COURSECONTENT

STRUCTURAL ENGINEERING LABORATORY								
ISemester:SE								
CourseCode	**Category**	**Hours/ Week**			**Credits**	**Maximum Marks**		
2512072	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		0	1	2	2	40	60	100
contactClasses:Nil	**TutorialClasses:15**	**PracticalClasses:30**				**TotalClasses:45**		
Prerequisites: ConcreteTechnology.								

Course Overview:

This lab focuses on testing and evaluating the properties of fresh and hardened concrete, including mix design, workability, strength, and material characteristics. It also covers durability tests and non-destructive evaluation methods to assess concrete performance. The course develops practical skills for quality control and analysis of concrete in engineering applications.

Course Objectives:

1. To develop the ability to design concrete mixes
2. To characterize concrete materials and ingredients
3. To analyze and evaluate the mechanical behaviour of hardened concrete
4. To assess the durability performance of concrete
5. To apply non-destructive testing techniques

Course Outcomes: After completion of the course, students will be able to:

1. Perform mix design and conduct workability and material characterization tests on fresh concrete
2. Conduct compression and flexure tests on hardened concrete specimens to assess strength characteristics
3. Evaluate the durability of concrete through permeability, chloride permeability, carbonation, and half-cell potential tests
4. Utilize non-destructive testing techniques such as rebound hammer and ultrasonic pulse velocity for assessing concrete quality
5. Interpret test results to determine concrete properties and suggest improvements for mix design and structural performance

LIST OF EXPERIMENTS:

A. Tests on following fresh concretes
Self-Compacting Concrete, High Strength Concrete, Normal Strength Concrete. The tests shall include:

1. Mix Design
2. Workability tests
3. Material characterization of ingredients
   a. Specific gravity test
   b. Water absorption test
   c. Gradation analysis (Sieve analysis)
   d. Tests on setting times

B. Tests on Hardened Concrete:

1. Compression test on high strength concrete cubes and cylinders
2. Flexure tests on normal strength concrete under reinforced, over reinforced and balanced beams
3. Flexure tests on normal strength concrete beams with and without shear reinforcement

C. Durability Tests:

1. Water permeability
2. Rapid chloride permeability test
3. Carbonation tests
4. Half-cell potential test

D. Non-Destructive Testing of concrete using rebound hammer & ultrasonic pulse velocity

REFERENCE BOOKS:

1. Properties of Concrete, Neville A. M., 5th Edition, Prentice Hall, 2012
2. Concrete Technology, Shetty M. S., S. Chand and Co., 2006
3. Concrete Technology by A. R. Santhakumar, Oxford University Press

ELECTRONIC RESOURCES:

1. https://nptel.ac.in/courses/105106176
2. https://nptel.ac.in/courses/105102012

MATERIALS ONLINE:

1. Virtual labs
2. Content beyond syllabus