

MECHANICAL ENGINEERING DEPARTMENT

Session 2024-2025(4th semester)

Subject:-Machine Design

Load:-3 hrs Theory

Lesson Plan

Week	THEORY	
	Day Lecture	Topic (Including Assignment/Test)
1	1	Introduction: Design – Definition, Type of design, necessity of design, Comparison of designed, and undersigned work, Design procedure, Characteristics of a good designer
	2	Design terminology: stress, strain, factor of safety, factors affecting factor of safety, stress concentration, methods to reduce stress concentration
	3	Fatigue, creep and tenacity, endurance limit. S-N Curve and its significance
2	1	General design consideration, Selection of materials, criteria of material selection, Codes and Standards (BIS standards)
	2	Various design failures- maximum normal stress theory, maximum stress theory, maximum strain theory
	3	Numericals
3	1	Design of Shaft: Type of shaft, shaft materials, Type of loading on shaft, standard sizes of shaft available
	2	Shaft subjected to torsion only, determination of shaft diameter (hollow and solid shaft) on the basis of : - Strength criterion - Rigidity criterion
	3	Determination of shaft diameter (hollow and solid shaft) subjected to bending
4	1	Numericals
	2	Determination of shaft diameter (hollow and solid shaft) subjected to combined torsion and bending.
	3	Numericals
5	1	Revision
	2	Assignment 1
	3	1st Sessional test
	4	Design of Key: Types of keys, materials of key, functions of key
6	1	Failure of key (by Shearing and Crushing).
	2	Design of key (Determination of key dimension) Effect of key-way on shaft strength
	3	Numericals
7	1	UNIT IV: Design of Coupling: Necessity of a coupling, advantages of a coupling, types of couplings,
	2	Design of muff coupling,
	3	Numericals
8	1	Design of flange coupling. (Both protected type and unprotected type).
	2	Design of Joints: Types of joints - Temporary and permanent joints, utility of various joints
	3	Design of Temporary Joints: Knuckle Joints – Different parts of the joint, material used for the joint, type of knuckle Joint, design of the knuckle joint.

9	1	Numericals
	2	Cotter Joint – Different parts of the spigot and socket joints, Design of spigot and socket joint.
	3	Numericals
10	1	Revision
	2	2nd Sessional test
	3	Design of Permanent Joint: Riveted Joints. : Rivet materials, Rivet heads, leak proofing of riveted joint – caulking and fullering.
11	1	Different modes of rivet joint failure.
	2	Design of riveted joint – Lap and butt, single and multi-riveted joint.
	3	Welded Joint - Welding symbols. Type of welded joint, strength of parallel and transverse fillet welds.
12	1	Strength of combined parallel and transverse weld.
	2	UNIT V: Design of Screwed Joints and Springs Design of screw: Introduction, Advantages and Disadvantages of screw joints, location of screw joints.
	3	Important terms used in screw threads, designation of screw threads,
13	1	Initial stresses due to screw up forces, stresses due to combined forces, Design of Screw jack
	2	Design of Spring: Classification and applications of springs, spring terminology, Stresses in springs
	3	Wahl's correction factor, design of open coil helical spring subjected to uniform applied load under tension and compression.
14	1	Numericals
	2	Revision
	3	3rd Sessional test
15	1	Revision

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