GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

MECHANICS OF SOLIDS LAB

Course Code: GR15A2025   L:0 T:0 P:2 C:2
II Year I Semester

Prerequisites
Fundamentals of Mechanics of solids

Course Objectives
- To provide the knowledge in finding out the strength & hardness of a material with different methods
- To know the mechanical properties of various materials by using universal testing machine.
- To provide the knowledge in finding out the slope & deflection of various types of beams

Course Outcomes
- To give practical knowledge of testing of strength of materials under application of types of loads.
- To determine safe load of application on various materials
- Apply the fundamental concepts of principle of superposition, equilibrium, compatibility, force-deformation, and stress-strain relationships to the solid and structural mechanics problems
- Analyze determinate and indeterminate bars, beams, and determinate trusses to determine axial forces, torques, shear forces, and bending moments
- Fundamental understanding of the concepts of stress and strain in mechanics of solids and structures and material properties.
- The ability to design structural members given the dimensions, material properties such as force-displacement relationships, boundary conditions, loading, allowable stresses, and factor of safety.

List of Experiments
1. To determine the resistance of a material to indentation using Brinnel's Hardness Test
2. To determine the resistance of a material to indentation using Rockwell's Hardness Test
3. To determine the resistance of a material to indentation using Vicker's Hardness Test
4. To determine the rigidity modulus of a spring using Compression Test

5. To determine the strength of material in tension using Tension Test
6. To determine the strength of material under compression using Compression Test
7. To determine the young's modulus of the given structural material using Cantilever Beam
8. To determine the young's modulus of the given structural material using Simply Supported Beam
9. To determine the young's modulus of the given structural material using Maxwell's Reciprocal Theorem
10. To determine the young's modulus of the given structural material using Continuous Beam
11. To determine the tensional strength and stiffness of a material using Torsion Test
12. To determine the ultimate shear strength of the given structural material using Direct Shear Test.

Teaching Methodology: Experimental Test rigs