II B. Tech – I Semester

(20ME3101) MECHANICS OF SOLIDS & METALLURGY LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
15	35	50	-	-	3	1.5

Pre-Requisites: Mechanics of solids, Material science

Course Objective:

- To impart practical exposure on the microstructures of various materials and their hardness evaluation
- 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) Metallurgy Lab:

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:

A student who successfully fulfills this course requirement will be able to:

S. No	Course Outcome	BTL
CO1	Understand the concepts of stress and strain by testing materials under various loading conditions.	L4
CO2	Apply the principles of mechanics of solids for finding out various mechanical properties of materials.	L4
CO3	Able to relate properties to microstructure	L4
CO4	Able to select metals and alloys for industrial applications	L4

Correlation of Cos with POs & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	0	0	3	1	0	3	3	3	3	3	2
CO2	3	2	3	0	0	3	1	0	3	3	3	3	3	2
CO3	3	2	3	0	0	3	1	0	3	3	3	3	3	2
CO4	3	2	3	0	0	3	1	0	3	3	3	3	3	2
CO5	3	3	3	3	2	2	1	3	1	3	1	0	3	2