EVEN SEMESTER TEACHING PLAN

Teacher's name: **Dr. Sandarbh Shukla**
Subject: **Non-Destructive Testing**
Subject Code: **RME-080**
Course: **B. TECH.**
Branch: **ME (VIII SEM); Section- ME-2**
Course credits: **04**
Total no. Of lectures required: **43**
Lectures Per Week: **05**

Unit	Lecture No.	Topic to be taught	Remarks
UNIT-I INTRODUCTION	**1.**	Scope and advantages of NDT, Comparison of NDT with Destructive Testing	
	2.	Some common NDT methods used since ages, Terminology	
	3.	Flaws and Defects, Visual inspection	
	4.	Equipment used for visual inspection	
	5.	Ringing test	
	6.	Uses of visual inspection tests in detecting surface defects and their interpretation.	
	7.	advantages & limitations of visual inspection	
	8.	Chalk test (oil whitening test)	
	9.	Advantages & disadvantages	
	10.	Limitations of Chalk test	
UNIT-II TESTS	**11.**	Die penetrate test (liquid penetrate inspection)	
	12.	Principle, scope	
	13.	Equipment & techniques	
	14.	Tests stations, Advantages,	
	15.	Types of penetrants and developers	
	16.	Zyglo test, Illustrative examples and interpretation of defects	
	17.	Magnetic particle Inspection – scope and working principle	
	18.	Ferro Magnetic and Nonferromagnetic materials	
	19.	Equipment & testing.	
	20.	Advantages, limitations Interpretation of results	

	21.	DC & AC magnetization, Skin Effect	
	22.	Use of dye & wet powders for magna glow testing	
	23.	Different methods to generate magnetic fields, Applications	
UNIT-III RADIOGRAPHIC METHODS	**24.**	Introduction to electromagnetic waves and radioactivity, various decays	
	25.	Attenuation of electromagnetic radiations,	
	26.	Photo electric effect, Rayleigh's scattering	
	27.	Compton's scattering (Incoherent scattering), Pair production,	
	28.	Beam geometry and Scattering factor.	
	29.	X-ray radiography: principle, equipment & methodology, applications, types of radiations and limitations.	
	30.	γ-ray radiography – principle, equipment., source of radioactive materials & technique,	
	31.	advantages of γ-ray radiography over X-ray radiography	
	32.	Precautions against radiation hazards. Case Study - casting and forging	
UNIT-IV ULTRASONIC TESTING METHODS	**33.**	Ultrasonic testing methods Introduction, Principle of operation,	
	34.	Piezoelectricity. Ultrasonic probes, CRO techniques, advantages, Limitation & typical applications.	
	35.	Applications in inspection of castings, forgings,	
	36.	Extruded steel parts, bars, pipes, rails and dimensions measurements.	
	37.	Case Study – Ultrasonography of human body	
UNIT-V SPECIAL NDT TECHNIQUES	**38.**	Eddy Current Inspection: Principle	
	39.	Methods, Equipment for ECT,	
	40.	Techniques, Sensitivity, Advanced ECT methods.	
	41.	Application, scope and limitations, types of Probes	
	42.	Case Studies. Introduction to Holography,	
	43.	Thermography, Acoustic emission Testing.	