

## LESSON PLAN

**Name of Faculty:** Chetna

**Subject:** STRUCTURAL MECHANICS

**Lesson Plan Duration:** Aug 2025 to Nov 2025

**Discipline:** Civil Engineering

**L T P**

**Semester :** 3<sup>rd</sup>

**2 - -**

Week	Theory		Delivery Date of Lecture		Whether the Lesson Plan Followed? Yes/No
	Lecture Day	Topic (Including Assignments / Group Discussion / Sessional Tests)	Expected	Actual	
1st	1	1. Properties of Materials 1.1 Classification of materials, elastic materials, plastic materials, ductile materials, brittle materials.			
	2	1.2 Introduction to tensile test, compressive test, impact test, fatigue test, torsion test on metals			
2nd	1	2. Simple Stresses and Strains 2.1 Concept of stress, normal and shear stresses, 2.2 Concept of strain and deformation, longitudinal and transverse strain, poisson's ratio, volumetric strain			
	2	2.3 Hooke's law, moduli of elasticity and rigidity, Bulk modulus of elasticity, relationship between the elastic constants.			
3rd	1	2.4 Stresses and strains in bars subjected to tension and compression.			
	2	Extension of uniform bar under its own weight, stress produced in compound bars due to axial load (two or three bars)			

4th	1	2.5 Stress-strain diagram for mild steel and HYSD steel, mechanical properties, factor of safety. 2.6 Temperature stresses and strains			
	2	3. Shear Force and Bending Moment 3.1 Concept of a beam and supports (Hinges, Roller and Fixed), types of beams: simply supported, cantilever, propped, overhang, cantilever and continuous beams (only concept).			
5th	1	3.2 Types of loads (dead load, live load, snow load, wind load seismic load as per IS Codes etc.) and types of loading (point, uniformly distributed and uniformly varying loads) 3.3 Concept of bending moment and shear force, sign conventions			
	2	3.4 Bending Moment and shear force diagrams for cantilever and simply supported subjected to concentrated, uniformly distributed 3.5 Relationship between load, shear force and bending moment, point of maximum bending moment, and point of contraflexure.			
6th	1	<b>Sessional Test-1</b>			
	2	4. Moment of Inertia Concept of moment of inertia and second moment of area and radius of gyration			
7th	1	Theorems of parallel and perpendicular axis			
	2	second moment of area of common geometrical sections: rectangle, triangle, circle (without derivations). Second moment of area for L, T and I sections, section modulus.			
8th	1	Bending Stresses in Beams Concept of pure/simple bending			
	2	5.2 Assumptions made in the theory of simple bending, derivation and application of bending equation to circular cross-section, I section, T&L sections only Moment of resistance			

9th	1	5.4 Calculations of bending stresses in simply supported beam 5.5 Concept of shear stresses in beams, shear stress (introduction only)			
	2	6. Slope and Deflection Determination of slope and deflection using Moment Area Theorem for simply supported beam for pointed load and U.D.L			
10th	1	Numerical problems. (no derivation)			
	2	<b>Sessional Test -2</b>			
11th	1	UNIT V 7. Columns			
	2	7.1 Theory of columns			
12th	1	7.1 Theory of columns			
	2	7.2 Problem solving using Euler's and Rankine Formula			
13th	1	7.2 Problem solving using Euler's and Rankine Formula			
	2	8. Analysis of Trusses 8.1 Concept of a perfect, redundant, and deficient Frames			
14th	1	8. Analysis of Trusses 8.1 Concept of a perfect, redundant, and deficient Frames			
	2	8.2 Assumptions and analysis of trusses by: a) Method of joints b) Method of sections			
15th	1	8.2 Assumptions and analysis of trusses by: a) Method of joints b) Method of sections			
	2	<b>Sessional Test -3</b>			