DISCIPLINECIVIL	SEMESTER:3RD	NAME OF THE TEACHING FACULTY:SIMARANI NAYAK
SUBJECT NAME: STRUCTURAL MECHANICS	No. of Days per Week Class Alloted: 4days	Semester From Date: 01/08/2023 To Date: 30/11/2023 No of Weeks :18
Week	Class Day	Theory Topics
August 1St Week	1st week- (1st,2nd,3rdday)	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
August 2nd Week 3rd Week 4th Week	**2nd week-** 1st day,2nd,3rd day) **3rd week -** 1st,2nd day,3rd day **4th week-** 1st,2nd,3rd,day **2nd week-** 1st,2nd 3rd day	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, Types of strains - Tensile, Compressive and Shear strains, Complimentary shear stress - Diagonal tensile / compressive Stresses due to shear, Elongation and Contraction,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.2.2Application 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, 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.2.3 Complex stress and strainPrincipal 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
August 5th Week September 1st week	**5th week-1st,2nd,3rd** day **1st week -1st,2nd,3rd day**	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 3.2 Shear stresses in beams: Shear stress distribution in beams of rectangular, circular and standard sections symmetrical about vertical axis. 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 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

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September 2nd week	**2nd week-** 1st,2nd,3rd day	Columns and Struts 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
September 3rd week 4th Week October 1st week	3rd week-1st, 2nd, 3rd day 4th week-1st, 2nd, 3rd day 1st week- 1st,2 nd,3rd day	Shear Force and Bending Moment 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. 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
October 2nd week 3rd week	2nd week-1st, 2nd, 3rd day 3rdweek-1st, 2nd, 3rd day ,	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)
November 1stweek 2nd week	1st week- 1st, 2nd, 3rd day 2nd week-1st, 2nd, 3rd day	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
November 3rdweek 4th week	3rd week- 1st, 2nd, 3rd day 4th week-1st, 2nd, 3rd day	8 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)

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