II Year I Semester	**L**	**T**	**P**	**C**
Code: 20ME3101	**0**	**0**	**3**	**1.5**

MECHANICS OF SOLIDS & METALLURGY LAB

Course Objective:

1. To impart practical exposure on the microstructures of various materials and their hardness evaluation
2. To impart practical knowledge on the evaluation of material properties through various destructive testing procedures.

NOTE: Any 6 experiments from each section A and B.

(A) MECHANICS OF SOLIDS LAB:

1. Direct tension test
2. Bending test on

a) Simple supported
b) Cantilever beam

3. Torsion test
4. Hardness test

a) Brinell's hardness test
b) Rockwell hardness test

5. Test on springs
6. Compression test on cube
7. Impact test
8. Punch shear test

(B) METALLURGYLAB:

1. Preparation and study of the Micro Structure of pure metals like Iron, Cu and Al.
2. Preparation and study of the Micro structure of Mild steels, low carbon steels, high–Carbon steels.
3. Study of the Micro Structures of Cast Irons.
4. Study of the Micro Structures of Non-Ferrous alloys.
5. Study of the Micro structures of Heat-treated steels.
6. Hardenability of steels by Jominy End Quench Test.
7. To find out the hardness of various treated and untreated steels.

Virtual Lab Links:

- http://vlabs.iitb.ac.in/vlabs-dev/labs/nitk_labs/physical-metallurgy/labs/index.php
- https://sm-nitk.vlabs.ac.in/

Course Outcomes:
By the end of the course the student will be able to:

CO1: Understand the concepts of stress and strain by testing materials under various loading conditions.
CO2: Apply the principles of mechanics of solids for finding out various mechanical properties of materials.
CO3: Able to relate properties to microstructure
CO4: Able to select metals and alloys for industrial applications