



Teaching Plan

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
23ME5T03	Design of Machine Elements	V	ME	6	2025-2026	09-07-2025

Course Outcomes:		
1	Describe the Design procedure and evaluate the size of simple mechanical components subjected to static and dynamic loads considering theories of failure.	[K4]
2	Design the permanent joints such as riveted joints, welded joints	[K4]
3	Design the shafts and shaft couplings. / Design the shafts and curved beams.	[K4]
4	Design of the friction clutches, brakes and springs.	[K4]
5	Design and Select a suitable Bearing for both static and dynamic loads.	[K4]
6	Design the spur gears based on beam strength.	[K4]

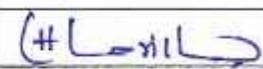
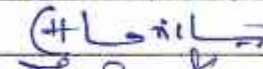
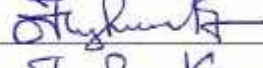
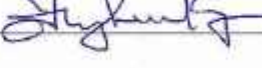
UNIT	Outcomes/ Bloom's Level	Topic No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
Introduction, Design for Static and Dynamic loads						
I	Design the machine members subjected to static and dynamic loads. [K4]	1.1	Mechanical Engineering Design: Design process, design considerations	T1,T2,R1	1	Chalk & Talk, PPT
		1.2	Codes and standards of designation of materials	T1,T2,R1	1	
		1.3	selection of materials	T1,T2,R1	1	
		1.4	Design for Static Loads: Modes of failure	T1,T2,R1	1	
		1.5	Design of components subjected to axial	T1,T2,R1	1	
		1.6	bending, torsional and impact loads.	T1,T2,R1	1	
		1.7	Theories of failure for static loads	T1,T2,R1	2	
		1.8	Design for Dynamic Loads: Endurance limit, fatigue strength under axial, bending and torsion	T1,T2,R1	1	
		1.9	Stress concentration, notch sensitivity.	T1,T2,R1	1	
		1.1	Types of fluctuating loads, fatigue design for infinite life	T1,T2,R1	2	

		1.11	Soderberg, Goodman and modified Goodman criterion for fatigue failure	T1,T2,R1	2	
		1.12	Fatigue design under combined stresses.	T1,T2,R1	1	
		CBS	Basics of GD&T		1	
					16	
Design of Bolted and Welded Joints						
II	Design the permanent joints such as riveted joints, welded joints [K4]	2.1	Design of Bolted Joints: Threaded fasteners, preload of bolts	T1,T2,R1	2	Chalk& Talk, PPT
		2.2	Various stresses induced in the bolts.	T1,T2,R1	2	
		2.3	Torque requirement for bolt tightening	T1,T2,R1	2	
		2.4	Gasketed joints.	T1,T2,R1	2	
		2.5	Welded Joints: Strength of lap and butt welds,	T1,T2,R1	2	
		2.6	Joints subjected to bending and torsion.	T1,T2,R1	2	
		Total			12	
Power transmission shafts and Curved Beams						
III	Design the shafts and curved beams. [K4]	3.1	Power Transmission Shafts: Design of shafts subjected to bending	T1,T2,R1	1	Chalk& Talk, PPT, PBL
		3.2	Torsion and axial loading.	T1,T2,R1	1	
		3.3	Shafts subjected to fluctuating loads using shock factors	T1,T2,R1	4	
		3.4	Curved Beams: Design of curved beams	T1,T2, T5,R1	1	
		3.5	Introduction, stresses in curved beams	T1,T2, T5,R1	1	
		3.6	Design of crane hooks for rectangular section, circular section, trapezoidal section, T – section and I section.	T1,T2, T5,R1	2	
		3.7	C – clamps for rectangular section, circular section, trapezoidal section, T – section and I section.	T1,T2, T5,R1	2	
		Total			12	
Design of Clutches, Brakes and Springs						
IV	Design of the friction clutches, brakes and springs. [K4]	4.1	Friction Clutches: Torque transmitting capacity of disc and centrifugal clutches.	T1,T2,R1	1	Chalk& Talk, PPT, Animations
		4.2	Uniform wear theory	T1,T2,R1	1	
		4.3	Uniform pressure theory.	T1,T2,R1	1	
		4.4	Brakes: Different types of brakes.	T1,T2,R1	1	

		4.5	Concept of self-energizing	T1,T2,R1	1	
		4.6	Self-locking of brake	T1,T2,R1	2	
		4.7	Band and block brakes,	T1,T2,R1	1	
		4.8	Disc brakes.	T1,T2,R1	1	
		4.9	Springs: Design of helical compression,	T1,T2,R1	1	
		4.1	tension, torsion Springs	T1,T2,R1	1	
		4.11	Leaf springs	T1,T2,R1	1	
		Total			12	
Design of Bearings and Gears						
V	Design and Select a suitable Bearing for both static and dynamic loads. Design the spur gears based on beam strength. [K4]	5.1	Design of Sliding Contact Bearings: Lubrication modes, bearing modulus,	T1,T2, T5,R1	1	Chalk & Talk, PPT Model Based Learning
		5.2	Mckee's equations,	T1,T2, T5,R1	1	
		5.3	Design of journal bearing.	T1,T2, T5,R1	1	
		5.4	Bearing failures.	T1,T2, T5,R1	1	
		5.5	Design of rolling contact bearings: static and dynamic load capacity,	T1,T2, T5,R1	1	
		5.6	Stribeck's equation,	T1,T2, T5,R1	1	
		5.7	Equivalent bearing load	T1,T2, T5,R1	1	
		5.8	Load-life relationships	T1,T2, T5,R1	1	
		5.9	Load factor	T1,T2, T5,R1	1	
		5.1	Selection of bearings from manufacturer's catalogue.	T1,T2, T5,R1	1	
		5.11	Design of Gears: Spur gears,	T1,T2, T5,R1	1	
		5.12	Beam strength,	T1, T2, T5, R1	1	
		5.13	Lewi's equation,	T1, T2, T5, R1	1	
		5.14	Design for dynamic and wear loads.	T1, T2, T5, R1	1	
	CBS	Design of Bevel Gears		1		
		Total			15	
Total					67	

Text Books:	
1	Bhandari V, "Design of Machine Elements", 4th Edition, Tata McGraw-Hill Book Co, 2017.
2	R.S. Khurmi, J.K.Guptha, "Machine Design", 14th Edition, S Chand publications, 2005.
3	R.L. Norton, Machine Design an Integrated approach, 2/e, Pearson Education, 2004.
4	Dr. N. C. Pandya &Dr. C. S. Shah, Machine design, 17/e, Charotar Publishing House Pvt. Ltd, 2009.
5	Design Data: Data Book of Engineers- PSG College – Kalaikathir Achchagam, Coimbatore, 2012.
Reference Books:	
1	R.K. Jain, Machine Design, Khanna Publications, 1978
2	J.E. Shigley, Mechanical Engineering Design, 2/e, Tata McGraw Hill, 1986
3	M.F.Spotts and T.E.Shoup, Design of Machine Elements, 3/e, Prentice Hall (Pearson Education), 2013.

Web Details	
1	https://nptel.ac.in/courses/112/105/112105124/
2	https://nptel.ac.in/courses/112/105/112105125/
3	https://www.yumpu.com/en/document/view/18818306/lesson-3-course-name-design-of-machine-elements-1-npte
4	https://www.digimat.in/nptel/courses/video/112105124/L01.html
5	https://dokumen.tips/documents/nptel-design-of-machine-elements-1.html
6	http://www.nitttrc.edu.in/nptel/courses/video/112105124/L25.html

		Name	Signature with Date
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PRINCIPAL