UTKAL INSTITUTE OF ENGINEERING & TECHNOLOGY

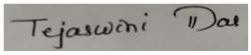
DISCIPLINE: Civil Engineering	**SEMESTER:** **3rd Sem**	**NAME OF THE TEACHING FACULTY: ER. Bijayalaxmi Sahoo**
SUBJECT: **Structural Mechanics**	No of Days/ Per week class allotted: **5 Class P/W** **-75**	Semester From Date:15/09/2022 To Date:22/12/2022 No. Of Weeks: **15**

WEEK	CLASS DAY	THEORY TOPICS	REMARKS	
1st	1st	Basic Principle of Mechanics: Force, Moment, support conditions.	Date	Dean/Principal
	2nd	Conditions of equilibrium, C.G & MI, Free body diagram.		
	3rd	Review of CG and MI of different sections.		
	4th	Introduction to stresses and strains: Mechanical properties of materials – Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness.		
	5th	Introduction to stresses and strains: Other Mechanical properties of materials – Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability.		
2nd	1st	Types of stresses -Tensile, Compressive and Shear stresses		
	2nd	Types of strains - Tensile, Compressive and Shear strains.		
	3rd	Complimentary shear stress - Diagonal tensile / compressive Stresses due to shear, Elongation and Contraction.		
	4th	Longitudinal and Lateral strains, Poisson's Ratio, Volumetric strain,		
	5th	Computation of stress, strain, Poisson's ratio, change in dimensions and volume etc.		
	1st	Hooke's law - Elastic Constants, Derivation of relationship between the elastic constants.		
	2nd	Revision of previous classes about stress, strain and material property and all.		

3rd	3rd	Behaviour of ductile and brittle materials under direct loads.		
	4th	Stress Strain curve of a ductile material, Limit of proportionality.		
	5th	Elastic limit, Yield stress, Ultimate stress, Breaking stress.		
4th	1st	Percentage elongation, Percentage reduction in area, Significance of percentage elongation and reduction in area of cross section.		
	2nd	Deformation of prismatic bars due to uniaxial load, Deformation of prismatic bars due to its self weight.		
	3rd	Principal stresses and strains: Occurrence of normal and tangential stresses,		
	4th	Concept of Principal stress and Principal Planes, major and minor principal stresses.		
	5th	Minor and major stresses and their orientations, Mohr's Circle and its application to solve problems of complex stresses.		
5th	1st	Stresses in beams due to bending: Bending stress in beams.		
	2nd	Theory of simple bending – Assumptions – Moment of resistance – Equation for Flexure.		
	3rd	Stresses in beams due to bending: Flexural stress distribution.		
	4th	Curvature of beam – Position of N.A. and Centroidal Axis.		
	5th	Flexural rigidity – Significance of Section modulus.		

6th	1st	Shear stresses in beams: Shear stress distribution in beams of rectangular.		
	2nd	Circular and standard sections symmetrical about vertical axis.		
	3rd	Stresses in shafts due to torsion: Concept of torsion.		
	4th	Basic assumptions of pure torsion, torsion of solid and hollow circular sections.		
	5th	Polar moment of inertia, torsion shearing stresses.		
7th	1st	Angle of twist, torsional rigidity, equation of torsion.		
	2nd	Combined bending and direct stresses: Combination of stresses Combined direct and bending stresses.		
	3rd	Maximum and Minimum stresses in Sections, Conditions for no tension.		
	4th	Middle third/fourth rule, Core or Kern for square,		
	5th	Limit of eccentricity and		
8th	1st	Rectangular and circular sections, chimneys, dams and retaining walls.		
	2nd	Details of Retaining Walls and Chimneys.		
	3rd	Columns and Struts, Definition.		
	4th	Short and Long columns, End conditions.		
	5th	Equivalent length / Effective length.		
9th	1st	Revision of last classes about column and strut.		
	2nd	Revision of last classes about Equivalent and effective Length.		
	3rd	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: Signs Convention for S.F. and B.M		
	1st	S.F and B.M of general cases of determinate beams with concentrated loads and udl only.		
	2nd	S.F and B.M diagrams for Cantilevers, Simply supported beams and Over hanging beams.		

10th	3rd	Position of maximum BM, Point of contra flexure, Relation between intensity of load, S.F and B.M.		
	4th	Revision of last class about of point of contra flexure.		
	5th	Revision of previous classes about S.F. and B.M.		
11th	1st	Revision of S.F and B.M sign convention.		
	2nd	Revision of about Beam and Load and trusses.		
	3rd	Introduction: Shape and nature of elastic curve (deflection curve).		
	4th	Relationship between slope deflection and curvature (No derivation).		
	5th	Importance of slope and deflection.		
12th	1st	Revision of last class about slope and deflection and its importance.		
	2nd	Revision of last class about Elastic curve.		
	3rd	Slope and deflection of cantilever and simply supported beams under concentrated and		
	4th	Uniformly distributed load (by Double Integration method, Macaulay's method).		
	5th	Revision of last class about UDL(Uniformly Distributed Load)		
13th	1st	Revision of last class about Slope and deflection.		
	2nd	Indeterminacy in beams, Principle of consistent deformation/compatibility		
	3rd	Analysis of propped cantilever.		
	4th	Fixed and two span continuous beams by principle of superposition		
	5th	SF and BM diagrams (point load and udl covering full span).		
14th	1st	Introduction: Types of trusses, statically determinate and indeterminate trusses		
	2nd	Degree of indeterminacy, stable and unstable trusses, advantages of trusses.		
	3rd	Revision of last classes about Trusses and Beam and sign convention of S.F and B.M.		
	4th	Types of Trusses and their uses.		
	5th	Different types of roof trusses and their uses		
15th	1st	Previous year questions discussion and revision.		
	2nd	Again revision of chapter 08 and questions discussion.		
	3rd	Revision of last chapter 05 and previous year questions will be discussed.		
	4th	Remind the important questions about all chapters.		
	5th	Important questions will be discussed for the semester Exam.		



HOD

DEAN

PRINCIPAL