Lesson Plan

Name of the faculty: Sh. Sombir Lecturer in Mechanical Engg.

Discipline: Mechanical

Semester: 4th Mechanical

Subject: Machine Design

Lesson Plan Duration: 15 weeks (January 2025 to May 2025)

Work Load (Lecture/ Practical) per week (in hours): Lecturers- 03

Week	Theory		Practical	
	Lecture day	Topic (including assignment / test)	Practical Day	Topic
1st	1st	Design – Definition, Type of design, necessity of design Comparison of designed and undesigned work		
	2nd	Design procedure Characteristics of a good designer		
	3rd	Design terminology: stress, strain, factor of safety, factors affecting factor of safety, stress concentration, methods to reduce stress concentration, fatigue, Endurance limit.		
2nd	1st	General design consideration, Selection of materials, criteria of material selection, Codes and Standards (BIS standards)		
	2nd	Various design failures- maximum normal stress theory, maximum stress theory		
	3rd	maximum strain theory		
3rd	1st	Design of Shaft		
	2nd	Type of shaft, shaft materials, Type of loading on shaft, standard sizes of shaft available		
	3rd	Shaft subjected to torsion only, determination of shaft diameter (hollow and solid shaft) on the basis of : - Strength criterion		
4th	1st	Shaft subjected to torsion only, determination of shaft diameter (hollow and solid shaft) on the		

		basis of : - Rigidity criterion		
	2nd	Determination of shaft diameter (hollow and solid shaft) subjected to bending		
	3rd	Determination of shaft diameter (hollow and solid shaft) subjected to combined torsion and bending		
5th	1st	Design of Key		
	2nd	Types of key		
	3rd	materials of key, functions of key		
6th	1st	Failure of key (by Shearing)		
	2nd	Failure of key (by Crushing).		
	3rd	Design of key (Determination of key dimension)		
7th	1st	Design of key (Determination of key dimension)		
	2nd	Effect of keyway on shaft strength. (Figures and problems).		
	3rd	Effect of keyway on shaft strength. (Figures and problems).		
8th	1st	Design of Coupling		
	2nd	Necessity of a coupling, advantages of a coupling		
	3rd	types of couplings		
9th	1st	design of muff coupling,		
	2nd	design of flange coupling		
	3rd	Design of Joints Types of joints - Temporary and permanent joints		
10th	1st	Utility of various joints		
	2nd	Design of Temporary Joints: Knuckle Joints – Different parts of the joint, material used for the joint		
	3rd	Type of knuckle Joint, design of the knuckle joint. (Figures and problems).		
11th	1st	Cotter Joint – Different parts of the spigot and socket joints		
	2nd	Design of spigot and socket joint.		
	3rd	Design of Permanent Joint: Riveted Joints. : Rivet materials, Rivet heads		
12th	1st	leak proofing of riveted joint caulking and fullering.		
	2nd	Different modes of rivet joint failure		
	3rd	Design of riveted joint – Lap and butt, single and multi riveted joint.		
13th	1st	Welded Joint - Welding symbols		
	2nd	Type of welded joint, strength of parallel and transverse fillet		

		welds.		
	3rd	Design of Screwed Joints and Springs Design of screw: Introduction, Advantages and Disadvantages of screw joints		
14th	1st	Location of screw joints. Important terms used in screw threads, designation of screw threads, Initial stresses due to screw up forces, stresses due to combined forces		
	2nd	Design of Screw jack		
	3rd	Design of Spring: Classification and applications of sprigs, spring terminology		
15th	1st	Stresses in springs, Wahl's correction factor		
	2nd	Design of open coil helical spring subjected to uniform applied load under tension and compression.		
	3rd	Design of open coil helical spring subjected to uniform applied load under tension and compression.		