



National Institute of Technology Meghalaya
An Institute of National Importance

CURRICULUM

Programme	Bachelor of Technology in Mechanical Engineering	Year of Regulation	2018
Department	Mechanical Engineering	Semester	III

Course Code	Course Name	Credit Structure				Marks Distribution	
		L	T	P	C	Continuous Evaluation	Total
ME 251	Materials Testing Laboratory	0	0	2	1	100	100
Course Objectives	Understand the behaviour of ductile materials under different loading conditions	Course Outcomes	CO1	Able to understand the behaviour of ductile materials under different loading conditions (Understanding)			
	To understand the behaviour of brittle materials under different loading conditions		CO2	Get ability understand the behaviour of brittle materials under different loading conditions (Understanding)			
	To conduct experiments with UTM, Impact and Torsion Testing Machines to evaluate mechanical properties of material.		CO3	Able to perform the experiments with Brinell, Rockwell and Vickers hardness tester to determine the hardness of different materials and to analyse them (Applying)			
	To perform experiments with Brinell, Rockwell and Vickers hardness tester to determine the hardness of different materials.		CO4	Able to apply the principles to perform experiments with Torsion Testing Machine to evaluate mechanical properties of material. (Applying)			
			CO5	Able to apply the principles to perform experiments with , Impact Testing to evaluate impact strength of the material. (Applying)			

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	2	2	2	0	0	0	0	0	2	0	0	0	2	1	0
2	CO2	2	2	2	0	0	0	0	0	2	0	0	0	2	1	0
3	CO3	2	2	2	0	0	0	0	0	2	0	0	0	2	1	0
4	CO4	2	2	2	0	0	0	0	0	2	0	0	0	2	1	0
5	CO5	2	2	2	0	0	0	0	0	2	0	0	0	2	1	0
6	CO6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SYLLABUS

No.	Content	Hours	COs
I	Demonstrate and explain working principle of UTM, Hardness testing machine (Brinell's, Vicker's, Rockwell's), Torsion testing and Impact testing machine	2	All COs
II	Uniaxial tension test: To obtain the stress-strain relation of mild steel using a circular cylindrical specimen and determine Young's modulus (E), proportional limit (p), yield stress (y), ultimate tensile stress (u) and percentage elongation (SOM 1)	2	CO1
III	Compression test: To study the stress-strain relation of cast iron using a cylindrical specimen (SOM 2)	2	CO2
IV	Hardness test: To determine the hardness of a given set of specimens by Brinell (SOM3)	2	CO3
V	Hardness test: Vickers hardness testing machines. (SOM 4)	2	CO3
VI	Hardness test: Rockwell hardness testing machines. (SOM 5)	2	CO3
VII	Torsion test: To obtain twisting moment - twist relationship of a mild steel specimen. To determine shear modulus G, yield stress y in pure shear, theoretical and experimental ultimate torque based on elastic - perfectly plastic model of material. (SOM 6)	2	CO4
VIII	Impact Test: To obtain mechanical properties against impact load using Izod and Charpy test (SOM 7)	2	CO5
Total Hours		16	

Essential Readings

1. E. P. Popov, "Engineering Mechanics of Solids", Prentice Hall.
2. F. P. Beer, E. R. Johnston (Jr.) and J.T. DeWolf, "Mechanics of Materials", Tata McGraw Hill

Supplementary Readings

1. S. P. Timoshenko, "Strength of Materials", Vols. 1 & 2, CBS Publishers.
2. H. Shames and J. M. Pitarresi, "Introduction to Solid Mechanics", Prentice Hall of India
3. R. Subramanian, "Strength of Materials", Oxford University Press