



GOVERNMENT POLYTECHNIC, BALASORE

Government of Odisha

ସରକାରୀ ବହୁବୃତ୍ତ ଅନୁଷ୍ଠାନ, ବାଲେଶ୍ୱର

Academic Lesson Plan for Winter Semester-2022

Discipline: Mechanical engineering.	Semester: 3rd	Name of the Teaching Faculty :Mrutunjaya Jena
Subject: Strength of Material	No of Days / Per week class allotted	No of weeks: 15
Week	Class day	Theory/Practical topics
1st	1st	1.0 Simple stress & strain 1.1 Types of load, stresses & strains, (Axial and tangential) Hooke's law,
	2nd	1.1 Young's modulus, bulk modulus, modulus of rigidity, Poisson's ratio derive the relation between three elastic constants
	3rd	1.2 Principle of super position, stresses in composite section
	4th	1.3 Temperature stress, determine the temperature stress in composite bar (single core)
2nd	1st	1.3 Simple problems on above.
	2nd	1.4 Strain energy and resilience
	3rd	1.4 Simple problems on above.
	4th	1.4 Stress due to gradually applied, suddenly applied and impact load
3rd	1st	1.5 Simple problems on above.
	2nd	UNIT 2 .Thin cylinder and spherical shell under internal pressure.
	3rd	2.1 Definition of hoop and longitudinal stress, strain
	4th	2.1 Simple problems on above
4th	1st	2.2 Derivation of hoop stress, longitudinal stress
	2nd	2.2 Simple problems on above
	3rd	2.2 hoop strain, longitudinal strain and volumetric strain
	4th	2.2 Simple problems on above
5th	1st	2.3 Computation of the change in length, diameter and volume

	2nd	2.4 Simple problems on above. UNIT-3.0 Two dimensional stress systems 3.1 Determination of normal stress
	3rd	3.1 Simple problems on above
	4th	
5th	1st	3.1 Determination of shear stress and resultant stress on oblique plane
	2nd	3.1 Simple problems on above.
	3rd	3.2 Location of principal plane and computation of principal stress
	4th	3.2 Simple problems on above
7th	1st	3.3 Location of principal plane and computation of principal stress using Mohr's circle.
	2nd	3.3 Simple problems on above.
	3rd	3.3 Maximum shear stress using Mohr's circle.
	4th	3.3 Simple problems on above.
3th	1st	UNIT4.0 Bending moment& shear force 4.1 Types of beam and load
	2nd	4.2 Concepts of Shear force and bending moment.
	3rd	4.3 Shear Force and Bending moment diagram.
	4th	4.3 Simple problems on above.
9th	1st	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam. With simple problem.
	2nd	simply supported beam. with simple problem.
	3rd	over hanging beam under point load, with problem.
	4th	Shear Force and Bending moment diagram UDL, with problem
10th	1st	Maximum bending moment calculation ,with problem.
	2nd	How to calculate point of contraflexure, with problem.
	3rd	5.0 Theory of simple bending. 5.1 Introduction of bending theory.
	4th	5.1 Assumptions in the theory of

2 nd	1st	bending.
	2nd	5.1 Bending stress calculation. 5.1 Position of neutral axis, & Moment of resistance.
	3rd	5.1 Moment of inertia calculation(MI)
	4th	5.2 Section modulus, calculation with problem.
	1st	5.3 Strength of the solid section & hollow section.
	2nd	5.4 Bending stresses in symmetrical section.
	3rd	5.4 Bending stresses in Unsymmetrical section.
	4th	5.5 Solve simple problems.
3 rd	1st	6.0 Combined direct & bending stresses.
	2nd	6.1 Define column & Types of column.
	3rd	6.2 Axial load, Eccentric load on column.
	4th	6.3 Euler's column theory derivation. 6.3 Direct stresses, Bending stresses, Maximum & Minimum stresses.
	1st	6.3 Numerical problems on above.
	2nd	6.4 Buckling load computation using Euler's formula (no derivation) in Columns with various end conditions
	3rd	UNIT 7.0 Torsion.
	4th	7.0 Introduction & Assumption of pure torsion. 7.1 The torsion equation for solid and hollow circular shaft.
4 th	1st	7.1 Strength of a solid shaft.
	2nd	7.1 Strength of a Hollow shaft.
	3rd	7.2 Power Transmitted by a shaft & polar moment of inertia .with numerical solve.
	4th	7.2 Comparison between solid and hollow shaft subjected to pure torsion

Mrununjay Jena

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