

MATERIAL TESTING AND CHARACTERIZATION LAB

Course Code	19ME3551	Year	III	Semester	I
Course Category:	Program Core	Branch	ME	Course Type	Lab
Credits:	1.5	L – T – P	0 – 0 – 3	Prerequisites:	Nil
Continuous Evaluation:	25	Semester End Evaluation:	50	Total Marks:	75

Course Outcomes

Upon successful completion of the course, the student will be able to

CO1	Apply methods to determine Mechanical properties and Elastic Constants.	L3
CO2	Appraise the students with the use of testing machines.	L4
CO3	Identify the microstructures of different ferrous and non-ferrous metals.	L1
CO4	Discuss the effect of cold working, heat treatment, and cooling rates on the properties of steels.	L2

Course Articulation Matrix:

	Contribution of Course Outcomes towards achievement of Program Outcomes													
	Strength of correlations (3: High, 2: Moderate, 1: Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1		1		3					3			3	1
CO2	1		1		3					3			3	1
CO3	1	2	3	3	3	2	3			3			3	1
CO4	1	2	3	3	2	2	3			3			3	1

Course Content	MAPPED COs
<p>Ten Experiments out of the following are to be performed Six</p> <ol style="list-style-type: none"> 1. Tension Test on UTM - Determination of the strength, percentage elongation and percentage reduction in area of the given specimen. 2. Deflection Test on Simply supported beam - Determination of Young's modulus of Simply Supported beam material. 3. Deflection Test on Cantilever beam - Determination of Young's modulus of cantilever beam material. 4. Torsion Test – Determination of modulus of rigidity of circular rod. 5. Brinnell's Hardness Test - Determination of Hardness Number for given specimen. 6. Rockwell Hardness test - Determination of Hardness Number for given specimen. 7. Izod Impact Test - Determination of impact strength of given specimen. 8. Charpy Impact Test - Determination of impact strength of given specimen. 9. Tests on helical spring - Determination of Modulus of Rigidity of Helical spring material. 10. Double shear Test - Determination of shear strength of given specimen. 	CO-1 & CO-2

<p>Ten Experiments out of the following are to be performed Six</p> <ol style="list-style-type: none">1. Preparation and study of microstructure of Iron, hypoeutectoid, eutectoid and hypereutectoid steels.2. Study of microstructure of Cast Iron samples viz. Ductile, Malleable, Grey, White Cast Irons.3. Preparation and study of microstructure of Aluminum and its alloy.4. Study of microstructure of Copper and its alloy.5. Study and quantification of micro phases in welded samples.6. Study of microstructure of various treated and untreated steels.7. Study of microstructure of 18/8 steel.8. Hardness of various treated and untreated steels.9. Hardenability of Steels by Jominy end Quench test.10. Comparison between annealing and normalizing of cold worked mild steel	<p>CO3 & CO4</p>
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