



GOVERNMENT POLYTECHNIC, NABARANGPUR
DEPARTMENT OF MECHANICAL ENGINEERING

Discipline MECHANICAL ENGG	3 RD Semester	Name of the Teaching Faculty: Anil Kumar Patra	
Subject STRENGTH OF MATERIAL	No. of days/ per week class allotted: 4	Semester From date: 15.09.2022 + 21/01/2023	To Date:
COURSE OUTCOMES	<p>Students will develop ability towards</p> <ol style="list-style-type: none"> Determination of stress, strain under uniaxial loading (due to static or impact Load and temperature) in simple and single core composite bars Determination of stress, strain and change in geometrical parameters of Cylindrical and spherical shells due to pressure Realization of shear stress besides normal stress and computation of resultant stress in two dimensional objects. Drawing bending moment and shear force diagram and locating points in a beam where the effect is maximum or minimum. Determination of bending stress and torsional shear stress in simple cases Understanding of critical loading slender column thus realizing combined effect of Axial and bending load. 		
Week	Class/Day	Theory/Practical Topics	
1 ST	1 ST	Load, types of loads, stress & types of stresses	
	2 ND	Strain, types of strains, Hooke's law, Young's modulus of elasticity	
	3 RD	Bulk's modulus, modulus of rigidity, Poisson's ratio, properties of Materials Stress-strain diagram for ductile & brittle materials Relation between elastic constants	
	4 TH	Principle of superposition & related numerical	
2 ND	1 ST	Stresses in composite section	
	2 ND	Temperature stress, temperature stress in composite bar	
	3 RD	Strain energy, resilience, stress due to gradually applied, suddenly applied & impact load	
	4 TH	Continued Numericals	
3 RD	1 ST	Pressure vessels, classification of pressure vessels, hoop stress & Longitudinal stress	
	2 ND	Stress on oblique plane, determination of normal stress, shear stress & Resultant stress on oblique planes subjected to direct stress in one direction	
		3 RD	Determination of stresses on oblique planes subjected to direct in two

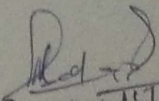
		directions stress
	4 TH	
4 TH	1 ST	Derivation of hoop stress & longitudinal stress
	2 ND	Derivation of hoop strain, longitudinal strain & volumetric strain
	3 RD	Computation of change in length, diameter & volume
	4 TH	Derivation of stress & strain in spherical vessel
5 TH	1 ST	Numericals
	2 ND	Numericals

	3 RD	Determination of stresses on oblique planes subjected to direct stress & Shear stress
	4 TH	Continued.
6 TH	1 ST	Principal stress & principal strains
	2 ND	Mohr's circle
	3 RD	Mohr's circle
	4 TH	Numericals
7 TH	1 ST	Beams, types of beams & loads
	2 ND	Concept of shear force & bending moment
	3 RD	Shear force & bending moment diagram for cantilever beam
	4 TH	Simply supported beam
8 TH	1 ST	Simply supported beam
	2 ND	Overhanging beam

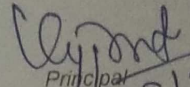
	3 RD	Overhanging beam
	4 TH	Simple bending & assumptions on the theory of simple bending
9 TH	1 ST	Bending equation
	2 ND	Bending equation
	3 RD	Moment of resistance & neutral axis
	4 TH	Moment of resistance & neutral axis
10 TH	1 ST	Numericals
	2 ND	Section modulus
	3 RD	Numericals
	4 TH	Column, axial load, eccentric load, buckling load
11 TH	1 ST	Direct stresses, bending stresses, maximum & minimum stress
	2 ND	Numericals
	3 RD	Numericals
	4 TH	Buckling load using Euler's formula for different columns
12 TH	1 ST	Buckling load using Euler's formula for different columns
	2 ND	Torsion, assumption of pure torsion
	3 RD	Torsion equation for hollow & solid circular shaft
	4 TH	Numericals
13 TH	1 ST	Comparison between solid & hollow shafts subjected to pure torsion
	2 ND	Comparison between solid & hollow shafts subjected to pure torsion
	3 RD	Numericals
	4 TH	Numericals

LEARNING RESOURCES:

A2
Sign Off Faculty
concerned
15/09/22


Academic coordinator
15/09/22

A/C
Sign Off TCD
15/09/22


Principal
15/09/22