C. V. RAMAN POLYTECHNIC, BHUBANESWAR
LESSON PLAN
Session (2025-2026)

Discipline: Mechanical Engineering	**Semester:** 3rd Semester, Winter/2025	**Name of the Faculty:** Sutapa Sarkar, Asst. Prof.
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Subject: Strength of Materials, MEPC203 TH:2	**No. of Days/week:** 03	**Start Date:** 14.07.2025
		End Date: 15.11.2025
Week	**Class Day**	**Theory Topics**
1st	1st	**Simple Stress and Strain** Types of forces, Stress, Strain and their nature;
	2nd	Mechanical properties of common engineering materials;
	3rd	Significance of various points on stress-strain diagram for M.S & C.I specimens; significance of factor of safety; Relation between elastic constants;
2nd	1st	Stress & strain values in bodies of uniform section and composite section under the influence of normal force: solving numerical.
	2nd	Stress & strain values in bodies of uniform section and composite section under the influence of normal force: solving numerical.
	3rd	Thermal stresses in bodies of uniform section and composite section: solving numerical.
3rd	1st	Thermal stresses in bodies of uniform section and composite section: solving numerical.
	2nd	Strain Energy: Resilience, Proof Resilience and Modulus of Resilience;
	3rd	Derivation of Strain Energy i) Gradually applied load. ii) Suddenly applied load iii) impact load related solving numerical.
4th	1st	Derivation of Strain Energy i) Gradually applied load. ii) Suddenly applied load iii) impact load related solving numerical.
	2nd	Types of beams; i) Cantilever beam, ii) Simply supported beam, iii) Over hanging beam, iv) Continuous beam, v) Fixed beam; Types of Loads – i) point load. ii) UDL, III) UVL

	3rd	**Shear Force and Bending Moment Diagram** Definition and explanation of Bending moment and Shear force.
5th	1st	Calculation and drawing of SF & BM (Cantilever beam with point load).
	2nd	Calculation and drawing of SF & BM (Cantilever beam with UDL).
	3rd	Calculation and drawing of SF & BM (Simply supported beam with point load)
6th	1st	Calculation and drawing of SF & BM (Simply supported beam with UDL)
	2nd	Calculation and drawing of SF & BM (Overhang beam with point load)
	3rd	Calculation and drawing of SF & BM (overhang beam with UDL)
7th	1st	Combination of point load &UDL related to numerical.
	2nd	**Theory of Simple Bending and Deflection of Beam** Explanation of terms: Neutral Layer. Neutral Axis. Modulus of Section, Moment of Resistance, Bending Stress. Radius of curvature.
	3rd	Assumptions in theory of simple bending; Bending Equation M/I = /Y = E/R with derivation.
8th	1st	Problems related to bending stress.
	2nd	Problems related to modulus of section.
	3rd	Problems related to moment of resistance.
9th	1st	Calculation of safe loads and safe span.
	2nd	Definition and explanation of deflection as applied to beams.
	3rd	Deflection formulae for Cantilever beam, simply supported beam with point loads and UDL; related numerical.
10th	1st	Deflection formulae for Cantilever beam, simply supported beam with point loads and UDL; related numerical.
	2nd	**Torsion in shafts and Springs** Definition and function of shaft; Calculation of Polar MI for solid shaft and hollow shaft.
	3rd	Definition and function of shaft; Calculation of Polar MI for solid shaft and hollow shaft.
11th	1st	Assumption in simple torsion; Derivation of the equation T/J = fs/R = G0/L
	2nd	Problems on design of shaft on based on strength and rigidity.

	3rd	Problems related to comparison of strength and weight of solid and hollow shafts.
12th	1st	Problems related to comparison of strength and weight of solid and hollow shafts.
	2nd	Nomenclature of closed coil spring: Deflection formula for closed coil helical spring; stiffness of spring.
	3rd	Problems on closed coil helical spring to find safe load, deflection, size of coil and numbers of coils.
13th	1st	Problems on closed coil helical spring to find safe load, deflection, size of coil and numbers of coils.
	2nd	**Thin Cylindrical Shells** Explanation of longitudinal and hoop stresses in the light of circumferential and longitudinal failure shell.
	3rd	Derivation of expressions for the longitudinal and hoop stress for seamless and seam shells.
14th	1st	Derivation of expressions for the longitudinal and hoop stress for seamless and seam shells.
	2nd	Related to above numerical problems for safe thickness and safe working pressure.
	3rd	Related to above numerical problems for safe thickness and safe working pressure.
15th	1st	Related to above numerical problems for safe thickness and safe working pressure.
	2nd	Revision
	3rd	Revision

Sutapa Sarkar 11/07/25
Concerned Faculty

H.O.D. 11.7.25