

PROGRAMME : DIPLOMA IN METALLURGICAL ENGINEERING

Subject : MATERIAL TESTING

Subject Code : MET305

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FULL MARKS : 100 (80 + 20)

RRATIONALE:-

Metallurgical engineering is a discipline that mainly deals with various metallic materials on the earth for the benefit of mankind. For that it is required to assess properties of metallic materials during various stages of their formation. Testing is essential to control and correlate various manufacturing parameters and also to decide suitability and predict probable behavior of metallic materials in practice. With the knowledge of testing procedures, students conduct various mechanical tests like tension, hardness, fatigue, impact test etc. Non-destructive tests such as ultrasonic, entrant & magnetic tests etc.

OBJECTIVES:-

The students will be able to

1. Understand various types of destructive and non-destructive tests.
2. Be familiar with the behavior of the materials & their specific uses.
3. Conduct various destructive & non-destructive tests & interpret the results.
4. Develop skills in handling various equipment's used in metallic testing.

Contents:-

Sl.No.	Description	Hrs & Marks
01.	Definition and difference in elasticity and plasticity of materials, Hook's law and Stress-strain graph, Effect of temperature on tensile strength and deformation behavior of metals, Effect of loading condition of forces on the strength of materials in application.	6 Hrs 10 marks
02.	Introduction of different mechanical properties e.g. Tensile and Compressive strength, Hardness, Toughness, Ductility, Malleability, Impact strength, Creep strength and Fatigue strength.	6 Hrs 10 marks

03.	Necessarily of material testing, Broad classification of testing methods: Destructive test and Non destructive test (NDT), Measurement of Tensile strength of given materials, Hardness tests : Brinell's Hardness, Vicker's Hardness and Rockwell Hardness tests.	10 Hrs 22 marks
04.	Effect of sudden loading on Strength of Material, Measurement of Impact strength by Izod and Charpy methods, Creep strength and study of Creep Curve, Fatigue and Fatigue Failure, S N Curve.	12 Hrs 22 marks
05.	Meaning of NDT, Types of NDT, Visual Test, Spark Test, Sound Test and Dyepenetrant Test.	4 Hrs 8 marks
06.	Magnetic Particle Test (Magna Flux Test), Radiography (x-ray & γ -ray), Ultrasonic test,	4 Hrs 8 marks

Books

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| 1. Making Shaping Treating | U S Steel |
| 2. Mechanical Metallurgy | Gorge E Dieter |

OBJECTIVES:-

The students will be able to

1. Perform general Mechanical Test such as Tensile and Compressive strength value of different metals.
2. Find Hardness value of Metals and Alloys.
3. Calculate percentage elongation i.e. ductility of as cast and as worked metals.
4. Familiar with the internal defects in materials by measuring them by non destructive test.
5. Assure the reliability of use of Materials as required.

Subject : Material Testing Lab

Subject Code : MET308

LABORATORY WORKS:-

The students will perform the following lab works

1. Determination of Tensile strength of metals by UTM.
2. Measurement of Hardness of material samples by Brinell's Hardness Tester.
3. Measurement of Hardness of material samples by Vicker's Hardness Tester.
4. Measurement of Hardness of material samples by Rockwell Hardness Tester.
5. Measurement of Hardness of material samples by Rubbing / Scratching between two surfaces.
6. Determination of impact strength of a metal.
7. Study of the Creep behavior of metals.
8. Study of Fatigue strength of metals.
9. Determination of flaws by Magna Flux method.
10. Determination of internal defect / voids by Ultrasonic methods.
11. Study of defects by X-ray Radiography.
12. Study of defects by γ -ray Radiography.
13. Detection of Cracks / crevice by Dye penetrant.
14. Material mix up control of various alloy by spark test.
15. Common visual test-- Inspection, Dimensional variation, Ovality, Rhomboidity, Pin holes Blowholes.