Lesson Plan

Name of the Faculty : Sh. Munish Kumar Jain

Discipline : Mechanical Engineering

Semester : 5th

Subject : Machine Design

Lesson Plan duration : 17 weeks (01.10.2021 to 28.01.2022)

Work load per week : Lecture – 04, Practical – 00

Week	Theory	
	Lecture Day	Topic (Including assessment/test)
1st	1st	Subject introduction and overview
	2nd	**Unit 1:** Introduction Design – Definition, Type of design, necessity of design
	3rd	Comparison of designed and un designed work, Design procedure
	4th	Characteristics of a good designer, Design terminology: stress, strain, factor of safety, factors affecting factor of safety
2nd	5th	stress concentration , methods to reduce stress concentration
	6th	fatigue, endurance limit
	7th	General design consideration
	8th	Codes and Standards (BIS standards)
3rd	9th	Engineering materials and their mechanical properties
	10th	Properties of engineering materials: elasticity, plasticity, malleability, ductility, toughness
	11th	Hardness and resilience. Fatigue, creep, tenacity and strength etc.
	12th	Selection of materials, criteria of material selection
4th	13th	**Unit 2: Design Failure** Various design failures-maximum stress theory
	14th	Maximum strain theory, Classification of loads
	15th	Design under tensile, compressive and torsional loads
	16th	Numerical Problems
5th	17th	**Unit 3: Design of Shaft** Type of shaft, shaft materials

	18th	Type of loading on shaft, standard sizes of shaft available
	19th	Shaft subjected to torsion only, determination of shaft diameter (hollow and solid shaft) on the basis of: Strength criterion
	20th	Shaft subjected to torsion only, determination of shaft diameter (hollow and solid shaft) on the basis of: Rigidity criterion
6th	21st	Determination of shaft diameter (hollow and solid shaft) subjected to Bending
	22nd	Determination of shaft diameter (hollow and solid shaft) subjected to combined torsion and bending
	23rd	Numerical Problems
	24th	**Unit 4: Design of Key** Types of key, materials of key, functions of key
7th	25th	**1st sessional test (Tentative)**
	26th	**Assessment**
	27th	Failure of key (by Shearing)
	28th	Failure of key (by Crushing)
8th	29th	Design of key (Determination of key dimension)
	30th	Effect of keyway on shaft strength
	31st	Various Figures and problems
	32nd	**Unit 5: Design of Joints** Types of joints - Temporary and permanent joints, utility of various joints
9th	33rd	Temporary Joint: Knuckle Joints – Different parts of the joint, material used for the joint
	34th	Type of knuckle Joint,
	35th	design of the knuckle joint
	36th	Figures and problems
10th	37th	Cotter Joint – Different parts of the spigot and socket joints
	38th	Design of spigot and socket joint
	39th	Figures and problems
	40th	Revision
11th	41st	**2nd sessional test (Tentative)**
	42nd	**Assessment**
	43rd	Permanent Joint: Welded Joint - Welding symbols. Type of welded joint
	44th	Strength of parallel and transverse fillet welds

12th	45th	Strength of combined parallel and transverse weld
	46th	Riveted Joints. : Rivet materials, Rivet heads
	47th	leak proofing of riveted joint – caulking and fullering
	48th	Different modes of rivet joint failure
13th	49th	Design of riveted joint – Lap and butt, single and multi riveted joint
	50th	**Unit 6: Design of Flange Coupling** Necessity of a coupling, advantages of a coupling, types of couplings
	51st	design of muff coupling, design of flange coupling. (both protected type and unprotected type)
	52nd	**Design of Screwed Joints** Introduction, Advantages and Disadvantages of screw joints, location of screw joints
14th	53rd	Important terms used in screw threads, designation of screw threads
	54th	Initial stresses due to screw up forces, stresses due to combined forces
	55th	Design of power screws (Press)
	56th	Design of power screws (screw jack)
15th	57th	Design of power screws (screw clamp)
	58th	**3rd sessional test (Tentative)**
	59th	**Assessment**
	60th	Revision
16th	61st	Revision
	62nd	Revision
	63rd	Revision
	64th	Revision
17th	65th	Revision
	66th	Revision
	67th	Revision
	68th	Revision