NON-DESTRUCTIVE TESTING

PROFESSIONAL ELECTIVE - I

VI Semester

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
A5AE40	PCC	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 - ASME, ASTM, AWS, BIS, SAE standard sample specifications - visual testing (direct and remote visual inspection) - principle and types of liquid penetrant tests (LPT) - properties of liquid penetrants and developers - advantages and limitations of LPT - applications of LPT

UNIT-II **MAGNETIC PARTICLE TESTI NG& EDDY CURRENT TESTING**

Introduction to magnetic particle testing (MPT) - magnetization methods - dry particle and wet fluorescent particle techniques - demagnetization - advantages and limitations of MPT - magnetic flux leakage testing - principle, instrumentation and applications of electromagnetic induction techniques and eddy current testing (ECT) method-principle, instrumentation and applications

UNIT-III **ULTRASONIC TESTING**

Introduction to ultrasonic testing (UT) - characteristics of ultrasonic waves - principle of UT – UT probes - UT inspection methods (pulse echo, transmission and phased array techniques, PAUT) -types of scanning and displays - application of UT for welded parts

UNIT-IV **RADIOGRAPHY TESTING**

Introduction to radiography testing (RT) - sources of X-rays and Gamma rays - characteristics of Xraysand Gamma rays (absorption, scattering) - filters and screens - film radiography and digital radiography (shadow formation, exposure factors, film handling and storage) - inverse square law -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 - pressure and leak detection - LASER stereography - acoustic holography

Text Books:

1. Baldev Raj, T. Jayakumar, M. Thavasimuthu, "Practical Non-Destructive Testing", Narosa Publishing, London, 2012.
2. Ravi Prakash, “Non-Destructive Testing Techniques”, New Age International Publisher. January 2010

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. McGonnagle, "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