



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad – 500043

Aeronautical Engineering

List of Laboratory Experiments

MECHANICS OF SOLIDS LABORATORY								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AAEC05	Core	L	T	P	C	CIA	SEE	Total
		0	0	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 36			Total Classes: 36			
Branch: AE	Semester: III	Academic Year: 2021-22			Regulation: UG20			
<p>Course overview: Mechanics of solids laboratory enable the students to understand the basic concepts of Mechanics of Solids and apply them to practical problems in Aerospace applications. Mechanical tests are conducted as per standards (ASTM and IS) for identifying the properties of various materials such as Young's Modulus, Hardness, Toughness, stiffness subjected to various loading and support conditions.</p> <p>Course objectives:</p> <p>The students will try to learn:</p> <ol style="list-style-type: none"> The learn the basic knowledge on the mechanical behaviour of materials like aluminium, mild steel, and cast iron. The adopt with the experimental methods to determine the mechanical properties of materials. The illustrate the crippling behaviour of different columns using Euler's and Rankine's theory. The determine the elastic constants of different materials by conducting experiments. <p>Course outcomes:</p> <p>After successful completion of the course, students will be able to:</p> <p>CO 1 Examine the Hardness of mild steel, carbon steel, brass and aluminium specimens using Brinell's and Rockwell's hardness test for characterization of materials used in engineering applications.</p> <p>CO 2 Make use of stress and strains relations of mild steel materials for observing ultimate load using Universal testing machine for design of machine components.</p> <p>CO 3 Identify the modulus of rigidity of a given shaft and spring wire for designing aerospace and automobile structures under loading conditions.</p> <p>CO 4 Analyze the impact strength of steel using Izod and Charpy test for characterization under suddenly applied load.</p> <p>CO 5 Identify the buckling load and crushing load of long and short columns for designing structures subjected to different loads and boundary conditions.</p> <p>CO 6 Choose the deflection equation of simply supported and cantilever beam for determining the young's modulus to predict the behaviour of the beam.</p>								
WEEK NO	EXPERIMENT NAME							Course Outcomes
WEEK – I	BRINELL HARDNESS TEST							CO1
	Determination of Brinell number of a given test specimen.							
WEEK – II	ROCKWELL HARDNESS TEST							CO1
	Determination of hardness number of different specimens such as steel and brass.							
WEEK – III	HARDNESS TEST							CO1
	Determination of hardness number of different specimens such as copper and aluminium.							
WEEK – IV	TENSION TEST							CO2
	Study the behaviour of mild steel and various materials under different loads. To determine: a) Tensile b) Yield strength c) Elongation d) Young 's modulus							
WEEK – V	TORSION TEST							CO3
	Determine of Modulus of rigidity of various specimens.							
WEEK – VI	TEST OF SPRINGS							
	Determine the stiffness of the spring and the Modulus of rigidity of wire material.							

WEEK – VII	IZOD IMPACT TEST	CO4
	Determination the toughness of the materials like steel, copper, brass and other alloys using Izod test.	
WEEK –VIII	CHARPY IMPACT TEST	CO4
	Determine the toughness of the materials like steel, copper, brass and other alloys using Charpy test	
WEEK - IX	COMPRESSION TEST ON SHORT COLUMN	CO5
	Determine the compressive stress on material.	
WEEK - X	COMPRESSION TEST ON LONG COLUMN	CO5
	Determine Young's modulus of the given long column.	
WEEK - XI	DEFLECTION TEST FOR SIMPLE SUPPORTED BEAM	CO6
	Determine the Young's modulus of the given material with the help of deflection of Simple Supported Beam.	
WEEK - XII	DEFLECTION TEST FOR CANTILEVER BEAM	CO6
	Determine the Young's modulus of the given material with the help of deflection of Cantilever beam.	