatigue loading - natural frequency of helical springs - Energy storage capacity - Helical torsion springs - Design of co-axial springs, Design of leaf springs.

Belts & Pulleys: Transmission of power by Belt and Rope Drives, Transmission efficiencies, Belts - Flat and V types - Ropes - pulleys for belt and rope drives.

UNIT –V:

Gears: Spur gears& Helical gears- Brief introduction involving important concepts - Design of gears using AGMA procedure involving Lewis and Buckingham equations. Check for wear.

TEXT BOOKS:

1. Design of Machine Elements / Spotts/ Pearson
2. Machine Design / Pandya & Shah / Charohtar

REFERENCE BOOKS:

1. Design of Machine Elements-II / Kannaiah / New Age
2. Design of Machine Elements / Sharma and Purohit/PHI
3. Design Data Book / P.V. Ramana Murthi & M. Vidyasagar/ B.S. Publications
4. Design Data Handbook / S. Md. Jalaludeen/ Anuradha Publishers