



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA 533003, Andhra Pradesh, India
DEPARTMENT OF MECHANICAL ENGINEERING

III Year - II Semester		L	T	P	C
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DESIGN OF MACHINE MEMBERS-II					

Course objectives:

- 1) To gain knowledge about the design of bearings.
- 2) To understand the concepts in designing various engine parts.
- 3) To gain knowledge to design curved beams and power screws.
- 4) To understand power transmission systems and to design pulleys and gear drives.
- 5) To understand the concepts in designing various machine tool elements.

UNIT– I:

BEARINGS: Classification of bearings- applications, types of journal bearings – lubrication – bearing modulus – full and partial bearings – clearance ratio – heat dissipation of bearings, bearing materials – journal bearing design – ball and roller bearings static loading of ball & roller bearings, bearing life.

UNIT– II:

ENGINE PARTS: Connecting Rod: Thrust in connecting rod – stress due to whipping action on connecting rod ends – cranks and crank shafts, strength and proportions of over hung and center cranks – crank pins, crank shafts.

Pistons, forces acting on piston construction design and proportions of piston, cylinder, cylinder liners,

UNIT– III:

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: Design of screw, square ACME, buttress screws, design of nut, compound screw, differential screw, ball screw- possible failures.

UNIT– IV:

POWER TRANSMISSIONS SYSTEMS, PULLEYS: Transmission of power by belt and rope drives, transmission efficiencies, belts – flat and V types – ropes - pulleys for belt and rope drives, materials, chain drives

SPUR & HELICAL GEAR DRIVES: Spur gears- helical gears – load concentration factor – dynamic load factor, surface compressive strength – bending strength – design analysis of spur gears – estimation of centre distance, module and face width, check for plastic deformation, check for dynamic and wear considerations.



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UNIT– V:

MACHINE TOOL ELEMENTS: Levers and brackets: design of levers – hand levers-foot lever – cranked lever – lever of a lever loaded safety valve- rocker arm straight – angular- design of a crank pin – brackets- hangers- wall boxes.

Wire Ropes: Construction, Designation, Stresses in wire ropes, rope sheaves and drums.

Note: Design data book is permitted for examination

TEXT BOOKS:

1. Machine Design/ V. Bhandari/TMH Publishers
2. Machine Design/ NC Pandya & CS Shaw/ Charotar publishers

REFERENCES:

1. Machine Design: An integrated Approach / R.L. Norton / Pearson Education
2. Mech. Engg. Design / JE Shigley/Tata McGraw Hill education
3. Design of machine elements- spots/Pearson Publications
4. Machine Design-Norton/Pearson Publications.

Course Outcomes: At the end of the course, student will be able to

CO1: Apply knowledge about the design of bearings.

CO2: Explain the concepts in designing various engine parts.

CO3: Utilize the knowledge to design curved beams and power screws.

CO4: Justify power transmission systems and to design pulleys and gear drives.

CO5: Apply the concepts in designing various machine tool elements.