MATERIAL TESTING NAD CHARECTERIZATION LAB

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

Course Outcomes		**Levels**
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

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H-High3, M-Medium-2, L- Low-1)

	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

Syllabus

Expt. No	**Content**	**Mapped COs**
SIX Experiments out of the following Ten are to be performed		
1.	Tension Test on UTM - Determination of the strength, percentage elongation and percentage reduction in area of the given specimen.	CO1 & CO2
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.	
SIX Experiments out of the following Ten 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.	CO3 & CO4
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.	Determining hardness of various treated and untreated steels.	
9.	Determining the hardenability of Steels by Jominy end Quench test.	
10.	Comparison between annealing and normalizing of cold worked mild steel	