GANDHI ACADEMY OF TECHNOLOGY AND ENGINEERING

**LESSON PLAN**

**Session (2023-2024)**

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| **Discipline:**  Mechanical | **Semester:**  3rd SEM | **Name of the Teaching Faculty:**  Mr. T. Ganesh Achary |
| **Subject:**  Strength of Material, Theory-2 | **No. of Days/Week:**  04 | Class Test: 20  End Semester Examination: 80 |

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| **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 in 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 |

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| 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. |

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| 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 |