DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Course Title	Non Destructive Testing and Failure Analysis		
Course Code	MTOE10	No. of Credits	03
Course Code of Pre-requisite subject(s)	Nil		
Session	Jan 2018	Section (if applicable)	NA
Name of Faculty	Mr. TEJAS R	Department	MME
Email	tejas@nitt.edu	Telephone No.	8608361648
Name of Course Coordinator(s)	-		
E-mail	-	Telephone No.	-
Course Type	☐ Core course	■ Elective course	

Syllabus (approved in BoS)

Visual examination, Basic principles of liquid penetrant testing and Magnetic particle testing. Radiography - basic principle, electromagnetic radiation sources, radiographic imaging, inspection techniques, applications, limitations and safety.

Eddy current testing - principle, application, limitation; ultrasonic testing – basic properties of sound beam, transducers, inspection methods, flaw characterisation technique, immersion testing, advantage, limitations; acoustic emission testing.

Leak testing, Holography and Thermography - principles, procedures and applications, Comparison and selection of NDT methods; defects in casting, forging, rolling and others.

Failure analysis methodology, tools and techniques of failure analysis, failure data retrieval, procedural steps for investigation of a failure for failure analysis; types of failure and techniques for failure analysis.

Some case studies of failure analysis, Introduction to quality management, concept of ISO9000, ISO14000, QS9000; Inspection, inspection by sampling.

COURSE OBJECTIVES

To develop the fundamental knowledge about non-destructive and destructive analysis, in order to control the quality in manufacturing and production engineering components.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. Differentiate various defect types and describe the main criteria to select the appropriate NDT methods for the product.	1, 4, 5
2. Define tools and techniques of failure analysis, procedural steps for investigation of failure and failure data retrieval	1, 4, 5, 11
3. Describe various types of failure and select suitable techniques for failure analysis	1, 4, 5
4. Know about various ISO standards, inspection, inspection by sampling and quality management	2, 3, 4, 7, 8

COURSE PLAN – PART II

COURSE OVERVIEW

This course will introduce the students to various non-destructive testing techniques, their merits and demerits, and their applications. Failure analysis and an introduction to quality management will also be covered.

COURSE TEACHING AND LEARNING ACTIVITIES

S. No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week #1 to #2	Visual examination, Basic principles of liquid penetrant testing and Magnetic particle testing.	Chalk-Talk and PPT
2	Week #3	Radiography - basic principle, electromagnetic radiation sources, radiographic imaging, inspection techniques, applications, limitations and safety.	Chalk-Talk and PPT
3	Week #4	Eddy current testing - principle, application, limitation	Chalk-Talk and PPT
4	Week #5 to #7	Ultrasonic testing – basic properties of sound beam, transducers, inspection methods, flaw characterisation technique, immersion testing, advantage, limitations; acoustic emission testing.	Chalk-Talk and PPT
5	Week #8 to #9	Leak testing, Holography and Thermography- principles, procedures and applications, Comparison and selection of NDT methods; defects in casting, forging, rolling and others.	Chalk-Talk and PPT
6	Week #10 to #11	Failure analysis methodology, tools and techniques of failure analysis, failure data retrieval, procedural steps for investigation of a failure for failure analysis; types of failure and techniques for failure analysis.	Chalk-Talk and PPT
7	Week #12 to #13	Some case studies of failure analysis, Introduction to quality management, concept of ISO9000, ISO14000, QS9000; Inspection, inspection by sampling.	Chalk-Talk and PPT

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assessment I (Written Test)	7th Week	45 mins	20%
2	Assessment II (Written Test)	12th Week	45 mins	20%
CPA	Compensation Assessment	14th Week	45 mins	20%
3	Assignment	7th to 10th Week	2 weeks	10%
4	Final Assessment	15th Week	3 Hrs	50%

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

Anonymous feedback will be collected towards the end of semester through the class representative.

COURSE POLICY

MODE OF CORRESPONDENCE (email/ phone etc)

Course related details and exact date-time for the assessments will be intimated to the students at appropriate time via webmail through class representatives.

Students can send any queries directly to the faculty/tutor at any stage in the course duration via email (tejas@nitt.edu) ONLY. Face to face discussions by appointment (via email) ONLY.

ATTENDANCE

Students are required to have a minimum of 70% attendance to be eligible to write the final assessment, without which they will have to redo the course.

COMPENSATION ASSESSMENT

Students who have missed any of the assessment tests (I or II) will be provided with one compensation assessment towards the end of the semester as per table above.

ACADEMIC HONESTY & PLAGIARISM

Students are expected to use fair means during assessments, and plagiarism will not be tolerated.

ADDITIONAL INFORMATION

Students are advised to regularly check their webmail, and also contact their class representatives for information and updates regarding the course.

FOR APPROVAL

Course Faculty - Mr. Tejas R	CC-Chairperson - Dr. S Jerome	HOD - Dr. S P Kumaresh Babu