

DESIGN OF MACHINE ELEMENTS-I

Sub Code	: 10ME 52	IA Marks	: 25
Hrs/week	: 04	Exam Hours	: 03
Total Lecture Hrs	: 52	Exam Marks	: 100

PART - A**UNIT- 1**

Introduction: Definitions: normal, shear, biaxial and tri axial stresses, Stress tensor, Principal Stresses. Engineering Materials and their mechanical properties, Stress-Strain diagrams, Stress Analysis, Design considerations: Codes and Standards.

05 Hours**UNIT- 2****Design For Static & Impact Strength:**

Static Strength: Static loads and factor of safety, Theories of failure: Maximum normal stress theory, Maximum shear stress theory, Maximum strain theory, Strain energy theory, Distortion energy theory. Failure of brittle and ductile materials, Stress concentration, Determination of Stress concentration factor.

Impact Strength: Introduction, Impact stresses due to axial, bending and torsional loads, effect of inertia.

07 Hours**UNIT - 3**

Design For Fatigue Strength: Introduction- S-N Diagram, Low cycle fatigue, High cycle fatigue, Endurance limit, Modifying factors: size effect, surface effect, Stress concentration effects, Fluctuating stresses, Goodman and Soderberg relationship, stresses due to combined loading, cumulative fatigue damage.

08 Hours**UNIT - 4**

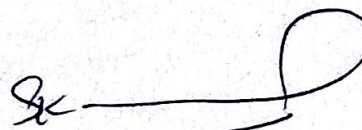
Threaded Fasteners: Stresses in threaded fasteners, Effect of initial tension, Design of threaded fasteners under static, dynamic and impact loads, Design of eccentrically loaded bolted joints.

06 Hours**PART - B****UNIT - 5**

Design Of Shafts: Torsion of shafts, design for strength and rigidity with steady loading, ASME codes for power transmission shafting, shafts under fluctuating loads and combined loads.

07 Hours**UNIT - 6**

Cotter And Knuckle Joints, Keys And Couplings: Design of Cotter and Knuckle joints, Keys: Types of keys, Design of keys, Couplings: Rigid and


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flexible couplings, Flange coupling, Bush and Pin type coupling and Oldham's coupling. 4

UNIT - 7

07 Hours

Riveted and Welded Joints – Types, rivet materials, failures of riveted joints, Joint Efficiency, Boiler Joints, Lozanze Joints, Riveted Brackets. Welded Joints – Types, Strength of butt and fillet welds, eccentrically loaded welded joints.

UNIT - 8

07 Hours

Power Screws: Mechanics of power screw, Stresses in power screws, efficiency and self-locking, Design of Power Screw, Design of Screw Jack: (Complete Design).

05 Hours

TEXT BOOKS

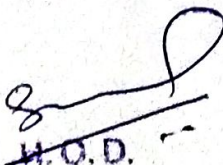
1. **Mechanical Engineering Design**, Joseph E Shigley and Charles R. Mischke. McGraw Hill International edition, 6th Edition 2009.
2. **Design of Machine Elements**, V.B. Bhandari, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2nd Edition 2007.

DESIGN DATA HANDBOOK

1. **Design Data Hand Book**, K. Lingaiah, McGraw Hill, 2nd Ed.
2. **Data Hand Book**, K. Mahadevan and Balaveera Reddy, CBS Publication
3. **Design Data Hand Book**, H.G. Patil, I. K. International Publisher, 2010.

REFERENCE BOOKS

1. **Machine Design**, Robert L. Norton, Pearson Education Asia, 2001.
2. **Design of Machine Elements**, M. F. Spotts, T. E. Shoup, L. E. Hornberger, S. R. Jayram and C. V. Venkatesh, Pearson Education, 2006.
3. **Machine Design**, Hall, Holowenko, Laughlin (Schaum's Outlines series) Adapted by S.K. Somani, Tata McGraw Hill Publishing Company Ltd., New Delhi, Special Indian Edition, 2008.
4. **Fundamentals of Machine Component Design**, Robert C. Juvinall and Kurt M Marshek, Wiley India Pvt. Ltd., New Delhi, 3rd Edition, 2007.



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