Lesson Plan

Name of Faculty : **Kamal Kumar, Assistant Professor**
Discipline : **Mechanical Engineering**
Semester : **3rd**
Subject : **PC/ME/31-T, MECHANICS OF SOLIDS-I**
Lesson Plan Duration : **15 weeks (from September, 2024 to December, 2024)**

Work Load (Lecture/Practical) per week (in hours): Lectures 04 hours

Week	Lecture Day	Topic (Including Assignment/Test)	% Syllabus Covered	Remarks
Unit-I		**Unit-I Simple stresses and strains, Complex stresses**		
1st	1	Introduction, General equations of equilibrium, free body diagram		
	2	Types of stresses and strains, Hooks law		
	3	elastic constants & their relationships, concept of stress at a point, stress-strain diagrams		
	4	Problems		
2nd	5	stresses and strains in compound bars under axial loading		
	6	Problems		
	7	stresses in composite systems, thermal stresses		
	8	Problems		
3rd	9	Two and three dimensional stress systems, rectangular stress components, principal stresses and planes		
	10	Mohr's stress circle		
	11	Problems		
	12	Problems		
		UNIT-II Shear force and bending moment diagrams		
4th	13	Relation between the rate of loading, the shear force and the bending moment		
	14	SF & BM calculations & diagrams for cantilevers		
	15	Problems		
	16	Problems		
5th	17	SF & BM calculations & diagrams for simply supported beams with or without over-hang		
	18	Problems		
	19	Problems		
	20	SF & BM calculations & diagrams for fixed beams		
6th	21	Problems		
	22	Problems		
	23	application of moments		
	24	Assignment- I		
7th		**Minor Test- I**		
		UNIT-III Centroid and Moment of Inertia, Bending stresses in beams		
8th	25	Centroid and MOI for different shaped beam cross sections		
	26	Parallel axes theorem, perpendicular axis theorem		
	27	Problems		
	28	Principal axes, principal moments of inertia		
9th	29	Problems		
	30	Product of inertia, ellipse of inertia		
	31	Problems		
	32	Properties of beam cross section		
10th	33	Problems		
	34	Theory of simple bending, position of neutral axis, flitched beams		
	35	Problems		
	36	Unsymmetrical Bending, Slope of the neutral axis, stresses & deflections		
11th	37	Problems		
	38	Shear center and the flexural axis, Shearing stresses in beams		
	39	Variation of shear stress in beam cross section, shear stress distribution for typical sections		
	40	Problems		
		UNIT-IV Torsion, Columns & Struts		
12th	41	Torsion of circular shafts, comparison of Solid and hollow circular shafts, stepped shaft		
	42	Composite circular shafts		
	43	Statically indeterminate shafts, stresses in shafts under combined torsion bending and axial loads		
	44	Problems		
13th	45	Column under axial load, concept of instability and buckling, slenderness ratio, derivation of Euler's formulae for the elastic buckling load		
	46	Problems		
	47	Eulers, Rankine, Gordon's formula, Johnson's empirical formula for axial loading columns		
	48	Problems		
14th		**Minor Test- II**		
15th	49	Eccentric compression of a short strut of rectangular sections		
	50	Eccentric compression of a short strut of circular sections		
	51	Problems		
	52	Assignment- II		