GOVERNMENT POLTECHNIC KANDHAMAL, PHULBANI

Lesson Plan

Subject Name: Strength of Materials (L-T-P = 3-0-0)

Subject Code: TH-2

Semester: 3rd, **Branch:** Mechanical Engineering

Academic Calendar: Winter 2025

Name of the Faculty: Dr Dillip Kumar Panigrahi, Lecturer in Mechanical, Govt. Polytechnic Kandhamal, Phulbani

Strength of Materials is a fundamental engineering course that examines the behaviour of deformable bodies under various loads. Lesson plans for this course typically cover topics like stress, strain, deformation, and failure criteria, equipping students with the knowledge to analyse and design structures and mechanical components.

SI No.	Date	Topics to be Covered as per Lesson Plan	Points / Contents to be Discussed (in detail)
1st Week	14-07-2025 to 19-07-2025	➢ Simple Stresses and Strains (Unit-1)	➢ Types of forces; Stress, Strain and their nature. ➢ Mechanical properties of common engineering materials; ➢ Significance of various points on stress- strain diagram for M.S. and C.I. specimens; ➢ Significance of factor of safety. ➢ Relation between elastic constants.
2nd Week	21-07-2025 to 26-07-2025	➢ Simple Stresses and Strains (Unit-1)	➢ Stress and strain values in bodies of uniform section and of composite section under the influence of normal forces; ➢ Thermal stresses in bodies of uniform section and composite sections; ➢ Related numerical problems on the above topics.
3rd Week	28-07-2025 to 02-08-2025	➢ Simple Stresses and Strains (Unit-1)	➢ Strain Energy: Strain energy or resilience, proof resilience and modulus of resilience; ➢ Derivation of strain energy for the following cases: i) Gradually applied load, ii) Suddenly applied load, iii) Impact/ shock load;

			➤ Related numerical problems.
4th Week	04-08-2025 to 09-08-2025	➤ Simple Stresses and Strains (Unit-1) ➤ Shear Force & Bending Moment Diagrams (Unit-2)	➤ Numericals on Simple Stresses and Strains ➤ Types of beams with examples: a) Cantilever beam, b) Simply supported beam, c) Over hanging beam, d) Continuous beam, e) Fixed beam; ➤ Types of Loads – Point load, UDL and UVL; ➤ Definition and explanation of shear force and bending moment;
5th Week	11-08-2025 to 16-08-2025	➤ Shear Force & Bending Moment Diagrams (Unit-2)	➤ Calculation of shear force and bending moment and drawing the S.F and B.M. diagrams by the analytical method only for the following cases: a) Cantilever with point loads, b) Cantilever with uniformly distributed load, c) Simply supported beam with point loads. ➤ Related numerical problems.
	15-08-2025	**Independence Day/Janmastami**	
6th Week	18-08-2025 to 23-08-2025	➤ Shear Force & Bending Moment Diagrams (Unit-2)	➤ Calculation of shear force and bending moment and drawing the S.F and B.M. diagrams by the analytical method for the following cases: d) Simply supported beam with UDL, e) Over hanging beam with point loads, at the centre and at free ends. ➤ Related numerical problems.
7th Week	25-08-2025 to 30-08-2025	➤ Shear Force & Bending Moment Diagrams (Unit-2)	➤ Calculation of shear force and bending moment and drawing the S.F and B.M. diagrams by the analytical method for the following cases: f) Over hanging beam with UDL throughout, g) Combination of point and UDL for the above. ➤ Related numerical problems.
	27-08-2025	**Ganesh Puja**	
	28-08-2025	**Nuakhai**	
8th Week	01-09-2025 to 06-09-2025	➤ Theory of Simple Bending and Deflection of Beams (Unit-3)	➤ Explanation of terms: Neutral layer, Neutral Axis, Modulus of Section, Moment of Resistance, Bending stress, Radius of curvature; ➤ Assumptions in theory of simple bending; ➤ Bending Equation $M/I = \sigma/Y = E/R$ with derivation;
	05-09-2025	**Birthday of Prophet Muhammad**	
9th Week	08-09-2025 to	➤ Theory of Simple Bending and Deflection of Beams (Unit-3)	➤ Problems involving calculations of bending stress, modulus of section and moment of resistance;

	13-09-2025		➢ Calculation of safe loads and safe span and dimensions of cross- section;
10th Week	15-09-2025 to 20-09-2025	➢ Theory of Simple Bending and Deflection of Beams (Unit-3)	➢ Definition and explanation of deflection as applied to beams; ➢ Deflection formulae without proof for cantilever and simply supported beams with point load and UDL only (Standard cases only); ➢ Related numerical problems.
11th Week	22-09-2025 to 27-09-2025	➢ Torsion in Shafts and Springs (Unit-4)	➢ Definition and function of shaft; Calculation of polar M.I. for solid and hollow shafts; Assumptions in simple torsion;
12th Week	29-09-2025 to 02-10-2025	**PUJA VACATION**	
	03-10-2025 to 04-10-2025	➢ Torsion in Shafts and Springs (Unit-4)	➢ Derivation of the equation $T/J=fs/R=G\theta/L$; ➢ Problems on design of shaft based on strength and rigidity;
13th Week	06-10-2025 to 11-10-2025	➢ Torsion in Shafts and Springs (Unit-4)	➢ Numerical Problems related to comparison of strength and weight of solid and hollow shafts; ➢ Classification of springs; Nomenclature of closed coil helical spring;
	07-10-2025	**Kumar Purnima**	
14th Week	13-10-2025 to 18-10-2025	➢ Torsion in Shafts and Springs (Unit-4)	➢ Deflection formula for closed coil helical spring (without derivation); stiffness of spring; ➢ Numerical problems on closed coil helical spring to find safe load, deflection, size of coil and number of coils.
15th Week	20-10-2025 to 25-10-2025	➢ Thin Cylindrical Shells (Unit-5)	➢ Explanation of longitudinal and hoop stresses in the light of Circumferential and longitudinal failure of shell; ➢ Derivation of expressions for the longitudinal and hoop stress for seamless shells; ➢ Related Numerical Problems
	21-10-2025	**Diwali**	
16th Week	27-10-2025 to 01-11-2025	➢ Thin Cylindrical Shells (Unit-5)	➢ Derivation of expressions for the longitudinal and hoop stress for seam shells; ➢ Related Numerical Problems

17th Week	03-11-2025 to 08-11-2025	➢ Thin Cylindrical Shells (Unit-5)	➢ Related numerical Problems for safe thickness and safe working pressure.
	05-11-2025	**Rahas Purnima**	
18th Week	10-11-2025 to 15-11-2025	Revision	
19th Week	17-11-2025 to 22-11-2025	Revision	

REFERENCES:

1. Strength of Materials – D. S. Bedi, Khanna Book Publishing Co. (P) Ltd., Delhi, 2017

2. Strength of Materials – B. C. Punmia, Ashok Kumar Jain & Arun Kumar Jain, Laxmi Publications, New Delhi, 2013

3. Strength of Materials – R.S. Khurmi, S. Chand Company Ltd. Delhi

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