| "PVC" NSSK G.P. BILASPUR at KALOL | | Department :- Mechanical Engg. (4th sem) | | Subject- SOM (MEPC202) | | |
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| | | Course- Diploma | | Duration -3 Years | | |
| SYLLABSE COVERRAGE | | Total Periods -56 (L - 42 , DCS – 14) | | Theory-56 | | |
| Sr no. | Period No's | Topic | Details | Instruction Reference | Additional Study Recommended | Remarks |
| 1 | 1-12 | **Simple Stresses and Strains** | 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 ( Formula without proof);Stress and strain values in bodies of uniform section and of composite section under the influence of normal forces; Thermal stresses in body of uniform section; Simple numerical problems on the above topics. | Strength of Materials–R.S. Khurmi, S. Chand Company Ltd. Delhi | A Text Book strength of Material– R.K. Bansal, Laxmi Publication New Delhi | |
| | | **Strain Energy** | Strain energy or resilience, proof resilience and modulus of resilience; Formula without derivation of strain energy for the following cases: i) Gradually applied load, ii) Suddenly applied load, iii)Impact/shock load; Simple numerical problems. | | | |
| 2 | 13-24 | **Equilibrium Shear Force & Bending Moment Diagrams** | 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; 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, d)Simply supported beam with UDL, e) Over hanging beam with point loads, at the centre and at free ends, f) Over hanging beam with UDL throughout, g)Combination of point and UDL for the above; Related simple numerical problems. | --------do-------- | --------do-------- | |
| 3 | 25-36 | **Theory of Simple Bending and Deflection of Beams:** | 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 $M/I = \sigma/Y = E/R$ ; Simple Problems involving calculations of bending stress, modulus of section and | --------do-------- | --------do-------- | |

| | | | moment of resistance; 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 simple numerical problems. | | | |
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| 4 | 37-48 | **Torsion in Shafts and Springs:** | Definition and function of shaft; Calculation of polar M.I. for solid and hollow shafts; Assumptions in simple torsion; Torsion equation $T/J=fs/R=G\theta/L$; Simple Problems on design of shaft based on strength and rigidity; Numerical Problems related to comparison of strength and weight of solid and hollow shafts; Classification of springs; Nomenclature of closed coil helical spring; Deflection formula for closed coil helical spring (without derivation);stiffness of spring; Simple Numerical problems on closed coil helical spring to find safe load, deflection, size of coil and number of coil | --------do-------- | --------do------- | |
| 5 | 49-56 | **Thin Cylindrical Shells** | 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; Related numerical Problems. | --------do------- | --------do------- | |

| Approved | | HOD Sign |
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| Date : 27/01/25 | | |