

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: VII

METALLURGY ENGINEERING

Subject Name: **Non Destructive Testing**

Subject Code: **172102**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
3	1	2	6	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	Defects in casting, forging, heat-treated and other products namely rolled/machined, welded products etc., Causes of defects.	2
2.	Fundamentals of and introduction to destructive and non-destructive testing. Scope and limitations of NDT, Visual examination methods. Different visual examination aids.	2
3.	Leak and pressure testing of industrial components. Various methods of pressure and leak testing ,underlying principles of these testing systems.	4
4.	Dye penetrant and magnetic particle methods of NDT. liquid penetrant testing – procedure; penetrant testing materials, penetrant testing method – sensitivity; application and limitations; magnetic particle testing; definition and principle; magnetizing technique, procedure, equipment ,sensitivity and limitation	6
5.	Ultrasonic methods of NDT-Basic principles of wave propagation, types of waves, methods of UT, their advantages and limitations. Various types of transducers. Calibration methods, use of standard blocks. inspection methods, technique for normal beam inspection, flaw characterization technique, ultrasonic flaw detection equipment ,modes of display, Characterization of defects in castings, forgings, rolled and welded products by UT. Thickness determination by ultrasonic method. Study of A, B and C scan presentations. immersion testing, advantage, limitations; acoustic emission testing – principles of AET and techniques	12

6.	Radiographic testing of metallic components. X-ray and Gamma-Ray radiography. Their principles, methods of generation. Industrial radiography techniques inspection techniques, applications, limitations. Types of films, screens and penetrameters. Interpretation of radiographs. Real time X-ray radiography. safety in industrial radiography.	12
7.	Electrical methods of NDT-Conductivity & resistivity methods and their applications. Eddy current testing. Principle, instrument , techniques, sensitivity, application, limitation ,Thermal methods of NDT.	6
8.	Study of advanced methods of NDT like holography, tomography, MRI etc.	4
9.	SELECTION OF NDT METHODS- VI, LPT, MPT, ECT, RT, UT, AET and thermography; reliability in NDT.	6

Text Books:

1. Practical Non-destructive Testing – Baldev Raj, T. Jayakumar & M. Thavasimuthu, Norosa Publishing House, New Delhi.
2. Treaties on Non-destructive testing, Vol. 1,2 & 3 Edited by Dr. E.G. Krishnadas Nair, NDT Centre, Hal, Bangalore

Reference Books:

1. Non-destructive testing, Warren J. McGonnagle, Gordon Breach, Science Publishers Ltd.
2. Ultrasonic Testing of Materials, J. Krautkramer & Herbert Krautkramer, Narosa Publishing House, New Delhi.
3. Non-destructive testing, R. Hatmshaw.
4. Ultrasonic Methods of Testing Materials, Leszek Filipezynski, Zdzislaw Pawlowski & Jerzywehr, Butterworths, London.