

**MATERIALS TESTING LAB**  
**B.E, III Semester, Mechanical Engineering**  
**[As per Choice Based Credit System (CBCS) scheme]**

<b>Course Code</b>	<b>17MEL37 A / 47A</b>	<b>CIE Marks</b>	<b>40</b>
<b>Number of Lecture Hours/Week</b>	<b>03 (1 Hour Instruction + 2 Hours Laboratory)</b>	<b>SEE Marks</b>	<b>60</b>
<b>RBT Levels</b>	<b>L1, L2, L3</b>	<b>Exam Hours</b>	<b>03</b>

**Credits – 02**

**Course Objectives:**

1. To learn the concept of the preparation of samples to perform characterization such as microstructure, volume fraction of phases and grain size.
2. To understand mechanical behavior of various engineering materials by conducting standard tests.
3. To learn material failure modes and the different loads causing failure.
4. To learn the concepts of improving the mechanical properties of materials by different methods like heat treatment, surface treatment etc.

**PART – A**

1. Preparation of specimen for Metallographic examination of different engineering materials.  
To report microstructures of plain carbon steel, tool steel, gray C.I, SG iron, Brass, Bronze & composites.
2. Heat treatment: Annealing, normalizing, hardening and tempering of steel.  
Metallographic specimens of heat treated components to be supplied and students should report microstructures of furnace cooled, water cooled, air cooled, tempered steel.  
Students should be able to distinguish the phase changes in a heat treated specimen compared to untreated specimen.
3. Brinell, Rockwell and Vickers's Hardness tests on untreated and heat treated specimens.
4. To study the defects of Cast and Welded components using Non-destructive tests like:
  - a) Ultrasonic flaw detection
  - b) Magnetic crack detection
  - c) Dye penetration testing.

**PART B**

1. Tensile, shear and compression tests of steel, aluminum and cast iron specimens using Universal Testing Machine
2. Torsion Test on steel bar.
3. Bending Test on steel and wood specimens.
4. Izod and Charpy Tests on Mild steel and C.I Specimen.
5. To study the wear characteristics of ferrous and non-ferrous materials under different parameters.

6. Fatigue Test (demonstration only)

Course outcomes:

- Acquire experimentation skills in the field of material testing.
- Develop theoretical understanding of the mechanical properties of materials by performing experiments.
- Apply the knowledge to analyze a material failure and determine the failure inducing agent/s.
- Apply the knowledge of testing methods in related areas.
- Know how to improve structure/behavior of materials for various industrial applications.

Scheme of Examination:

ONE question from part -A:	30 Marks
ONE question from part -B:	50 Marks
Viva -Voice:	20 Marks

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Total : 100 Marks

  
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