

# METALLURGY & MECHANICS OF SOLIDS LABORATORY

## MECHANICS OF SOLIDS LABORATORY

### OBJECTIVE:

In this laboratory, students have to perform tests on materials in tension, compression, torsion, bending, and impact. These conditions and/or constraints are designed to reinforce classroom theory by having the student perform required tests, analyze subsequent data, and present the results in a professionally prepared report.



The machines and equipment used to determine experimental data include universal testing machines, torsion equipment, spring testing machine, compression testing machine, impact tester, hardness tester, etc. Data will be collected using Dial indicators, extensometers, strain gages and strain indicator equipment, as well as load and strain readouts on the machinery and graphing capabilities to print relevant plots for analysis.

## **OUTCOMES:**

Upon the completion of Mechanics of Solids practical course, the student will be able to:

1. Determine the young's modulus for ductile materials.
2. Analyze the various points on stress strain diagram.
3. Calculate the modulus of rigidity of ductile materials.
4. Calculate & Compare the hardness values for various materials.
5. Experiment on a spring to interpret the stiffness and shear modulus.
6. Apply the concept of impact loading and to determine impact values for various materials.
7. Analyze the compression strength of different materials
8. Determine the shear stress of different materials.

## **LIST OF EXPERIMENTS**

### **(A) METALLURGY LAB:**

1. Preparation and study of the micro structure of pure metals like iron , cu and Al.
2. Preparation and study of the microstructure of mild steels, low carbon steels, high-C steels
3. Study of the microstructure of Cast Irons
4. Study of the microstructure of Non -Ferrous alloys
5. Study of the microstructure of Heat treated steels
6. Hardenability of steels by Jominy End quench test
7. To find out the hardnes of various treated and untreated steels

### **(B).MECHANICS OF SOLIDS LAB:**

1. Direct tension test
2. Torsion test
3. Hardness test
  - a. Brinells hardness test
  - b. Rockwell hardness test
4. Test on springs
5. Compression test on cube
6. Impact test
7. Punch shear test