

BMEE202P	Mechanics of Solids Lab	L	T	P	C
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Pre-requisite	BMEE201L	Syllabus version			
		1.0			
Course Objectives					
1. To impart practical skills in investigating the mechanical behavior of materials. 2. To demonstrate the importance of testing standards in the determination of mechanical properties.					
Course Outcome					
At the end of the course, the student will be able to 1. Evaluate elastic constants of engineering materials as per the ASTM standards. 2. Develop stress-strain diagram of engineering materials as per the ASTM standards. 3. Examine the impact behavior of ductile materials as per the ASTM standards.					
Indicative Experiments					
1.	Tensile and compression tests on the given specimens for determining Young's modulus of materials using Universal Testing Machine.				
2.	Determination of the Poisson's ratio of a metallic specimen in the linear elastic range of loading.				
3.	Estimation of Notch Toughness of the metallic bar using Charpy/Izod Impact Testing Machines.				
4.	Determination of the ultimate shear strength of mild steel specimen by double shear test.				
5.	Determination of Young's modulus of the metallic/non-metallic beam using the deflection test method.				
6.	Verification of the Maxwell's Reciprocal Theorem.				
7.	Determination of the Maximum bending stress of a mild steel beam using deflection test method.				
8.	Hardness tests using Brinell and Rockwell test rigs.				
9.	Estimation of the stiffness and the rigidity modulus of the given helical spring under axial loading.				
10.	Torsion test on mild steel or cast-iron specimens to find out modulus of rigidity.				
11.	Verification of the Euler buckling equations using steel columns subjected to different end conditions.				
12.	Strain measurement of the given beam using the Rosette Strain Gauge.				
Total Laboratory Hours					30 hours
Text Book(s)					
1.	Ferdinand P. Beer, E. Russell Johnston, John T. DeWolf, David F. Mazurek, Sanjeev Sangh, Mechanics of Materials, 2020, 8 th Edition, McGraw Hill Education, India.				
2.	Russell C. Hibbeler, Mechanics of Materials in SI Units, 2018, 9 th Edition, Pearson Education, India.				
3.	Lab Manual prepared by course faculty members				
Reference Books					
1.	James M. Gere, Barry J. Goodno, Mechanics of Materials, 2019, 9th Edition, Cengage Learning India Pvt. Ltd.				
2.	Rattan S. S, Strength of Materials, 2017, 3rd edition, McGraw Hill Education, India.				
3.	Ramamrutham S, Narayanan R, Strength of Materials, 2020, 20th Edition, Dhanpat Rai Publishing Company, India.				
4.	Popov E. P, Nagarajan S, Lu Z. A; Mechanics of materials, SI version, 2015,				

	Prentice-Hall of India.		
5.	James M. Gere, and Stephen Timoshenko, Mechanics of Materials; 2004, 2 nd edition, CBS publishers and distributors.		
Mode of assessment: Viva-voce examination, Lab performance & FAT			
Recommended by Board of Studies		09-03-2022	
Approved by Academic Council		No. 65	Date 17-03-2022