ADVANCED MATERIAL TESTING LABORATORY

VI Semester: CE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ACE109	Core	-	-	3	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		

OBJECTIVES:

The **course should enable the students to:**

I. The course intends to provide an overview tests on cement.
II. To gain the knowledge of workability tests on fresh traditional and self-compacting concrete.
III. To provide an overview of non-destructive tests on hardened concrete.
IV. To gain the knowledge on self-compacting concrete.

COURSE OUTCOMES (COs):

CO 1. Assess the physical properties of cement, sand and aggregate
CO 2. Describe properties of various types of admixtures and their utility.
CO 3. Measure important properties of fresh and hardened cement concrete.
CO 4. Understand the basic principles of various NDT techniques and various applications of NDT techniques.
CO 5. Explain the properties self-compacting concrete separation.

COURSE LEARNING OUTCOMES (CLOs):

The students should enable to:

1. Determine the consistency, soundness, setting time and compressive strength of cement.
2. Determine the Fineness modulus of aggregates.
3. Understand the bulking of fine aggregates.
4. Determine the aggregate crushing and impact value.
5. Understand the workability of self-compacting concrete.
6. Determine the air content of freshly mixed concrete from observations.
7. Understand the fluidity of cement
8. Determine the optimum dosage of super plasticizer.
9. Determine the permeability of the concrete specimen.
10. Apply scientific and technical knowledge to the field of Non-Destructive Testing
11. Analyze the Accelerated Curing of concrete.
12. Evaluate the Influence of water cement ratio on strength and aggregate/cement ratio on workability and strength.
13. Synthesis the influence of different chemical admixtures on concrete.
14. Understand the concept of water cement ratio

LIST OF EXPERIMENTS	
Week-1	**TESTS ON CEMENT**
Tests on cement - Consistency, setting times, soundness, compressive strength	
Week-2	**GRADATION CHARTS OF AGGREGATES**
Study of gradation charts of aggregates.	
Week-3	**BULKING OF SAND**
Study of bulking of sand	
Week-4	**AGGREGATE CRUSHING AND IMPACT VALUE**
Measurement of aggregate impact test.	
Week-5	**WORKABILITY TESTS ON FRESH SELF-COMPACTING CONCRETE**
Measurement of workability tests on fresh self-compacting concrete	
Week-6	**AIR ENTRAINMENT TEST ON FRESH CONCRETE**
Measurement of air entrainment test on fresh concrete	
Week-7	**MARSH CONE TEST**
Performing marsh cone test on fresh concrete	
Week-8	**PERMEABILITY OF CONCRETE**
Performing permeability of concrete test on fresh concrete	
Week-9	**NON DESTRUCTIVE TESTING OF CONCRETE.**
Performing nondestructive testing of concrete	
Week-10	**ACCELERATED CURING OF CONCRETE**
Performing accelerated curing test on concrete	
WeeK-11	**INFLUENCE OF W/C RATIO ON STRENGTH AND AGGREGATE / CEMENT RATIO ON WORKABILITY AND STRENGTH**
Influence of W/C ratio on strength of concrete Influence of aggregate / cement ratio on workability and strength	
Week-12	**INFLUENCE OF DIFFERENT CHEMICAL ADMIXTURES ON CONCRETE**
Finding the influence of different chemical admixtures on concrete	

Text Books:

1. M.S. Shetty, " Concrete Technology, theory and practice", S. Chand publishing, revised edition, 2012
2. H.S. Moondra, Rajiv Gupta, "Laboratory Manual for Civil Engineering", CBS Publishers, New Delhi, 4th Edition, 2015.

Reference Books:

1. S. K. Duggal, " Building materials" new age international publications, third revised edition, 2008
2. Hemant Sood, "Laboratory Manual on Testing of Engineering Materials", New Age International Publishers, New Delhi, 2nd Edition, 2007