



GOVERNMENT POLYTECHNIC, BALASORE

Government of Odisha

ସରକାରୀ ବହୁବୃତ୍ତି ଅନୁଷ୍ଠାନ, ବାଲେଶ୍ଵର

Academic Lesson Plan for 3rd semester- 2021-2022

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| Discipline: Mechanical engineering. | Semester:3rd | Name of the Teaching Faculty : MANOJ KUMAR SAHOO |
| Subject: Strength of Material | No of Days /Per week class allotted | No of week:15 |
| Week | Class day | Theory/Practical topics |
| 1St | 1st | 1.0 Simple stress& strain 1.1 Types of load, stresses & strains,(Axial and tangential) Hooke's law, |
| | 2nd | 1.1 Young's modulus, bulk modulus, modulus of rigidity, Poisson's ratio |
| | 3rd | derive the relation between three elastic constants |
| | 4th | 1.2 Principle of super position, stresses in composite section |
| 2nd | 1st | 1.3Temperature stress, determine the temperature stress in composite bar (single core) |
| | 2nd | 1.3 Simple problems on above. |
| | 3rd | 1.4 Strain energy and resilience |
| | 4th | 1.4 Simple problems on above. |
| 3rd | 1st | 1.4 Stress due to gradually applied, suddenly applied and impact load |
| | 2nd | 1.5 Simple problems on above. |
| | 3rd | UNIT 2 .Thin cylinder and spherical shell under internal pressure. 2.1 Definition of hoop and longitudinal stress, strain |
| | 4th | 2.1 Simple problems on above |
| 4th | 1st | 2.2 Derivation of hoop stress, longitudinal stress |
| | 2nd | 2.2 Simple problems on above. |
| | 3rd | 2.2 hoop strain, longitudinal strain and volumetric strain |
| | 4th | 2.2 Simple problems on above. |
| | 1st | 2.3 Computation of the change in |

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| 5th | | length, diameter and volume |
| | 2nd | 2.4 Simple problems on above. |
| | 3rd | UNIT-3.0 Two dimensional stress systems 3.1Determination of normal stress |
| | 4th | 3.1 Simple problems on above |
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| 6th | 1st | 3.1 Determination of shear stress and resultant stress on oblique plane |
| | 2nd | 3.1 Simple problems on above. |
| | 3rd | 3.2 Location of principal plane and computation of principal stress |
| | 4th | 3.2 Simple problems on above |
| 7th | 1st | 3.3 Location of principal plane and computation of principal stress using Mohr's circle. |
| | 2nd | 3.3 Simple problems on above. |
| | 3rd | 3.3 Maximum shear stress using Mohr's circle. |
| | 4th | 3.3 Simple problems on above. |
| 8th | 1st | UNIT4.0 Bending moment& shear force |
| | | 4.1 Types of beam and load. |
| | 2nd | 4.2 Concepts of Shear force and bending moment. |
| | 3rd | 4.3 Shear Force and Bending moment diagram. |
| | 4th | 4.3Simple problems on above. |
| 9th | 1st | Shear Force and Bending moment diagram and its salient features illustration in cantilever beam.With simple problem. |
| | 2nd | simply supported beam.with simple problem. |
| | 3rd | over hanging beam under point load,with problem. |
| | 4th | Shear Force and Bending moment diagram UDL,with problem |
| 10th | 1st | Maximum bending moment calculation ,with problem. |
| | 2nd | How to calculate point of contraflexure,with problem. |
| | 3rd | 5.0 Theory of simple bending. 5.1 Introduction of bending theory. |

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| | 4th | 5.1 Assumptions in the theory of bending. |
| 11th | 1st | 5.1 Bending stress calculation. |
| | 2nd | 5.1 Position of neutral axis, & Moment of resistance. |
| | 3rd | 5.1 Moment of inertia calculation (MI) |
| | 4th | 5.2 Section modulus, calculation with problem. |
| 12th | 1st | 5.3 Strength of the solid section & hollow section. |
| | 2nd | 5.4 Bending stresses in symmetrical section. |
| | 3rd | 5.4 Bending stresses in Unsymmetrical section. |
| | 4th | 5.5 Solve simple problems. |
| 13th | 1st | 6.0 Combined direct & bending stresses. |
| | 2nd | 6.1 Define column & Types of column. |
| | 3rd | 6.2 Axial load, Eccentric load on column. |
| | 4th | 6.3 Euler's column theory derivation. |
| 14th | 1st | 6.3 Direct stresses, Bending stresses, Maximum & Minimum stresses. |
| | 2nd | 6.3 Numerical problems on above. |
| | 3rd | 6.4 Buckling load computation using Euler's formula (no derivation) in Columns with various end conditions |
| | 4th | UNIT 7.0 Torsion. |
| 15th | 1st | 7.0 Introduction & Assumption of pure torsion. |
| | 2nd | 7.1 The torsion equation for solid and hollow circular shaft. |
| | 3rd | 7.1 Strength of a solid shaft. |
| | 4th | 7.1 Strength of a Hollow shaft. |
| 15th | 1st | 7.2 Power Transmitted by a shaft & polar moment of inertia .with numerical solve. |
| | 2nd | 7.2 Comparison between solid and hollow shaft subjected to pure torsion |
| | 3rd | |
| | 4th | |

