

Dicipline: <u>Mechanical</u>	Semester: <u>3rd</u>	Name of the Teaching Faculty: <u>Ashish Kumar Sahoo</u>	
Subject: <u>Strength of Materials</u>	No of Days/Week Class Allotted: <u>4</u>	Semester From date: <u>01.10.21</u> To date: <u>18.01.22</u>	No. of Weeks: <u>15</u>

WEEK	Class Day	Theory Topics
1st	1st	Types of load, stresses & strains (Axial and tangential.)
	2nd	Hooke's law, Young's modulus.
	3rd	Bulk modulus.
	4th	Modulus of rigidity.
	5th	
2nd	1st	Poisson's ratio, derive the relation between three elastic constants.
	2nd	Principle of super position, stresses in composite section.
	3rd	Temperature stress, determine temperature stress in composite bar.
	4th	Strain energy and resilience, stresses due to gradually applied load.
	5th	
3rd	1st	Stress due to suddenly applied and impact load.
	2nd	Simple problems on above.
	3rd	Introduction of thin cylinder & spherical shell. Hoop stress and longitudinal stress.
	4th	Derivation of hoop stress and longitudinal stress.
	5th	

WEEK	Class Day	Theory Topics
4th	1st	Definition of hoop strain & longitudinal strain and their derivations.
	2nd	Derivation of volumetric strain.
	3rd	Computation of the change in length.
	4th	Computation of the change in diameter and volume.
	5th	
5th	1st	Numerical problems on above.
	2nd	Continuing numerical problems on above.
	3rd	Two Dimensional Stress Systems. Determination of normal stress, shear stress & resultant stress.
	4th	stress on an oblique plane (i) pure shear (ii) pure normal stress.
	5th	
6th	1st	General two dimensional stress systems formula and its derivations.
	2nd	Numerical problems on above.
	3rd	Location of principal stresses & computation of principal stress.
	4th	Alternative method for derivation of principal stress & maximum shear stress.
	5th	

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WEEK	Class Day	Theory Topics
7 th	1st	Construction of Mohr circle.
	2nd	Maximum shear stress using Mohr circle pure compression & principal stress equal in both.
	3rd	Solve numerical problems on above.
	4th	Class test-I. Question & answer discussions.
	5th	
8 th	1st	Explain Types of beam and load.
	2nd	Definition and concepts of shear force.
	3rd	Definition and concepts of bending moment.
	4th	Shear force and bending moment diagram and its salient features.
	5th	
9 th	1st	SFD & BMD for simply supported beam for point load at mid point & eccentric point.
	2nd	SFD & BMD for cantilever carrying point load at end point & any other point.
	3rd	SFD & BMD for overhanging beam carrying point load at end point & other point.
	4th	SFD & BMD for simply supported beam carrying Uniform Distributed Load (UDL).
	5th	

WEEK	Class Day	Theory Topics
10th	1st	SFD & BMD for cantilever carrying UDL.
	2nd	SFD & BMD for overhanging beam carrying UDL.
	3rd	Introduction of simple bending and assumptions made in the theory of bending.
	4th	Bending moment equation, Moment of resistance, Section modulus & neutral axis.
	5th	
11th	1st	Derivations of Bending moment equation
	2nd	Derivations of Section modulus & moment of inertia for rectangular sections.
	3rd	Moment of inertia & section modulus for circular sections.
	4th	Derivations of section modulus & moment of inertia for triangular sections.
	5th	
12th	1st	Moment of inertia & Section modulus for I-sections.
	2nd	Some numerical problems on above.
	3rd	Continuing numerical problems on above.
	4th	Define Column.
	5th	

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WEEK	Class Day	Theory Topics
13 th	1st	Define axial load, eccentric load on a column.
	2nd	Direct stress & bending stress on a column.
	3rd	Maximum & minimum stress on a column.
	4th	Solve numericals on above.
	5th	
14 th	1st	Buckling load computation using Euler's formula with various end conditions.
	2nd	Introduction to Torsion & assumptions of pure torsion.
	3rd	Derivation of torsion equation for solid circular shaft.
	4th	Derivation of torsion equation for hollow circular shaft.
	5th	
15 th	1st	Comparison between solid & hollow shaft subjected to pure torsion.
	2nd	Solve numerical problems on above.
	3rd	Continuing numerical problems on above.
	4th	Class test-II. Question answers discussion.
	5th	