

Lesson Plan

Name of the Faculty : Sh. Munish Kumar Jain

Discipline : Mechanical Engineering

Semester : 5th

Subject : Machine Design

Lesson Plan duration : 17 weeks (15.09.2022 to 16.01.2023)

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 .		
	2 nd	Unit 1: Introduction 1.1 Design – Definition, Type of design, necessity of design		
	3 rd	1.1.1 Comparison of designed and un designed work, 1.1.2 Design procedure		
	4 th	1.1.3 Characteristics of a good designer, 1.2 Design terminology: stress, strain, factor of safety, factors affecting factor of safety		
2 nd	5 th	1.2 stress concentration , methods to reduce stress concentration		
	6 th	1.2 fatigue, endurance limit		
	7 th	1.2.1 General design consideration		
	8 th	1.2.2 Codes and Standards (BIS standards)		
3 rd	9 th	1.3 Engineering materials and their mechanical properties 1.3.2 Properties of engineering materials: elasticity, plasticity,		
	10 th	1.3.2 malleability, ductility, toughness, hardness and resilience.		
	11 th	1.3.2 Fatigue, creep, tenacity and strength etc.		
	12 th	1.3.3 Selection of materials, criteria of material selection		

4 th	13 th	Unit 2: Design Failure 2.1 Various design failures-maximum stress theory		
	14 th	2.2 Maximum strain theory, Classification of loads		
	15 th	2.3 Design under tensile, compressive and torsional loads		
	16 th	2.3 Design under tensile, compressive and torsional loads		
5 th	17 th	Numerical Problems		
	18 th	Unit 3: Design of Shaft 3.1 Type of shaft, shaft materials		
	19 th	3.1 Type of loading on shaft, standard sizes of shaft available		
	20 th	3.2 Shaft subjected to torsion only, determination of shaft diameter (hollow and solid shaft) on the basis of: Strength criterion		
6 th	21 st	3.2 Shaft subjected to torsion only, determination of shaft diameter (hollow and solid shaft) on the basis of: Rigidity criterion		
	22 nd	3.3 Determination of shaft diameter (hollow and solid shaft) subjected to Bending		
	23 rd	3.4 Determination of shaft diameter (hollow and solid shaft) subjected to combined torsion and bending		
	24 th	Numerical Problems		
7 th	25 th	1st sessional test (Tentative)		
	26 th	Assessment		
	27 th	Unit 4: Design of Key 4.1 Types of key, materials of key, functions of key		
	28 th	4.1 Types of key, materials of key, functions of key		
8 th	29 th	4.2 Failure of key (by Shearing)		
	30 th	4.2 Failure of key (by Crushing)		
	31 st	4.3 Design of key (Determination of key dimension)		

	32 nd	4.4 Effect of keyway on shaft strength		
9 th	33 rd	Various Figures and problems		
	34 th	Unit 5: Design of Joints Types of joints - Temporary and permanent joints, utility of various joints		
	35 th	5.1 Temporary Joint: 5.1.1 Knuckle Joints – Different parts of the joint, material used for the joint		
	36 th	5.1.1 Type of knuckle Joint,		
10 th	37 th	5.1.1 design of the knuckle joint		
	38 th	5.1.1 (Figures and problems)		
	39 th	5.1.2 Cotter Joint – Different parts of the spigot and socket joints		
	40 th	5.1.2 Design of spigot and socket joint		
11 th	41 st	Figures and problems		
	42 nd	5.2 Permanent Joint: 5.2.1 Welded Joint - Welding symbols. Type of welded joint		
	43 rd	5.2.2 Strength of parallel and transverse fillet welds		
	44 th	5.2.2 Strength of combined parallel and transverse weld		
12 th	45 th	2nd sessional test (Tentative)		
	46 th	Assessment		
	47 th	5.2.3 Riveted Joints. : Rivet materials, Rivet heads, leak proofing of riveted joint – caulking and fullering		
	48 th	5.2.4 Different modes of rivet joint failure		
13 th	49 th	5.2.5 Design of riveted joint – Lap and butt, single and multi riveted joint.		
	50 th	Unit 6: Design of Flange Coupling Necessity of a coupling, advantages of a coupling, types of couplings		
	51 st	design of muff coupling, design of flange coupling. (both protected type and unprotected type)		

	52 nd	Unit 7: Design of Screwed Joints 7.1 Introduction, Advantages and Disadvantages of screw joints, location of screw joints		
14 th	53 rd	7.2 Important terms used in screw threads, designation of screw threads		
	54 th	7.3 Initial stresses due to screw up forces, stresses due to combined forces		
	55 th	7.4 Design of power screws (Press)		
	56 th	7.4 Design of power screws (Press)		
15 th	57 th	7.4 Design of power screws (screw jack)		
	58 th	7.4 Design of power screws (screw jack)		
	59 th	7.4 Design of power screws (screw clamp)		
	60 th	7.4 Design of power screws (screw clamp)		
16 th	61 st	3rd sessional test (Tentative)		
	62 nd	Assessment		
	63 rd	Revision		
	64 th	Revision		
17 th	65 th	Revision		
	66 th	Revision		
	67 th	Revision		
	68 th	Revision		