SYNERGY SCHOOL OF ENGINEERING,DHENKANAL

LESSON PLAN

Session (2024-2025)

iscipline: lechanical	**Semester:** 3rd, Winter/2024	**Name of the Teaching Faculty:** Mr Somanath Sethy (Lecturer) **Email ID:**
ubject: trength of Material. heory-2	**No. of Days/Week:** 04	**Start Date:** 01/07/2024 **End Date:** 08/11/2024

Week	Class Day	Theory/Practical Topics
1st	1st	Strength of Material-Introduction. Load, stress & strain, and their types.
	2nd	Stress ~ Strain Diagram. Lateral strain and Linear strain. Poisson's ratio.
	3rd	Hooke's law. Elastic constants: Young's modulus, bulk modulus, and modulus of rigidity. Relation between E&K.
	4th	Relation between E&C. Relation between three elastic constants (E, C and K)
2nd	1st	Numerical: Determination of stress, strain, elongation and Poisson's ratio.
	2nd	Numerical: Determination of Elastic constants and Poisson's ratio.
	3rd	Principle of super position: Numerical
	4th	Stresses in composite section: Numerical
3rd	1st	Temperature stress and strain, Temperature stress in composite bar (single core): Numerical
	2nd	Composite section subjected to thermal stress and strain: Numerical
	3rd	Strain energy and resilience. Stress due to gradually applied, suddenly applied and impact load
	4th	Doubt Clearing Class
4th	1st	Thin cylindrical shell. Assumption. Hoop stress and longitudinal stress. Failure of thin cylindrical shell. 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: Change in length, diameter and volume of thin cylindrical shell.
	4th	Numerical to find change n dimensions of thin cylindrical shell.
5th	1st	Class test/Assignment-01
	2nd	Types of beams and loads Shear force and bending moment. Sign convention.
	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 U.D.L

6th	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 U.D.L.
	3rd	Numerical to determine Shear Force and Bending moment diagram in overhanging beam subjected to point load.
	4th	Numerical to determine Shear Force and Bending moment diagram in overhanging beam subjected U.D.L.
7th	1st	Doubt Clearing Class
	2nd	QUIZ Test-1
	3rd	Simple bending: Introduction, Assumption, Position of neutral axis.
	4th	Theory of simple bending (Derivation of bending equation)
8th	1st	Section modulus, Moment of inertia, Numerical.
	2nd	Numerical
	3rd	Define column, types of columns, Axial load, Eccentric load, Slenderness ratio, Buckling load.
	4th	Direct stresses, Bending stresses, Maximum & Minimum stresses in short column: for uniaxial and biaxial system
9th	1st	Buckling load computation using Euler's formula (no derivation) in Columns with various end conditions
	2nd	Numerical
	3rd	Doubt Clearing Class
	4th	Torsion in shafts, Assumption of pure torsion
11th	1st	Theory of pure torsion (Derivation of bending equation)
	2nd	Strength of solid and hollow shafts. Polar moment of inertia and Polar modulus.
	3rd	Power transmission in solid and hollow shafts. Torsional rigidity. Combined bending and twisting.
	4th	Numerical
12th	1st	Numerical
	2nd	Quiz Test-2
	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
13th	1st	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
	2nd	Determination of normal stress, shear stress and resultant stress on an oblique plane of a body which subjected to (iii) shear stress only: Numerical
	3rd	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. Problem
	4th	Determination of normal stress, shear stress and resultant stress on an oblique plane of a body which subjected to (iv) direct stress in two perpendicular directions and followed by shear stress. Problem.

14th	1st	Concept of Mohr's circle. Mohr's circle Problems.
	2nd	Mohr's circle Problems.
	3rd	Doubt Clearing Class
	4th	Class test/Assignment-2
15th	1st	Revision/Doubt Clearing Classes
	2nd	Revision/Doubt Clearing Classes
	3rd	Revision/Doubt Clearing Classes
	4th	Revision/Doubt Clearing Classes

(Mr Somanath Sethy)

Lecturer – Mechanical Engineering