

SWARNANDHRA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by NAAC with "A" Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956, Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF MECHANICAL ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
19ME5T01	DESIGN OF MACHINE ELEMENTS	V	Mechanical Engineering	6	2021-22	4-10-2021
COURSE OUTCOMES						
1	Describe the design process, material selection, stress concentrations under various loading. [K2]					
2	Design the machine elements like shaft, couplings and keys. [K4]					
3	Design the temporary joints such as cotter joints, knuckle joints, and screw joints. [K4]					
4	Design the permanent joints such as riveted joints, welded joints. [K4]					
5	Design and analyze mechanical springs for the given loading conditions. [K4]					
UNIT	Out Comes/ Bloom's Level	Topics No.	Topics/Activity	Text Book/ Reference	Contact Hour	Delivery Method
I	CO1: Describe the design process, material selection, stress concentrations under various loading. [K2]	Unit-1. INTRODUCTION				
		1.1	Introduction , a) Basic Procedure of Machine Design, b) classification of machine design ,	T1,T2	1	Chalk & Talk, PPT, & Tutorial
		1.2	a) Classification of engineering materials, b) Selection of materials for engineering ,	T1,T2	1	
		1.3	Mechanical properties of materials.	T1,T2	1	
		1.4	a) Manufacturing consideration in design. b) Manufacturing Processes like Casting, c) Forging. Mechanical Working of Metals	T1, T2	1	
		1.5	a) Tolerances and fits–Types of Fits, b) Basis of Limit System, Indian Standard System of Limits and Fits. BIS codes of steels	T1, T2	1	
		1.6	Concept of Machine Design: Types of loads	T1,T2	1	



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	1.7	Different types of stresses and strain, types of elastic constants and relation between them.	T1, T2	1		
	1.8	Different modes of failure in machine members	T1, T2	1		
	1.9	Principal stresses- Determination of Principal Stresses for a Member Subjected to Bi-axial Stress	T1, T2	1		
	1.10	Application of Principal Stresses in Designing Machine Members	T1, T2	1		
	1.11	Theories of failures- a) Maximum Principal or Normal Stress Theory (Rankine's Theory) b) Maximum Shear Stress Theory (Guest's or Tresca's Theory)	T1, T2	1		
	1.12	a) Maximum Principal Strain Theory (Saint Venant's Theory) b) Maximum Strain Energy Theory (Haigh's Theory)	T1, T2	1		
	1.13	Maximum Distortion Energy Theory (Hencky and Von Mises Theory).	T1, T2	1		
	1.14	Design of simple machine parts.	T1, T2	1		
	Total				14	
	II	Unit-2 SHAFTS, KEYS AND COUPLINGS				
	CO2: Design the machine elements like shaft, couplings and keys. [K4]	2.1	a) Introduction, b) Material Used for Shafts, Manufacturing of Shafts.	T1, R3	1	Chalk & Talk, PPT, & Tutorial
		2.2	Shafts subjected to bending	T1, R3	1	
		2.3	Shafts subjected to torsion	T1, R3	2	
		2.4	Shafts subjected to axial loading	T1, R3	2	
2.5		Shafts subjected to fluctuating loads	T1, R3	2		
2.6		a) Design of shafts based on rigidity	T1, R3	1		
2.7		Keys-types, Design of keys,	T1, R3	1		
2.8		Couplings – design of flange and universal couplings.	T1, R3	1		



