INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

ADVANCED CONCRETE LABORATORY								
I Semester: ST								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
BSTE12	Core	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		0	0	4	2	40	60	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 45**				**Total Classes: 45**		
Prerequisite: Concrete Technology Laboratory								

I. COURSE OVERVIEW:

Advanced concrete laboratory provides a comprehensive coverage of the theoretical and practical aspects of the subject and includes the latest developments in the field of concrete construction. It incorporates the latest Indian standard specifications and codes regulating concrete construction. The properties of concrete and it constituent materials and the role of various admixtures in modifying these properties to suit specific requirements, such as ready-mix concrete, reinforcement detailing, disaster-resistant construction, and concrete machinery have been treated exhaustively the and also special concrete in addition to the durability maintenance and quality control of concrete structure.

II. COURSE OBJECTIVES:

The students will try to learn:

I. Mechanical behavior of concrete through stress–strain, tensile, flexural, and shear tests.
II. Correlations among cube, cylinder, tensile, and flexural strengths of concrete.
III. The assessment of concrete quality using Non-Destructive Testing and evaluate permeability and durability.
IV. The workability and strength characteristics of self-compacting concrete.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1 Construct the stress-strain curve of high strength concrete for the design of RC structures.

CO 2 Develop the correlation between cube strength and cylinder strength for understanding the different codal provisions other than IS.

CO 3 Determine the relation between compressive strength and split tensile strength for the analysis of concrete in tension.

CO 4 Identify the relation between the compressive strength and modulus of rupture of concrete for understanding the behavior of concrete in rupture.

CO 5 Test for the Non-Destructive testing of concrete members using rebound hammer and ultrasonic pulse velocity.

CO 6 Explain the behavior of beams under flexure, shear and torsion for design purpose.

IV. COURSE CONTENT:

Week-I: STRESS STRAIN CURVE FOR CONCRETE
Study of stress-strain curve of high strength concrete.

Week-II: CORRELATION BETWEEN CUBE STRENGTH AND CYLINDER STRENGTH
Correlation between cube strength and cylinder strength.

Week-III: DETERMINTION OF SPLIT TENSILE STRENGTH OF CONCRETE
Split tensile strength.

Week-IV: DETERMINTION OF MODULUS OF RUPTURE OF CONCRETE
Modulus of rupture.

Week-V: RELATION BETWEEN COMPRESSIVE STRENGTH AND SPLIT TENSILE STRENGTH
Correlation between compressive strength and cylinder strength.

Week-VI: RELATION BETWEEN COMPRESSIVE STRENGTH AND MODULUS OF RUPTURE
Effect of cyclic loading on steel.

Week-VII: NON – DESTRUCTIVE TEST (NDT)
Non-Destructive testing (rebound hammer) of existing concrete members.

Week-VIII: PERMEABILITY OF CONCRETE TEST
Permeability of concrete test.

Week-IX: SHEAR STRENGTH TEST
Behavior of Beams under Shear.

Week-X: TORSION STRENGTH TEST
Behavior of steel under Torsion.

Week-XI: WORKABILITY TEST ON SELF COMPACTING CONCRETE
Determine the workability of self-compacting concrete by using L-box, U-box, V-Funnel and J-ring.

Week-XII: QUALITY OF CONCRETE USING NDT
Determine the uniformity of concrete using Ultra sonic pulse velocity.

Week-XIII: STRENGTH OF SCC WITH DIFFERENT W/C RATIOS
Determine the strength of Self compacting concrete with different W/C ratios.

Week-XIV: DURABILITY OF CONCRETE
Determine the durability of concrete

V. TEXTBOOKS:

1. Shetty, M. S., "*Concrete Technology*", S. Chand and Co. Publishers, 3rd Edition, 2006.
2. Taylor, Walter Harold. "*Concrete Technology and Practice*, 4/E.", 1967.

VI. REFERENCE BOOKS:

1. Dr. S. Kandasamy, Dr.S. Syed Ibrahim, Dr.S. Pradeep Kumar, "*Advanced Concrete Technology*", Notion Press, 2020.
2. S.S. Bhavikatti, "*Concrete Technology*", Dream tech Press, 2019.

VII. ELECTRONICS RESOURCES:

1. http://kec.edu.np/wp-content/uploads/2017/06/Advanced-Concrete-Technology.pdf.
2. http://alphace.ac.in/downloads/notes/cv/10cv81.pdf.

VIII. MATERIALS ONLINE:

1. Course Outline Description
2. Lab manual