

MECHANICS OF SOLIDS LABORATORY

III Semester: AE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AAEB04	Core	L	T	P	C	CIA	SEE	Total
		-	-	2	1	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 24			Total Classes: 24			
<p>OBJECTIVES: The course should enable the students to:</p> <p>I. Understand basic knowledge on the mechanical behavior of materials like aluminum, mild steel, and cast iron.</p> <p>II. Adopt with the experimental methods to determine the mechanical properties of materials.</p> <p>COURSE LEARNING OUTCOMES (CLOs):</p> <ol style="list-style-type: none"> 1. Able to understand Brinell number of copper, mild steel, aluminum and brass materials. 2. Able to understand the hardness number of copper, mild steel, aluminum and brass materials. 3. Calculate the ultimate tensile strength, percentage of elongation, percentage of reduction of area of mild steel by using UTM. 4. Able to draw stress strain diagram of mild steel. 5. Calculate the modulus of rigidity of a given specimen by using torsion testing machine. 6. Able to draw the relation between T-θ diagram. 7. Understand torsion equation of circular shaft which is fixed at one end and free at other end. 8. Calculate impact strength of a given specimen by Izod impact test. 9. Calculate impact strength of a given specimen by Charpy impact test. 10. Calculate compressive strength of a given specimen by using compression testing machine. 11. Calculate Young's modulus of the long column by using UTM. 12. Able to understand the behavior of spring under gradually applied load. 13. Study the variation of stress along the cross section of the simply supported beam under uniformly distributed load. 14. Study the variation of stress along the cross section of the cantilever beam under uniformly distributed load. 								
LIST OF EXPERIMENTS								
Week-1	BRINELL HARDNESS TEST							
Determination of Brinell number of a given test specimen.								
Week-2	ROCKWELL HARDNESS TEST							
Determination of hardness number of different specimens such as steel, brass, copper and aluminum.								
Week-3	TENSION TEST							
Study the behavior of mild steel and various materials under different loads. To determine <ol style="list-style-type: none"> a) Tensile b) Yield strength c) Elongation 								

d) Young's modulus	
Week-4	TORSION TEST
Determine of Modulus of rigidity of various specimens.	
Week-5	IZOD IMPACT TEST
Determination the toughness of the materials like steel, copper, brass and other alloys using Izod test	
Week-6	CHARPY IMPACT TEST
Determine the toughness of the materials like steel, copper, brass and other alloys using Charpy test.	
Week-7	COMPRESSION TEST ON SHORT COLUMN
Determine the compressive stress on material.	
Week-8	COMPRESSION TEST ON LONG COLUMN
Determine Young's modulus of the given long column.	
Week-9	TESTING OF SPRINGS
Determine the stiffness of the spring and the Modulus of rigidity of wire material.	
Week-10	DEFLECTION TEST FOR SSB AND CANTILEVER BEAM
Determine the Young's modulus of the given material with the help of deflection of SSB and cantilever beam.	
Week-11	REVIEW - I
Spare session for additional repetitions and review.	
Week-12	REVIEW - II
Spare session for additional repetitions and review.	
Reference Books:	
<ol style="list-style-type: none"> 1. Gere, Timoshenko, "Mechanics of Materials", McGraw Hill, 3rd Edition, 1993. 2. R. S Kurmi, Gupta, "Strength of Materials", S. Chand, 24th Edition, 2005. 3. William Nash, "Strength of Materials", Tata McGraw Hill, 4th Edition, 2004. 	