PNS SCHOOL OF ENGINEERING & TECHNOLOGY

LESSION PLAN

C	SEMESTER-3RD	NAME OF THE FACULTY-ER. MRS. SANTOSHI DIPTY PRUSTY
SUBJECT-STRUCTURAL MECHANICS	NO OF DAYS PER WEEK -6 CLASS ALLOTTED-75	SEMESTER FROM-01/08/2023 TO 30/11/2023

WEEK	CLASS DAY	THEORY TOPIC
AUGUST-1ST	2ND	**Introduction:** Review Of Basic Concepts Basic Principle of Mechanics: Force, Moments
	3RD	support conditions, Conditions of equilibrium
	4TH	C.G & MI, Free body diagram
	5TH	Review of CG and MI of different sections
2ND	1ST	**Simple And Complex Stress, Strain**
	2ND	Simple Stresses and Strains Introduction to stresses and strains
	3RD	Mechanical properties of materials – Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness
	4TH	Ductility, Malleability, Creep, Fatigue, Tenacity, Durability
	5TH	Types of stresses -Tensile, Compressive and Shear stresses, Types of strains
3RD	1ST	Tensile, Compressive and Shear strains, Complimentary shear stress - Diagonal tensile / compressive Stresses due to shear, Elongation and Contraction, Longitudinal and Lateral strains
	3RD	Poisson's Ratio, Volumetric strain, computation of stress, strain, Poisson's ratio
	4TH	change in dimensions and volume etc, Hooke's law - Elastic Constants, Derivation of relationship between the elastic constants
	5TH	**Application of simple stress and strain in engineering field:**
4TH	1ST	Behaviour of ductile and brittle materials under direct loads
	2ND	Stress Strain curve of a ductile material
	3RD	Limit of proportionality
	4TH	Elastic limit, Yield stress, Ultimate stress, Breaking stress, Percentage elongation,
	5TH	Percentage reduction in area, Significance of percentage elongation and reduction in area of cross section,
SEPTEMBER-1ST	5TH	Deformation of prismatic bars due to uniaxial load
	1ST	Deformation of prismatic bars due to its self weight.
	4TH	**Complex stress and strain**

2ND	5TH	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,
3RD	1ST	Mohr's Circle and its application to solve problems of complex stresses
	2ND	**Stresses In Beams and Shafts**
	3RD	Stresses in beams due to bending: Bending stress in beams
	4TH	Theory of simple bending – Assumptions – Moment of resistance
	5TH	– Equation for Flexure– Flexural stress distribution – Curvature of beam – Position of N.A. and Centroidal Axis – Flexural rigidity – Significance of Section modulus
4TH	1ST	**Shear stresses in beams:**
5TH	1ST	Shear stress distribution in beams of rectangular, circular and standard sections symmetrical about vertical axis.
	2ND	**Stresses in shafts due to torsion**: Concept of torsion, basic assumptions of pure torsion
	3RD	torsion of solid and hollow circular sections, polar moment of inertia, torsional shearing stresses
	4TH	angle of twist, torsional rigidity, equation of torsion
OCTOBER-1ST	3RD	**Combined bending and direct stresses**: Combination of stresses, Combined direct and bending stresses, Maximum and Minimum stresses in Sections
	4TH	Conditions for no tension, Limit of eccentricity, Middle third/fourth rule, Core or Kern for square
2ND	1ST	rectangular and circular sections, chimneys, dams and retaining walls
	2ND	**Columns and Struts.** Columns and Struts, Definition, Short and Long columns, End conditions
	3RD	Equivalent length / Effective length, Slenderness ratio, Axially loaded short and long column
	4TH	Euler's theory of long columns, Critical load for Columns with different end conditions
	5TH	**Shear Force and Bending Moment.**Types of loads and beams: Types of Loads: Concentrated (or) Point load, Uniformly Distributed load (UDL)
3RD	1ST	Types of Supports: Simple support, Roller support, Hinged support, Fixed support
	2ND	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
	3RD	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,

5TH	1ST	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.
	2ND	**Slope and Deflection** Introduction: Shape and nature of elastic curve (deflection curve); Relationship between slope
NOVEMBER-1ST	3RD	deflection and curvature (No derivation), Importance of slope and deflection.
	4TH	Slope and deflection of cantilever and simply supported beams under concentrated and uniformly distributed load (by Double Integration method, Macaulay's method)
	5TH	**Indeterminate Beams** Indeterminacy in beams, Principle of consistent deformation/compatibility, Analysis of propped cantilever
2ND	1ST	, fixed and two span continuous beams by principle of superposition, SF and BM diagrams (point load and udl covering full span)
	2ND	**Trusses** 8.1 Introduction: Types of trusses, statically determinate and indeterminate trusses,
	3RD	degree of indeterminacy, stable and unstable trusses, advantages of trusses.
	4TH	Analysis of trusses: Analytical method (Method of joints, method of Section)
	5TH	TO CONTINUE AND END
3RD	2ND	IMPORTANT QUESTIONS AND ANSWER DISSCUSSION
	3RD	IMPORTANT QUESTIONS AND ANSWER DISSCUSSION
	4TH	IMPORTANT QUESTIONS AND ANSWER DISSCUSSION
	5TH	IMPORTANT QUESTIONS AND ANSWER DISSCUSSION
4TH	1ST	REVESION
	2ND	REVESION
	3RD	REVESION
	4TH	REVESION
	5TH	REVESION
5TH	2ND	REVESION
	3RD	REVESION
	4TH	REVESION

Santoshi Dipty Prusty

Sign of Lecture

Sudeepta Mishra

Sign of HOD