

Dicipline:	CIVIL	Semester: 3 <sup>rd</sup>	Name of the Teaching Faculty: Sanghamitra Mohapatra	
Subject: Structural Mechanics	No of Days/Week Class Allotted: 5	Semester From date: 15/09/22 To date: _____	No. of Weeks: 15	

WEEK	Class Day	Theory Topics
1 <sup>st</sup> 15.09.22 to 17.9.22	1 <sup>st</sup>	Basic principle of Mechanics - Force, moment, support conditions, CG, Problems on C.G.
	2 <sup>nd</sup>	Conditions of equilibrium, MI, Problems on M.I Freebody diagram.
	3 <sup>rd</sup>	
	4 <sup>th</sup>	
	5 <sup>th</sup>	
2 <sup>nd</sup> 19.9.22 to 24.9.22	1 <sup>st</sup>	Simple stresses & strain - Introduction Types of stresses and strains and mechanical properties of materials.
	2 <sup>nd</sup>	Complimentary shear stress - Diagonal tensile/compressive stresses due to shear.
	3 <sup>rd</sup>	Elongation and contraction, longitudinal and lateral strains, Poisson's ratio.
	4 <sup>th</sup>	Volumetric strain, computation of stress, strain, change in dimensions and volume.
	5 <sup>th</sup>	Hooke's law - Elastic constants, Derivation of relationship between the elastic constants.
3 <sup>rd</sup> 26.9.22 to 1.10.22	1 <sup>st</sup>	Application of simple stress and strain in Engg. field - Behaviour of ductile and brittle material.
	2 <sup>nd</sup>	Stress-strain curve of a ductile material.
	3 <sup>rd</sup>	percentage elongation, percentage reduction in area.
	4 <sup>th</sup>	Significance of percentage elongation & reduction in area of C/s.
	5 <sup>th</sup>	Deformation of prismatic bars due to uniformly load.



WEEK	Class Day	Theory Topics
4 <sup>th</sup> 10.10.22 to 15.10.22	1st	Complex stress & strain - principal stresses and strains :- Occurrence of normal and tangential stresses.
	2nd	Concept of principal stress and principal planes.
	3rd	Major and minor principal stresses and their orientations.
	4th	Mohr's Circle and its application to solve problems of complex stresses.
	5th	Stresses in beams due to bending - Bending stress, Theory of simple bending
5 <sup>th</sup> 17.10.22 to 22.10.22	1st	Curvature of beam, position of N.A & centroidal axis, Flexural rigidity.
	2nd	Significance of section modulus. Shear stress distribution in beam of rectangular sec <sup>n</sup> .
	3rd	Stress distribution of circular sec <sup>n</sup> , symmetrical about vertical axis.
	4th	Stress distribution of standard sec <sup>n</sup> , symmetrical about vertical axis.
	5th	Torsion - Concept of torsion, basic assumptions of pure torsion
6 <sup>th</sup> 24.10.22 29.10.22	1st	Torsion of solid and hollow circular sections, polar moment of Inertia.
	2nd	Torsional shearing stresses, angle of twist, torsional rigidity, equation of torsion.
	3rd	Combination of stresses, combined direct and bending stresses, Max <sup>m</sup> . & min <sup>m</sup> . stresses in sections.
	4th	Conditions for no tension, Limit of eccentricity, Middle 3/4 rule, core or kern for square.
	5th	Rectangular and circular sections, Chimneys, dams and retaining walls.



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WEEK	Class Day	Theory Topics
7th 31.10.22 to 5.11.22	1st	Columns and struts, Definition, short and long columns, End conditions,
	2nd	Effective length, slenderness ratio, Axially loaded short and long column, Euler's theory of long column.
	3rd	Critical load for columns with different end conditions.
	4th	Shear force and bending moment - sign convention, Types of beams & loads.
	5th	Types of supports, Types of reactions, Calculation of support reac. using static equilibrium.
8th 7.11.22 to 12.11.22	1st	S.F and B.M of general cases of determinate beam with concentrated loads & udl.
	2nd	SFD & BMD for cantilever beam.
	3rd	Problems on cantilever beam.
	4th	SFD & BMD for simply supported beam.
	5th	problems on simply supported beam.
9th 14.11.22 to 19.11.22	1st	SFD & BMD for over hanging beam.
	2nd	problems on over hanging beam.
	3rd	positions of max <sup>m</sup> . bending moment and its numericals.
	4th	point of contra flexure and its numericals.
	5th	Relation between intensity of load, SF and B.M.



WEEK	Class Day	Theory Topics
10 <sup>th</sup> 21.11.22 to 26.11.22	1st	Slope and deflection - Introduction, shape and nature of elastic curve, Relation bet <sup>n</sup> . slope, deflection & curvature, Importance
	2nd	Importance of slope and deflection, etc.
	3rd	S&D of cantilever beam under point load by Double Integration method.
	4th	Problems on S&D of cantilever beam.
	5th	S&D of simply supported beam, under point load.
11 <sup>th</sup> 28.11.22 to 3.12.22	1st	Problems on S&D of SSB.
	2nd	S&D of cantilever beam with udl.
	3rd	S&D of SSB with udl.
	4th	Problems on Macaulay's method.
	5th	Problem on S&D. method.
12 <sup>th</sup> 5.12.22 to 10.12.22	1st	Indeterminacy in Beam, Principle of consistent deformation.
	2nd	Analysis of propped cantilever.
	3rd	problems on propped cantilever.
	4th	Fixed and two span continuous beams by principle of superposition.
	5th	SF&BM diagrams with point load.



Discipline: CIVIL	Semester: 3 <sup>rd</sup>	Name of the Teaching Faculty: P. Mohapatra	
Subject: SM	No of Days/Week Class Allotted: _____	Semester From date: _____ To date _____	No. of Weeks: _____

WEEK	Class Day	Theory Topics
13 <sup>th</sup> 12.12.22 to 17.12.22	1st	Problems on SFD & BMD with point load.
	2nd	SFD & BMD with UDL.
	3rd	Problem on UDL.
	4th	Problems on SFD & BMD
	5th	Problems on SFD & BMD.
14 <sup>th</sup> 19.12.22 to 24.12.22	1st	Truss - Introduction, Types.
	2nd	Statically determinate & Indeterminate trusses.
	3rd	Degree of Indeterminacy
	4th	Problem on statically determinate truss.
	5th	Problems on statically Indeterminate truss.
15 <sup>th</sup>	1st	Problems on degree of Indeterminacy
	2nd	Stable and unstable trusses.
	3rd	Advantages of trusses.
	4th	Practice - 1
	5th	Practice - 2