MATERIAL TESTING AND CHARACTERIZATION LAB

Course Code	20ME3453	Year	II	Semester	II
Course Category	Professional Core	Branch	ME	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	Mechanics
Continuous Internal Evaluation	15	Semester End Evaluation	35	Total Marks	50

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

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

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3-High, 2: Medium, 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	2	3	3	3	2	3			3			3	1
CO3	1		1		3					3			3	1
CO4	1	2	3	3	2	2	3			3			3	1

Syllabus	
Course Content	**MAPPED COs**
1. Determination of Tensile strength, percentage elongation and percentage reduction in area of the given Ferrous and non-Ferrous materials. 2. Determination of Young's modulus of given beam material (Deflection Test on beams). 3. Determination of modulus of rigidity of circular rod (Torsion Test). 4. Determination of Modulus of Rigidity of given Helical spring. 5. Determination of Hardness Number for given material. 6. Determination of impact strength of given material.	**CO1 & CO3**
Out of the Ten Experiments ANY Six are to be performed 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.	**CO2 & CO4**

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	