

# Indian Institute of Technology Mandi

## Proposal for a New Course

**Course Number** : CE556P  
**Course Name** : Structural Engineering Laboratory  
**Credits** : 0-0-4-2  
**Prerequisites** : NIL  
**Intended for** : PG (MS, MTech, PhD)  
**Distribution** : Specialization Core (MTech in Structural Engineering), Elective (MS, PhD)  
**Semester** : Odd/Even

### **Preamble:**

This course is intended to expose the students to hands on experiments to investigate the behavior of reinforced concrete structural components under different loading conditions. Students will perform experiments on building models to identify the dynamic characteristics of the systems. They will also carry out some non-destructive testing (NDT) for damage detection in model/real structures.

### **Course Modules with Quantitative Lecture Hours:**

#### **Module 1:** **(12 hours)**

Self-Compacting and High-Strength Concrete:

- (i) Mix-design for self-compacting and high-strength concrete
- (ii) Stress-strain characterization of self-compacting and high-strength concrete

#### **Module 2:** **(16 hours)**

Behavior of Structural Elements:

- (i) Behavior of Reinforced Concrete (RC) beam under flexure and shear
- (ii) Un-symmetrical bending of steel beam
- (iii) Behavior of slab

#### **Module 3:** **(8 hours)**

Non-Destructive Testing and Damage Detection

#### **Module 4:** **(20 hours)**

Model Testing for Dynamic Characterization:

- (i) Free and forced vibrations of structure and evaluation of dynamic characteristics
- (ii) Dynamic Young's modulus, shear modulus, and Poisson's ratio of materials
- (iii) Behavior of frame and shear wall building models under horizontal excitation
- (iv) Time and frequency-domain study for dynamic response analysis

### **Textbook:**

- (i) H.G. Harris, G. Sabnis (1999), "Structural Modeling and Experimental Techniques", 2<sup>nd</sup> edition, CRC Press.

**References:**

- (i) W.F. Sharpe (2008), "Springer Handbook of Experimental Solid Mechanics", Springer.
- (ii) V.M. Malhotra, N.J. Carino (2003), "Handbook of Nondestructive Testing of Concrete", 2<sup>nd</sup> edition, CRC Press.
- (iii) R.E. Coleman (2004) "Experimental Structural Dynamics: An Introduction to Experimental Methods of Characterizing Vibrating Structures", AuthorHouse.

**Similarity content declaration with existing courses:**

Sl. No.	Course Code	Similarity Content	Approximate % of Content
1	NIL	-	-

**Justification for new course proposal if cumulative similarity content is > 30%:**

Not Applicable.

**Approvals:**

Other faculty interested in teaching this course: Dr. Rajneesh Sharma and Dr. Maheshreddy Gade

Proposed by: Dr. Sandip Saha,  
Dr. Subhamoy Sen and Dr. Kaustav Sarkar

School: School of Engineering (SE)



Signature:

Date: 01.05.2018

**Recommended / Not Recommended, with comments:**

Chairman, CPC

Date:

Approved / Not Approved:

Chairman, Senate

Date:

***Responses to comments received during 16<sup>th</sup> Senate meeting.***

- (1) The text book and references has been modified.