

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN METTALLURGY ENGINEERING

SEMESTER: V

Subject Name: **Materials and Testing**

Sr. No.	Course content
1.	Engineering Materials: 1.1 Define engineering materials. 1.2 Classification of engineering materials . 1.3 Non-metallic materials,(rubber, plastics, ceramics etc.) Physical properties and uses.
2.	Criteria for Selection of Engineering Materials: 2.1 Differentiate between ferrous and non-ferrous materials. 2.2 List important ferrous materials like C.I., Steel, Wrought iron. 2.3 Metallic materials (EN-31, HSS, CI, Brass, Bronze, Al-Alloys etc.) 2.4 Criteria for selection of material like fabrication requirement, cost effective, castability, machinability, service requirement,etc.
3.	Importance of Testing: 3.1 Understand the importance of testing of materials. 3.2 ISO-9000 series, its importance, implications in Indian engineering industries. 3.3 Types of testing. 3.4 Merits and demerits of DT and NDT.
4.	Destructive Testing: 4.1 List the destructive test. 4.2 Explain stress-strain diagram. 4.3 Tensile testing: Importance, procedure, calculation, operation and co-relation with other test. 4.4 Compression testing : Importance, procedure. 4.5 Hardness testing : Importance, types of testing, procedure, applications. 4.6 Impact testing : Importance, procedure, types of test. 4.7 Fatigue testing : Explain endurance limit, procedure. 4.8 Creep testing : Importance, procedure. 4.9 Cupping test : Importance, procedure.
5.	Non-Destructive Testing: 5.1 List the non-destructive test. 5.2 Visual inspection: Application, Merits and demerits. 5.3 Liquid penetrant test : Procedure, merits and demerits. 5.4 Magnetic flux method : Procedure merits and demerits. 5.5 Ultrasonic test : Procedure, merits and demerits. 5.6 X-ray, Gamma ray radiography : Procedure, merits and demerits. 5.7 Eddy current test : Procedure merits and demerits. 5.8 Identify defects by relevant NDT methods.

Laboratory Experiments:

1. To determine the tensile strength of M.S. and Al alloys on universal testing machine as per I. S. Code.
2. To determine the compressive strength of C.I., Brass and Copper as per IS code.
3. To determine the Impact strength of Cu, Brass, Al, M.S. on Izod impact testing machine as per IS code.
4. To determine the Hardness by Rockwell hardness tester of Cu, Al and M.S.
5. To determine the Hardness by Brinell hardness tester of Cu, Al and M.S.
6. To determine the Hardness by Vicker's hardness test of Cu, Al and M.S.
7. To study the determination of Fatigue strength.
8. To study the determination of Creep strength.
9. To study the determination of Cupping value of low Carbon steel as per IS, BIS, DIN code on Cupping testing machine.
10. To study the Radiographic testing of welded joints and casting.
11. To perform the Ultrasonic testing of welded joints and casting.
12. To perform the Magnetic testing for bearing case and welded joints.
13. To perform study the Liquid penetrant test on welded joints and boiler plate, castings.
14. Identification of Ferrous and Non ferrous material according to their physical properties.