NON-DESTRUCTIVE TESTING METHODS

OPEN ELECTIVE - II

VI Semester

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
A5AE65	OEC	3	0	0	3	30	70	100

COURSE OBJECTIVES:

1. To impart knowledge about the non-destructive testing methods.
2. To provide knowledge on the selection of NDT methods for application in engineering industries.
3. Classify the various NDT methods for detecting defects in the structural components.
4. Judge defects basing on data representation of testing

UNIT-I SURFACE TECHNIQUES

Introduction to non-destructive testing (NDT) - importance of NDT techniques - types of NDT techniques - visual testing (direct and remote visual inspection) - principle and types of liquid penetrant tests (LPT) - - advantages and limitations of LPT - applications of LPT.

UNIT-II MAGNETIC PARTICLE TESTING

Introduction to magnetic particle testing (MPT) – principle, magnetization methods - demagnetization – advantages, limitations and applications of MPT, eddy current testing (ECT) method- principle advantages, limitations and applications

UNIT-III ULTRASONIC TESTING

Introduction to ultrasonic testing (UT) -- principle of UT – UTprobes - UT inspection methods (pulse echo, transmission and phased array techniques) - advantages, limitations and applications

UNIT-IV RADIOGRAPHY TESTING

Introduction to radiography testing (RT) - sources of X-rays and Gamma rays - characteristics of Xrays and Gamma rays (absorption, scattering) - filters and screens - film radiography and digital radiography (shadow formation, exposure factors, film handling and storage) --exposure charts - penetrameters - safety issues.

UNIT-V SPECIAL TECHNIQUES

Acoustic emission testing (AET) principle, advantages, limitations - instrumentation and application of AET - infra red thermography (IRT) - contact and non-contact inspection methods - acoustic holography.

Text Books:

1. Baldev Raj, T. Jayakumar, M. Thavasimuthu, "Practical Non-Destructive Testing", Narosa Publishing, London, 2012.
2. Paul E. Mix, "Introduction to Non Destructive Testing", A Training Guide, Wiley- Interscience, New Jersey, USA, June 2005.

Reference Books:

1. ASM Metals Handbook, V-17, "Non-Destructive Evaluation and Quality Control", American Society of Metals, Metals Park, Ohio, USA, 2001
2. W.T. Mc Gonnagle, "Non-Destructive Testing", McGraw Hill Book Co., USA, 2013.

COURSE OUTCOMES:

1. Recognize various non-destructive techniques for engineering industries.
2. Select appropriate non-destructive technique for defects detection in manufactured/operating parts.
3. Perform inspection using major non-destructive testing methods.
4. Understand the importance and application of NDT in Aerospace structural analysis
5. Determine the defects basing on the principal of radiography