



LESSON PLAN: 2023-24

Sub: DESIGN OF MACHINE ELEMENTS

Faculty name : Prasanna Mohanty
Branch : Mechanical Engineering
Semester : 5th
Duration : 60 hours

forces
Objective : This subject useful for detailed study of 1. Understanding the behaviours of material and their uses. 2. Understanding the design of various fastening elements and their industrial uses. 3. Understanding the different failures of design elements. 4. Understanding the change of design to accomplish the different field of applications. 5. Design shafts, keys, couplings required for power transmission. 6. Design closed coil helical spring

Learning Outcome:

Machine design is the art of planning or devising new or improved machines to accomplish specific purposes. Idea of design is helpful in visualizing, specifying and selection of parts and components which constitute a machine. Hence all mechanical engineers should be conversant with the subject

Sl.No	Chapter	Proposed Week for Teaching	Lecture No.	Sub. Topic	Important Teaching Points	Content Source
1	I	1	1	Introduction to Machine Design and Classify it	Basic fundamental classes	R.S. KHURMI
2			2	Simple Stress & Strain	Explain stress, strain curve. Elasticity Plasticity Stress strain	R.S. KHURMI
3			3	Different mechanical engineering materials	their mechanical and physical properties	R.S. KHURMI

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4			4	Define working stress, yield stress, ultimate stress & factor of safety	strain curve for M.S & C.I	R.S. KHURMI
5	I	2	1	Modes of Failure	(By elastic deflection, general yielding & fracture	R.S. KHURMI
6			2	Cont.	Cont.	R.S. KHURMI
7			3	factors governing the design of machine elements	General consideration	R.S. KHURMI
8			4	design procedure.	Method adoption during design.	R.S. KHURMI
9	I & II	3	1	Design of fastening elements	Joints and their classification	R.S. KHURMI
10			2	types of welded joints	Lap ,butt etc.	R.S. KHURMI
11			3	advantages of welded joints over other joints	advantages of welded joints over other joints derivation	R.S. KHURMI
12			4	Thin cylinder and spherical shell under internal pressure	Longitudinal stress 2 Derivation Thin spherical shell under internal pressure derivation	R.S. KHURMI
13	II	4	1	Design of welded joints	for eccentric loads.	R.S. KHURMI
			2	types of riveted joints	types of riveted joints	R.S. KHURMI NOTES
14			3	failure of riveted joints	Tearing, shearing & crushing	R.S. KHURMI NOTES

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				numericals		
15			4	numericals	numericals	R.S. KHURMI NOTES
16	II & III	5	1	numericals	Numerical problemson above	R.S. KHURMI
17			2		Solved Previousyear question	R.S. KHURMI
18			3	strength & efficiency of riveted joints.	Determination of strength & efficiency of riveted joints. plane.	R.S. KHURMI
19			4	strength & efficiency of riveted joints.	Determination of strength & efficiency of riveted joints. plane.	R.S. KHURMI
20			III	6	1	Design riveted joints for pressure vessel.
21	2	Two-dimensional stress systems			Hoop & longitudinal stress	R.S. KHURMI
22	3	Solve numerical on Welded Joint and Riveted Joints			Solve numerical on Welded Joint and Riveted Joints	R.S. KHURMI
23	4	Solve numerical on Welded Joint and Riveted Joints			Solve numerical on Welded Joint and Riveted Joints	R.S. KHURMI
24	III III		1	Design of shafts and Keys	introduction	R.S. KHURMI
25			2	function of shafts	Power transmission	R.S. KHURMI
26			3	materials for shafts.	Types of material.	R.S. KHURMI
27			4	Design solid & hollow shafts	Numerical problemson above	R.S. KHURMI
28	III		1	Strength: (i) Shear stress, (ii) Combined bending	Numerical problemson above	R.S. KHURMI
29			2	tension; b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity	Numerical problemson above	R.S. KHURMI

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30	& IV	7	3	standard size of shaft as per I.S	Types of shaft available	R.S. KHURMI
31			4	function of keys	types of keys & material of keys.	R.S. KHURMI
32	III	8	1	Describe failure of key	Problems on above.	R.S. KHURMI
33			2	effect of key way	Explain simply Problems on above.	R.S. KHURMI
34			3	Design rectangular sunk key	its failure against shear & crushing	R.S. KHURMI
35			4	Design rectangular sunk key	Explain Problems on above	R.S. KHURMI
36			1	Design rectangular sunk key	by using empirical relation for given diameter of shaft.	R.S. KHURMI
37	III	9	2	Bending moment & shear force	over hanging beam problem With UDL & point load.	R.S. KHURMI
38			3	State specification of parallel key	gib-head key, taper key	R.S. KHURMI PG NO 313,314
39			4	numerical on Design of Shaft and keys.	numerical on Design of Shaft and keys.	R.S. KHURMI
40	IV	10	1	Design of Coupling	Introduction	R.S. KHURMI.
41			2	Design of Shaft Coupling	Requirements of a good shaft coupling	R.S. KHURMI
42			3	Cont.	Cont.	R.S. KHURMI

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43			4	Types of Coupling	Muff, sleeve etc.	R.S. KHURMI
44	IV	11	1	Design of Sleeve	problems on above.	R.S. KHURMI
45			2	Numerical	problems on above.	R.S. KHURMI
46			3	Numerical	problems on above.	R.S. KHURMI
47			4	Compression Coupling	problems on above.	R.S. KHURMI
48			V	12	1	Design a closed coil helical spring:
49	2	Cont..			Cont..	R.S. KHURMI
50	3	Materials used for helical spring.			Numerical problems on above	R.S. KHURMI
51	4	Combined direct & bending stresses			Numerical problems on above	R.S. KHURMI
52	V	13			1	Standard size spring wire
53			2	Terms used in compression spring	Terms used in compression spring	R.S. KHURMI
54			3	Stress in helical spring	Numerical problems on above	R.S. KHURMI
55			4	Deflection of helical spring	Numerical problems on above	R.S. KHURMI

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56	V	14	1	Surge in spring	Meaning & Definition	R.S. KHURMI
57			2	Solve numerical	on design of closed coil helical compression spring	R.S. KHURMI
58			3	Solve numerical	Numerical problems on above	R.S. KHURMI
59			4	Solve numerical	Previous year question paper	R.S. KHURMI

Text book suggested : R.S. KHURMI & PERSONAL NOTES

Signature of

Faculty Member

HOD

Principal/ Director