

Lesson Plan

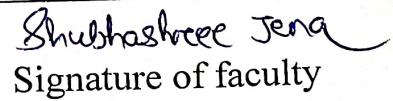
Subject: - Mechanics of Material (TH-3) Name of faculty:- Subhashree Jena

Semester:-3rd Total time allotted:45Hrs Branch: - Civil Engg. Session: 2025(W)

Discipline	Semester:-3 rd	From date:- 14/07/2025 To 15/11/2025	Teaching Aid
Subject:	No. of days/ per week 3p/w	Theory/ Practical –Topics/Lesson	
Week	Date/Period		
1	15/07/2025 TO 19/07/2025	Review Of Basic Concepts 1.1 Basic Principle of Mechanics: Force, Moment, support conditions, Conditions of equilibrium, C.G & MI, Free body diagram 1.2 Review of CG and MI of different sections	White board & marker
2	21/07/2025 TO 26/07/2025	2.1 Simple Stresses and Strains Introduction to stresses and strains: Mechanical properties of materials – Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability, Types of stresses - Tensile, Compressive and Shear stresses	White board & marker
3	28/07/2025 TO 02/08/2025	Types of strains - Tensile, Compressive and Shear strains, Complementary shear stress - Diagonal tensile / compressive Stresses due to shear, Elongation and Contraction,	White board & marker
4	04/08/2025 TO 09/08/2025	Longitudinal and Lateral strains, Poisson's Ratio, Volumetric strain, computation of stress, strain, Poisson's ratio, change in dimensions and volume etc, Hooke's law - Elastic Constants, Derivation of relationship between the elastic constants	White board & marker
5	11/08/2025 TO 16/08/2025	2.2 Application of simple stress and strain in engineering field: Behaviour of ductile and brittle materials under direct loads, Stress Strain curve of a ductile material, Limit of proportionality, Elastic limit, Yield stress, Ultimate stress, Breaking stress,	White board & marker
6	18/08/2025 TO 23/08/2025	Percentage elongation, Percentage reduction in area, Significance of percentage elongation and reduction in area of cross section, Deformation of prismatic bars due to uniaxial load, Deformation of prismatic bars due to its self weight.	White board & marker
7	25/08/2025 TO 30/08/2025	2.3 Complex stress and strain Principal stresses and strains: Occurrence of normal and tangential stresses, Concept of Principal stress and Principal Planes, major and minor principal stresses and their orientations, Mohr's Circle and its application to solve problems of complex stresses	White board & marker
8	01/09/2025 TO 06/09/2025	3.1 Stresses in beams due to bending: Bending stress in beams – Theory of simple bending – Assumptions – Moment of resistance – Equation for Flexure– Flexural stress distribution – Curvature of beam – Position of N.A. and Centroidal Axis – Flexural rigidity – Significance of Section modulus	White board & marker
9	08/09/2025 TO 13/09/2025	3.2 Shear stresses in beams: Shear stress distribution in beams of rectangular, circular and standard sections symmetrical about vertical axis.	White board & marker

	15/09/2025 TO 20/09/2025	3.3 Stresses in shafts due to torsion: Concept of torsion, basic assumptions of pure torsion, torsion of solid and hollow circular sections, polar moment of inertia, torsional shearing stresses, angle of twist, torsional rigidity, equation of torsion	White board & marker
	22/09/2025 TO 27/09/2025	3.4 Combined bending and direct stresses: Combination of stresses, Combined direct and bending stresses, Maximum and Minimum stresses in Sections, Conditions for no tension, Limit of eccentricity, Middle third/fourth rule, Core or Kern for square, rectangular and circular sections, chimneys, dams and retaining walls	White board & marker
	08/10/2025 TO 11/10/2025	4.1 Columns and Struts: Definition, Short and Long columns, End conditions, Equivalent length / Effective length, Slenderness ratio, Axially loaded short and long column, Euler's theory of long columns, Critical load for Columns with different end conditions	White board & marker & smart board
4	13/10/2025 TO 18/10/2025	5.1 Types of loads and beams: Types of Loads: Concentrated (or) Point load, Uniformly Distributed load (UDL), Types of Supports: Simple support, Roller support, Hinged support, Fixed support, Types of Reactions: Vertical reaction, Horizontal reaction, Moment reaction, Types of Beams based on support conditions: Calculation of support reactions using equations of static equilibrium.	White board & marker
	20/10/2025 TO 25/10/2025	5.2 Shear force and bending moment in beams: Shear Force and Bending Moment: Signs Convention for S.F. and B.M, S.F and B.M of general cases of determinate beams with concentrated loads and udl only, S.F and B.M diagrams for Cantilevers, Simply supported beams and Over hanging beams, Position of maximum BM, Point of contra flexure, Relation between intensity of load, S.F and B.M.	White board & marker
15	27/10/2025 TO 01/11/2025	Slope and Deflection 6.1 Introduction: Shape and nature of elastic curve (deflection curve); Relationship between slope, deflection and curvature (No derivation), Importance of slope and deflection. 6.2 Slope and deflection of cantilever and simply supported beams under concentrated and uniformly distributed load (by Double Integration method, Macaulay's method).	White board & marker & smart board
16	03/11/2025 TO 08/11/2025	Indeterminate Beams 7.1 Indeterminacy in beams, Principle of consistent deformation/compatibility, Analysis of propped cantilever, fixed and two span continuous beams by principle of superposition, SF and BM diagrams (point load and udl covering full span)	White board & marker
17	10/11/2025 TO 15/11/2025	Trusses 8.1 Introduction: Types of trusses, statically determinate and indeterminate trusses, degree of indeterminacy, stable and unstable trusses, advantages of trusses. 8.2 Analysis of trusses: Analytical method (Method of joints, method of Section)	White board & marker


Signature of HOD


Signature of faculty