Department of Civil Engineering

Government Polytechnic Sundernagar Distt Mandi (H.P) -175018

Lesson Plan for Mechanics of Materials (Semester-3rd) Session: (August- December, 2025)

S.No	MONTH	WEEK	CONTENTS	REMARKS
1	August	1	**Unit – 1 Moment of Inertia** Moment of inertia (M.I.): Definition, M.I. of plane lamina, Radius of gyration, section modulus	
		2	Parallel and Perpendicular axes theorems (without derivations). M.I. of rectangle, square, circle, semi-circle, quarter circle and triangle section (without derivations).	
		3	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.	
		4	**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.	
		5	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	
2	September	1	Deformation of body due to axial force, forces applied at intermediate sections, Maximum and minimum stress induced, Composite section under axial loading	
		2	**Class Test-1 as per academic calender.** 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.	
		3	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).	
		4	Unit– 3 Shear Force and Bending Moment Types of supports, beams, and loads. Concept and definition of shear force and bending moment.	
		5	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	
3	October	1	shear force and bending moment (without derivation) Shear force and bending moment diagram for cantilever and simply supported beams subjected to uniformly distributed loads (combination of any two types of loading), point of contra flexure.	
		2	**Unit– 4 Bending and Shear Stresses in beams** Concept and theory of pure bending, assumptions, flexural equation (without derivation), bending stresses and their nature, bending stress distribution diagram.	
		3	Concept of 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. **Class Test-2 as per academic calender.**	

		4	Shear stress distribution for square, rectangular, circle, hollow, angle sections, channel section, I-section, T section.	
		5	Simple numerical problems based on shear equation.	
4	November	2	**House Test as per academic calender.**	
		3	Unit– 5 Columns Concept of compression member, short and long column, Effective length, Radius of gyration	
		4	Slenderness ratio, Types of end condition for columns, Rankine' s formula and its application to calculate crippling load. Buckling of axially loaded columns.	
		5	Euler's theory, assumptions made in Euler's theory and its limitations, Application of Euler's equation to calculate buckling load. Concept of working load/safe load, design load and factor of safety.	

Note:- The Lesson Plan is tentative, subject to availaibility of time,students & faculty.

Signature of Teacher
(Er Pratik Gupta)

Signature of H.O.D
(Er Anita Joshi)