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		2.9	Muff and Split Muff Coupling	T1, R3	1		
		Total			12		
III	CO3: Design the temporary joints such as cotter joints, knuckle joints, and screw joints. [K4]	Unit-3. DESIGN OF TEMPORARY JOINTS					Chalk & Talk, PPT, & Tutorial
		3.1	Socket & Spigot cotter joint,	T2, R2	3		
		3.2	Sleeve & Cotter joint	T2, R2	3		
		3.3	Gib and Cotter joint	T2, R2	2		
		3.4	Knuckle Joint.	T2, R2	2		
		3.5	Bolted joints – design of bolts with pre-stresses	T2, R2	2		
		3.6	Design of joints under eccentric loading.	T2, R2	2		
		Total			14		
IV	CO4: Design the permanent joints such as riveted joints, welded joints. [K4]	Unit-4. DESIGN OF PERMANENT JOINTS					Chalk & Talk, PPT, & Tutorial
		4.2	Types of riveted joints,	T1, T2	1		
		4.3	Types of failures, Efficiency of riveted joint,	T1, T2	2		
		4.4	Design of joints for boiler Shell	T1, T2	3		
		4.5	Eccentrically loaded riveted joints	T1, T2,	3		
		4.6	Welded joints- types,	T1, T2	2		
		4.7	Strength of parallel fillet welds, transverse fillet welds,	T1, T2	1		
		4.8	Axially loaded unsymmetrical welded joints,	T1, T2	1		
		4.9	Eccentrically loaded welded joints.	T1, T2	1		
		Total			14		
V	CO5: Design and analyze mechanical springs for the given loading conditions. [K4]	Unit 5. MECHANICAL SPRINGS					Chalk & Talk, PPT, & Tutorial
		5.1	Helical springs- a) Classification, b) terminology c) spring materials,	T1, T3,R1	2		
		5.2	a) Spring end formation. b) Design of helical springs	T1, T2	3		
		5.3	classification, terminology, spring materials	T1, T3, R1	2		
		5.4	concentric springs, and surge in spring, helical torsion springs	T1, T3, R1	2		
		5.5	Design of Leaf springs. Helical springs	T1, T3, R1	2		
		Total			11		



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CUMULATIVE PROPOSED PERIODS	Total	65
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Text Books:

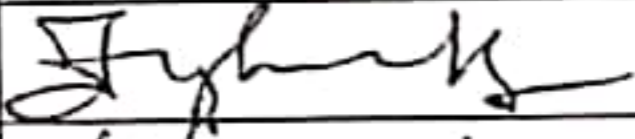
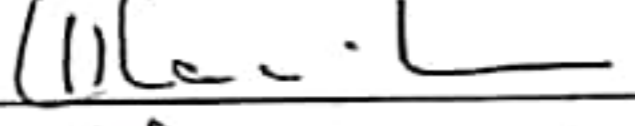
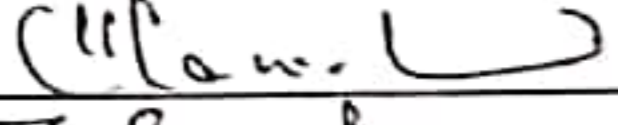
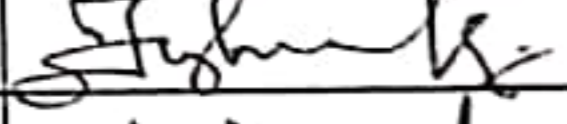
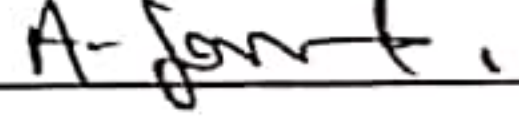
S. No.	
T1	1. Bhandari V, "Design of Machine Elements", 4th Edition, Tata McGraw-Hill Book Co, 2017.
T2	2. R.S. khurmi, J.K.Guptha, "Machine Design", 14th Edition, S Chand publications, 2020.
T3	3. P.C. Sharma., D.K. Agarwal, "Machine Design", 8th Edition, S.K.Kataria& Sons, 2010.
T4	4. S MD Jalaludin, "Machine Design", 3rd Edition, Anuradha Publishers, 2016.

Reference Books:

S.No.	
R1	Schaum Series, "Machine design", 1st Edition, McGraw Hill Professional publications, 2017
R2	Pandya& shah, "Machine design", 20th Edition, Charotar Publishing House Pvt. Limited, 2015.
R3	Machine design - Pandya & shah / Charotar Publishing House Pvt. Limited.

Web Details

1	https://nptel.ac.in/courses/112/105/112105124/
2	https://nptel.ac.in/courses/112/105/112105125/

	Name	Signature with Date
i. Faculty	Dr. FRANCIS LUTHER KING.M	
ii. Faculty II (for common Course)	Mr. CH. HARISH KUMAR	
iii. Course Coordinator	Mr. CH. HARISH KUMAR	
iv. Module Coordinator	Dr. FRANCIS LUTHER KING.M	
v. Programme Coordinator	Dr. A. GOPI CHAND	


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