

Lesson Planning (Theory)

Branch : Civil Engineering

Semester : 3rd

Subject : Mechanics Of Materials

Session : August-December 2026

Teacher: Er. Harish Kumar

Class Room : A-202

S.No.	No. of WEEKS	Chapter/ Unit Description	Detail of Contents	Reference Resources	Remarks
1	3 WEEKS	Unit – 1 Moment of Inertia	Moment of inertia (M.I.): Definition, M.I. of plane lamina, Radius of gyration, section modulus, Parallel and Perpendicular axes theorems (without derivations), M.I. of rectangle, square, circle, semi-circle, quarter circle and triangle section (without derivations). M.I. of symmetrical and unsymmetrical I-section, Channel section, T-section, Angle section, Hollow sections about centroidal axes. Polar Moment of Inertia of solid circular sections.	R1,R2	
2	3 WEEKS	Unit– 2 Simple Stresses and Strains	Definition of rigid, elastic and plastic bodies, Definition of stress, strain, elasticity, Hook's law, Elastic limit, Modulus of elasticity. Type of Stresses-Normal, Direct, Bending and Shear and nature of stresses i.e., Tensile and Compressive stresses. Standard stress strain curve for tor steel bar under tension, Yield stress, Proof stress, Ultimate stress, Strain at various critical points, Percentage elongation and Factor of safety. Deformation of body due to axial force, forces applied at intermediate sections, Maximum and minimum stress induced, Composite section under axial loading. Concept of temperature stresses and strain, Stress and strain developed due to temperature variation in homogeneous simple bar (no composite section) Longitudinal and lateral strain, Modulus of Rigidity, Poisson's ratio, volumetric strain, change in volume, Bulk modulus (Introduction only). Relation between modulus of elasticity, modulus of rigidity and bulk modulus (without derivation).	R1,R2	
3	3 WEEKS	Unit– 3 Shear Force and Bending Moment	Types of supports, beams, and loads. Concept and definition of shear force and bending moment, Relation between load, shear force and bending moment (without derivation). Shear force and bending moment diagram for cantilever and simply supported beams subjected to point loads, uniformly distributed loads (combination of any two types of loading), point of contra flexure.	R1,R2	
4	3 WEEKS	Unit– 4 Bending and Shear	Concept and theory of pure bending, assumptions, flexural equation (without derivation), bending stresses and their nature, bending stress distribution diagram. Concept of	R1,R2	

		Stresses in beams	moment of resistance and simple numerical problems using flexural equation. Shear stress equation (without derivation), relation between maximum and average shear stress for rectangular and circular section, shear stress distribution diagram. Shear stress distribution for square, rectangular, circle, hollow, angle sections, channel section, I-section, T section. Simple numerical problems based on shear equation.		
5	2 WEEKS	Unit– 5 Columns	Concept of compression member, short and long column, Effective length, Radius of gyration, Slenderness ratio, Types of end condition for columns, Buckling of axially loaded columns. Euler's theory, assumptions made in Euler's theory and its limitations, Application of Euler's equation to calculate buckling load. Rankine's formula and its application to calculate crippling load. Concept of working load/safe load, design load and factor of safety.	R1,R2	

REFERENCE RESOURCES

- Bedi D.S. , Strength of Materials, Khanna Publishing House, Delhi, Ed. 2018
- Timoshenko, S., Strength of Materials, Vol. I, CBS, New Delhi.

Signature of Teacher

Signature of H.O.D/OIC