

GOVERNMENT POLYTECHNIC JAJPUR

A/ P: Ragadi, Block: Korei, Dist.: Jajpur, Odisha- 755019

Website: <https://www.gpjajpur.org> E-mail: principalgpjajpur@yahoo.co.in Contact: 9437155107

DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN (2022-2023)

Discipline: Mechanical	Semester: 3RD	Name of the Teaching faculty: KEDARNATH JENA
Subject: Strength of Material (Th-2)	No of Days/ Week class alloted: 4	Semester from Date: 15. 19 . 2022 To Date: 22.01.2022 No of weeks: 15
Week	Class Day	Topics
		CH. 1 SIMPLE STRESS & STRAIN.
1st	4th	Introduction to Strength of Material. Types of load, stresses & strains (Axial and tangential)
2nd	1st	Poisson's ratio, Lateral and Linear strain. Numerical to find stress, strain, elongation and Poisson's ratio.
	2nd	Hooke's law. Young's modulus, bulk modulus, modulus of rigidity, Relation between E & C, E & K.
	3rd	Relation between three elastic constants. Numerical
	4th	Principle of super position. Numerical
3rd	1st	<i>Numerical on above.</i>
	2nd	<i>Numerical on above.</i>
	3rd	Stresses in composite section. Numerical
	4th	Temperature stress and strain, Temperature stress in composite bar (single core). Numerical
4th	1st	<i>Numerical on above.</i>
	2nd	Strain energy and resilience, Stress due to gradually applied load.
	3rd	Stress due to suddenly applied and impact load
	4th	CH. 2 Thin cylinder and spherical shell under internal pressure. Introduction to Thin cylinder and spherical shell. Assumption for thin cylindrical shell. Hoop and longitudinal stress and strain.
5th	1st	Determination of hoop stress and longitudinal stress.
	2nd	Numerical to find safe pressure, thickness and diameter.
	3rd	Determination of Hoop strain, longitudinal strain and volumetric strain
	4th	Determination of Change in length, diameter and volume of thin cylindrical shell.
6th	1st	Numerical to find change in dimensions of thin cylindrical shell.
	2nd	Numerical to find change in dimensions of thin cylindrical shell.
		CH. 3. Two dimensional stress system.
	3rd	Introduction to 2-dimensional stress system; Concept of Principal plane, Principal stress and strain; Stresses in oblique plane
	4th	Determination of normal stress, shear stress and resultant stress on an oblique plane of a body which subjected to (i) direct stress in one direction only. Numerical
	1st	<i>Numerical</i>

7th	2nd	Determination of normal stress, shear stress and resultant stress on an oblique plane of a body which subjected to (ii) direct stress in two perpendicular directions. Numerical
	3rd	Numerical.
	4th	Determination of normal stress, shear stress and resultant stress on an oblique plane of a body which subjected to (iii) shear stress only. Numerical
8th	1st	Numerical.
	2nd	Determination of normal stress, shear stress and resultant stress on an oblique plane of a body which subjected to (iv) direct stress in one direction and followed by shear stress. Numerical
	3rd	Numerical.
	4th	Determination of normal stress, shear stress and resultant stress on an oblique plane of a body which subjected to (v) direct stress in two perpendicular direction and followed by shear stress. Numerical
9th	1st	Numerical.
	2nd	Concept of Mohrs circle. Mohrs circle problems.
	3rd	Mohrs circle problems.
	4th	Class TEST 1
10th	1st	CH.-4 Bending moment and shear force. Types of beam and load. Concept of shear force and bending moment.
	2nd	Sign convention . Relationship between SF, BM and loading.
	3rd	Numerical to determine Shear force and bending moment diagram in cantilever beam subjected to point load.
	4th	Numerical to determine Shear force and bending moment diagram in cantilever beam subjected to point U.D.L.
11th	1st	Numerical to determine Shear force and bending moment diagram in Simply supported beam subjected to point load.
	2nd	Numerical to determine Shear force and bending moment diagram in Simply supported beam subjected to point U.D.L.
	3rd	Numerical to determine Shear force and bending moment diagram in Over hanging beam subjected to point load.
	4th	Numerical to determine Shear force and bending moment diagram in Over hanging beam subjected to U.D.L..
12th	1st	CH. 5 Theory of simple bending. Introduction to Theory of simple bending, Assumptions in the theory of bending
	2nd	Neutral axis , Theory of simple bending
	3rd	Moment of resistance, Bending equation
	4th	Section modulus of rectangular and circular beam sections
13th	1st	<i>Numerical</i>
	2nd	<i>Numerical</i>
		CH. 6. Combined direct and bending stress.
	3rd	Define column, types of column, Axial load, Eccentric load on column.
14th	4th	Direct stresses, Bending stresses, Maximum & Minimum stresses in short column: for uniaxial system
	1st	Direct stresses, Bending stresses, Maximum & Minimum stresses in short column: for biaxial system
	2nd	<i>Numerical</i>
	3rd	Buckling load computation using Euler's formula (noderivation) in Columns with various end conditions

	4th	<i>Numerical on above.</i>
		CH. 7. Torsion.
15th	1st	Torsion in shafts, Assumption of pure torsion
	2nd	Theory of pure torsion
	3rd	Torsion equation for solid and hollow circular shaft , Numerical
	4th	Comparison between solid and hollow shaft subjected to pure torsion, torsional rigidity, Numerical
16th	1st	<i>Numerical</i>
	2nd	Class test 2
	3rd	<i>Previous year question discussion.</i>

Learning resources:

Sl. No.	Author	Title of the book	Publisher
01	S Ramamrutham	Strength of Materials	Dhanpat Rai
02	R K Rajput	Strength of Materials	S.Chand
03	R.S khurmi	Strength of Materials	S.Chand
04	G H Ryder	Strength of Materials	Mc millon and co. lmtd
05	S Timoshenko and D H Young	Strength of Materials	TMH

Signature of Faculty

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15-09-22