2/4 B.Tech. THIRD SEMESTER

ME3L3 MECHANICS OF SOLIDS & METALLURGY LAB Credits: 2

Lecture:- - Internal assessment: 25marks
Lab practice: - 3 periods/week Semester end examination: 50 marks

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Objectives:

1. Calculate the various Mechanical properties of materials such as Strength and Hardness
2. Determine Elastic Constants of material by basic principles
3. Identify the steps required to prepare a metallographic sample and document the microstructure.
4. Conduct the jomney end quench test and determine the hardenability of steels.

Learning Outcomes:

At the end of course the student will be able to:

1. Perform tests to determine mechanical properties of materials
2. Apply the methods to determine Elastic Constants
3. Predict the Strength of different Mechanical parts of the machine
4. Operate a metallographic microscope independently to observe and document the microstructure.
5. Get the hardness of steels in different untreated and heat treated conditions.
6. Perform the jomney end quench test and determine the hardenability of steel.

Pre-Requisites:

Engineering Mechanics, Metallurgy & Material Science

ANY 6 EXPERIMENTS FROM EACH SECTION A AND B

(A) MECHANICS OF SOLIDS LAB:

1. Tension test on ductile material
2. Compression Test on wood/concrete
3. Brinell Hardness test
4. Rockwell Hardness test

5. Torsion test
6. Izod Impact test
7. Charpy Impact test
8. Testing of springs
9. Deflection test on simply supported Beam
10. Deflection test on cantilever beam
11. Double shear test on rods
12. Bend test on plates

(B) METALLURGY LAB:

1. Preparation and study of the microstructure of pure metals like Iron, Copper and Aluminium.
2. Preparation and study of the microstructure of Mild Steel, Low and High Carbon Steel.
3. Study of microstructure of Cast Irons
4. Study of microstructure of Non Ferrous Alloys like Brass.
5. Study of microstructure of various treated and untreated steels.
6. Hardenability of Steels by Jominy end Quench test.
7. Hardness of various of treated and untreated steels.