

Lesson Plan

Name of the Faculty : Sh. Abhay Tiwari
 Discipline : Mechanical Engineering
 Semester : 5th
 Subject : Machine Design
 Lesson Plan duration : 15 weeks (01.09.2023 to 15.12.2023)
 Work load per week : Lecture – 04, Practical – 00

Week	Theory		EXECUTION	
	Lecture Day	Topic (Including assessment/test)	Date	Sign.
1 st	1 st	Introduction about the subject and brief overview. Unit 1: Introduction 1.1 Design – Definition, Type of design, necessity of design		
	2 nd	1.1.1 Comparison of designed and un designed work, 1.1.2 Design procedure		
	3 rd	1.1.3 Characteristics of a good designer 1.2 Design terminology: stress, strain, factor of safety, factors affecting factor of safety		
	4 th	1.2 stress concentration , methods to reduce stress concentration 1.2 fatigue, endurance limit		
2 nd	5 th	1.2.1 General design consideration 1.2.2 Codes and Standards (BIS standards)		
	6 th	1.3 Engineering materials and their mechanical properties 1.3.2 Properties of engineering materials: elasticity, plasticity		
	7 th	1.3.2 malleability, ductility, toughness, hardness and resilience.		
	8 th	1.3.2 Fatigue, creep, tenacity and strength etc.		
3 rd	9 th	1.3.3 Selection of materials, criteria of material selection		
	10 th	Unit 2: Design Failure 2.1 Various design failures-maximum stress theory		
	11 th	2.2 Maximum strain theory, Classification of loads		
	12 th	2.3 Design under tensile, compressive and torsional loads		

4th	13 th	2.3 Design under tensile, compressive and torsional loads		
	14 th	Numerical Problems		
	15 th	Unit 3: Design of Shaft 3.1 Type of shaft, shaft materials		
	16 th	3.1 Type of loading on shaft, standard sizes of shaft available		
5th	17 th	3.2 Shaft subjected to torsion only, determination of shaft diameter (hollow and solid shaft) on the basis of: Strength criterion		
	18 th	3.2 Shaft subjected to torsion only, determination of shaft diameter (hollow and solid shaft) on the basis of: Rigidity criterion		
	19 th	3.3 Determination of shaft diameter (hollow and solid shaft) subjected to Bending		
	20 th	3.4 Determination of shaft diameter (hollow and solid shaft) subjected to combined torsion and bending		
6th	21 st	Numerical Problems		
	22 nd	1st sessional test (Tentative)		
	23 rd	Assessment		
	24 th	Unit 4: Design of Key 4.1 Types of key, materials of key, functions of key		
7th	25 th	4.1 Types of key, materials of key, functions of key		
	26 th	4.2 Failure of key (by Shearing)		
	27 th	4.2 Failure of key (by Crushing)		
	28 th	4.3 Design of key (Determination of key dimension)		
8th	29 th	4.4 Effect of keyway on shaft strength		
	30 th	Various Figures and problems		
	31 st	Unit 5: Design of Joints Types of joints - Temporary and permanent joints, utility of various joints		
	32 nd	5.1 Temporary Joint: 5.1.1 Knuckle Joints – Different parts of the joint, material used for the joint		
9th	33 rd	5.1.1 Type of knuckle Joint		
	34 th	5.1.1 design of the knuckle joint		
	35 th	5.1.1 (Figures and problems)		

	36 th	5.1.2 Cotter Joint – Different parts of the spigot and socket joints		
10th	37 th	5.1.2 Design of spigot and socket joint		
	38 th	Figures and problems		
	39 th	2nd sessional test (Tentative)		
	40 th	Assessment		
11th	41 st	5.2 Permanent Joint: 5.2.1 Welded Joint - Welding symbols. Type of welded joint		
	42 nd	5.2.2 Strength of parallel and transverse fillet welds		
	43 rd	5.2.2 Strength of combined parallel and transverse weld		
	44 th	5.2.3 Riveted Joints. : Rivet materials, Rivet heads, leak proofing of riveted joint – caulking and fullering		
12th	45 th	5.2.4 Different modes of rivet joint failure		
	46 th	5.2.5 Design of riveted joint – Lap and butt, single and multi riveted joint.		
	47 th	Unit 6: Design of Flange Coupling Necessity of a coupling, advantages of a coupling, types of couplings		
	48 th	Design of muff coupling, design of flange coupling. (both protected type and unprotected type)		
13th	49 th	Unit 7: Design of Screwed Joints 7.1 Introduction, Advantages and Disadvantages of screw joints, location of screw joints		
	50 th	7.2 Important terms used in screw threads, designation of screw threads		
	51 st	7.3 Initial stresses due to screw up forces, stresses due to combined forces		
	52 nd	7.4 Design of power screws (Press)		
14th	53 rd	7.4 Design of power screws (screw jack)		
	54 th	7.4 Design of power screws (screw clamp)		
	55 th	3rd sessional test (Tentative)		
	56 th	Assessment		
15th	57 th	Revision		
	58 th	Revision		
	59 th	Revision		
	60 th	Revision		

