

MATERIALS AND SOLID MECHANICS LABORATORY

III Semester: ME								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AMEC09	Core	L	T	P	C	CIA	SEE	Total
		0	0	3	1.5	30	70	100
Contact Classes: 0		Tutorial Classes: 0		Practical Classes: 42		Total Classes: 42		
Prerequisite: Fundamentals of solid mechanics								
I. COURSEOVERVIEW:								
<p>Materials and Mechanics of Solids concerned with the micro structures of both ferrous and non ferrous materials, mechanical properties of materials such as percentage elongation, modulus of elasticity, hardness of materials, modulus of rigidity etc. Investigating the mechanical properties of materials are highly important before going to fabrication of products for yielding the higher performance.</p>								
II. COURSEOBJECTIVES:								
The students will try to learn:								
<p>I. The determination of mechanical properties of different materials. II. The constitutive relations in metals using destructive methods. III. The behavior of members during twisting and transverse loading. IV. The familiarization with standard test specimens. V. The investigating micro structure of different materials.</p>								
III. LIST OF EXPERIMENTS:								
Week-1: MICROSTRUCTURE OF PURE METALS								
Batch I& II: Preparation and study of the micro Structure of pure metals like iron, cu and al.								
Week –2: MICROSTRUCTURE OF STEELS								
Batch I& II: Preparation and study of the microstructure of mild steels, low carbon steels, high–C steels.								
Week –3: MICROSTRUCTURE OF CAST IRON								
Batch I& II: Study of the micro structures of cast irons.								
Week –4: MICROSTRUCTURE OF COPPER								
Batch I& II: Study of the micro structures of copper.								
Week –5: MICROSTRUCTURE OF HIGH CARBON STEEL								
Batch I& II: Study of the micro structures of high carbon steel								
Week –6: TENSION TEST								
Batch I& II: To Find % of elongation and young's modulus of a material.								
Week –7: TORSION TEST								
Batch I& II: To find the torsional rigidity of a material.								
Week –8: Brinell HARDNESS TEST								
Batch I& II: To find the Hardness number of given material.								
Week –9: Rockwell HARDNESS TEST								
Batch I& II: To find the Hardness number of given material.								

Week –10: SPRING TEST

Batch I& II: Testing on compressive and elongation springs.

Week –11: COMPRESSION TEST

Batch I& II: Compression test on concrete cube.

Week –12: Charpy IMPACT TEST

Batch I& II: To find the Impact strength of a given specimen

Week –13: IZOD IMPACT TEST

Batch I& II: To find the Impact strength of a given specimen

Week –14: SHEAR TEST

Batch I& II: Punch shear test on aluminium sheet.

IV. TEXT BOOKS:

1. Sidney H Avner, "Introduction to Physical Metallurgy", McGraw Hill Education, 2nd Edition, 2008.
2. William, Callister, "Material Science and Engineering", Wiley, 9th Edition, 2014.
3. V Raghavan, "Elements of Material Science", PHI Learning Company Pvt Ltd, 6th Edition, 2015.
4. Er.Amandeep Singh Wadhva, "Engineering Materials and Metallurgy", Laxmi Publications, 1st Edition, 2008.
5. Traugott Fisher, "Material Science", Academic Press Elsevier, 1st Edition, 2013.

V WEB REFERENCES:

1. <https://www.labtesting.com/about/capabilities/metal-and-material-analysis/metallurgical-analysis/>