

DEPARTMENT OF MECHANICAL ENGINEERING

applications.

Welded joints: Types, strength of butt and fillet welds, eccentrically loaded welded joints, Discussion on engineering applications.

Spur Gears: Definitions, stresses in gear tooth: Lewis's equation and form factor, design for strength, dynamic load and wear.

Module – 4

Helical Gears: Definitions, transverse and normal module, formative number of teeth, design based on strength, dynamic load and wear.

Bevel Gears: Definitions, formative number of teeth, design based on strength, dynamic load and wear.

Worm Gears: Definitions, types of worm and worm gears, and materials for worm and worm wheel. Design is based on strength, dynamic, wear loads and efficiency of worm gear drives.

Module – 5

Design of Clutches and Brakes: Design of single plate, multi-plate based on uniform pressure and uniform wear theories. Design of band brakes, block brakes

Lubrication and Bearings: Lubricants and their properties, bearing materials and properties. mechanisms of lubrication, hydrodynamic lubrication, pressure development in oil film, bearing modulus, coefficient of friction, minimum oil film thickness, heat generated, and heat dissipated.

List of Textbooks:

- 1 Shigley's Mechanical Engineering Design Richard G. Budynas, and J. Keith Nisbett McGraw-Hill Education 10th Edition, 2015
- 2 Fundamentals of Machine Component Design Juvinall R.C, and Marshek K.M John Wiley & Sons Third Edition 2007 Wiley student edition
- 3 Design of Machine Elements V. B. Bhandari Tata McGraw Hill 4th Ed 2016.

Reference Books:

1. Machine Design- an integrated approach Robert L. Norton Pearson Education 2nd edition.
2. Design and Machine Elements Spotts M.F., Shoup T.E Pearson Education 8th edition, 2006.
3. Machine Component Design Orthwein W Jaico Publishing Co 2003.
4. Machine Design Hall, Holowenko, Laughlin (Schaum's Outline series) Tata McGraw Hill Publishing Special Indian Edition, 2008.
5. Elements of Machine Design H.G.Patil, S.C.Pilli, R.R.Malagi, M.S.Patil IK International First edition, 2019.
6. Design of Machine Elements Volume I and II T. Krishna Rao, IK international publishing house 2012.
7. Hand book of Mechanical Design G. M. Maithra and L.V.Prasad Tata McGraw Hill 2nd edition, 2004.

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Course Outcomes

At the end of the course, the student will be able to

CO1: Apply codes and standards in the design of machine elements and select an element based on the Manufacturer's catalogue.

CO2: Analyze the performance and failure modes of mechanical components subjected to combined loading and fatigue loading using the concepts of theories of failure.

CO3: Demonstrate the application of engineering design tools to the design of machine components like shafts, springs, couplings, fasteners, welded and riveted joints, brakes and clutches.

CO4: Design different types of gears and simple gear boxes for relevant applications.

CO5: Apply design concepts of hydrodynamic bearings for different applications and select Anti friction bearings for different applications using the manufacturers, catalogue.

Scheme of Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub questions), should have a mix of topics under that module.
3. The students must answer 5 full questions, selecting one full question from each module.
4. Marks scored shall be proportionally reduced to 50 marks.

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code: BME602				TITLE: Machine Design				Faculty Name:				
List of Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO-1	3	3	3	2	1	-	-	1	-	2	-	2
CO-2	3	3	3	2	1	-	-	-	-	2	-	2
CO-3	3	3	3	2	2	-	-	-	-	2	-	1
CO-4	3	3	3	2	2	-	-	-	-	2	-	1
CO-5	3	3	3	2	2	-	-	-	-	2	-	1
	Program Specific Outcomes											
	PSO1						PSO2					
CO-1	-						2					
CO-2	-						2					
CO-3	2						3					
CO-4	2						3					
CO-5	2						2					

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution