

Devi Ahilya University, Indore, India Institute of Engineering & Technology			III Year B.E. (Mechanical Engg.) (Full Time)				
Subject Code & Name	Instructions Hours per Week			Credits			
MER5C2 MACHINE DESIGN I	L	T	P	L	T	P	Total
Duration of Theory Paper: 4 Hours	3	1	0	3	1	0	4

**Learning Objectives:**

1. To introduce the students about the concept and importance of the design (A decision making)
2. To give the concept about the theories of failures and importance of material's selection in design
3. To give the concepts about the design of basic mechanical components like springs, rotating elements etc.

**Pre requisite(s):** Theory of Machines, Strength of Materials, Material Science.

**COURSE CONTENTS**

**UNIT-I**

**Theory of Failures & Applications:**Theories of failure, their applications to the design problems. Design of parts subjected to torsional and/ or bending such as spiral, helical and leaf springs.

**UNIT-II**

**Pressure Vessels and Cover Plates:**Analysis of thick cylindrical and spherical shells, compound cylinders, joint for steam and hydraulic pipes, parts of press fit and shrink fit, design consideration of pressure vessels and cover plates.

**UNIT-III**

**Rotating Rings and Disks:**Disk of uniform thickness and disk of uniform strength. Effect of drilled hole and extra mass, design of flywheel and pulleys.

**UNIT-IV**

**Design Analysis of Curved Machine Members:**Crane Hook, Chain link, open and closed links, M/c. Frames, Wall brackets, design and selection of hooks and wire ropes.

**UNIT-V**

**Experimental Methods in Design:** Brief idea about experimental stress analysis techniques and their applications and limitation.

**Note:** Only Mechanical Engineer's Handbook, Data-books and Certified notes are allowed in the examination hall.

**Learning Outcomes:**

After Completing the Course, Student will be able to:

1. Have the importance, role and concept of design
2. Learn to apply the knowledge of material science in real life situations.
3. Design the basic machine elements like spring, cylinder etc.
4. Know about the latest stress analysis techniques

**BOOKS RECOMMENDED:**

- [1]. Shingley J.E., *Mechanical Engineering Design*, McGraw-Hill 2003.
- [2]. Spotts M.F., Shoup T.E., Hrnberger L.E., *Design of Machine Elements*, Pearson Education ,8e, 2006
- [3]. Sharma P.C. & Aggarwal D.K., *Machine Design*, S.K.Kataria & Sons, 11e, 2006
- [4]. Shariff A., *Design of Machine Elements*, Dhanpat Rai Publications(P) Ltd., 3e, 1995