

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Nondestructive Testing and Health Monitoring of Civil Structures
2.	Course Number	CE5029
3.	Status of the Course	Elective
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Civil Engineering
8.	To take effect from	July 2019
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	Course Objective: The objective of this course is to introduce students to the concepts of non-destructive evaluation (NDE) and structural health monitoring (SHM) and their application to civil engineering structures. The course provides an overview of various techniques associated with NDE and SHM and discusses about their applicability in various civil engineering scenarios.	
12.	Course Content: Introduction – necessity of NDE and SHM; Fundamental differences between NDE and SHM philosophies; Causes of degradation in concrete and steel structures; General methods of NDT of civil engineering structures according to Indian Standards; Sensor based SHM of civil structures – optical, piezoelectric and non-contact approaches; Imaging as a tool for NDT – A scan, B-scan, C-scan, time of flight based reconstruction, synthetic aperture focusing technique; Electromagnetic imaging – fundamentals, ground penetrating radar; Thermography – fundamentals, Infrared thermography; Elastic wave based methods – impact echo; Ultrasonics – fundamentals, instrumentation, imaging methodologies; Future directions.	
13.	Text book(s): 1. Grandt Jr A F, <i>Fundamentals of Structural Integrity: Damage Tolerant Design and Nondestructive Evaluation</i> , Wiley Publications (2014). 2. Maierhofer C and Dobmann G, <i>Non-Destructive Evaluation of Reinforced Concrete Structures: Non-Destructive Testing Methods</i> , Woodhead Publishing (2010).	
14.	Reference(s): 1. Hellier C, <i>Handbook of Nondestructive Evaluation</i> , Mc-Graw Hill Education (2012).	