INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad -500 043

CIVIL ENGINEERING

COURSE DESCRIPTOR

Course Title	**ADVANCED CONCRETE LABORATORY**				
Course Code	BSTB10				
Programme	M.Tech				
Semester	I	STE			
Course Type	Core				
Regulation	IARE - R18				
Course Structure	**Theory**			**Practical**	
	Lectures	**Tutorials**	**Credits**	**Laboratory**	**Credits**
	-	-	-	4	2
Chief Coordinator	Dr. Venu M, Professor, Department of Civil Engineering				
Course Faculty	Dr. Venu M, Professor, Department of Civil Engineering				

I. COURSEOVERVIEW:

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 concretestructure.

II. COURSEPRE-REQUISITES:

Level	Course Code	Semester	Prerequisites	Level
-	-	-	-	-

III. MARKSDISTRIBUTION:

Subject	SEE Examination	CIA Examination	Total Marks
Advanced Concrete Laboratory	70 Marks	30 Marks	100

IV. DELIVERY / INSTRUCTIONALMETHODOLOGIES:

✘	Chalk & Talk	✘	Quiz	✘	Assignments	✘	MOOCs
✔	LCD / PPT	✘	Seminars	✘	Mini Project	✔	Videos
✔	Open Ended Experiments						

V. EVALUATIONMETHODOLOGY:

Each laboratory will be evaluated for a total of 100 marks consisting of 30 marks for internal assessment and 70 marks for semester end lab examination. Out of 30 marks of internal assessment, continuous lab assessment will be done for 20 marks for the day to day performance and 10 marks for the final internal lab assessment.

Semester End Examination (SEE): The semester end lab examination for 70 marks shall be conducted by two examiners, one of them being Internal Examiner and the other being External Examiner, both nominated by the Principal from the panel of experts recommended by Chairman, BOS.

The emphasis on the experiments is broadly based on the following criteria:

20 %	To test the preparedness for the experiment.
20 %	To test the performance in the laboratory.
20 %	To test the calculations and graphs related to the concern experiment.
20 %	To test the results and the error analysis of the experiment.
20 %	To test the subject knowledge through viva – voce.

Continuous Internal Assessment (CIA):

CIA is conducted for a total of 30 marks (Table 1), with 20 marks for continuous lab assessment during day to day performance, 10 marks for final internal lab assessment.

Table 1: Assessment pattern for CIA

Component	Laboratory		Total Marks
Type of Assessment	Day to day performance	Final internal lab assessment	
CIA Marks	20	10	30

Continuous Internal Examination(CIE):

One CIE exams shall be conducted at the end of the 16th week of the semester. The CIE exam is conducted for 10 marks of 3 hoursduration.

Preparation	Performance	Calculations and Graph	Results and Error Analysis	Viva	Total
2	2	2	2	2	10

VI. HOW PROGRAM OUTCOMES AREASSESSED:

Program Outcomes (POs)		Strength	Proficiency assessed by
PO 3	Capable to apply the core, multidisciplinary knowledge for understanding the problems in structural engineering and allied fields.	2	Presentation on realworld problems
PO 4	Apply appropriate techniques, resources, modern engineering and Information Technology (IT) tools including predictions, modeling of complex structural engineering activities.	2	Open Ended Experiments
PO 5	Able to identify and analyze the impact of Structural Engineering in development projects and find a suitable solution from number of alternatives.	2	Presentation on realworld problems
PO 6	Conceptualize and design civil engineering structures considering various socio-economic factors.	1	Open Ended Experiments

3 = High; 2 = Medium; 1 = Low

VII. COURSE OBJECTIVES(COs):

The course should enable the students to:	
I	Design high grade concrete and study the parameters affecting its performance.
II	Conduct Non Destructive Tests on existing concrete structures.
III	Apply engineering principles to understand behavior of structural/ elements.

VIII. COURSE LEARNING OUTCOMES(CLOs):

CLO Code	CLO's	At the end of the course, the student will have the ability to:	PO's Mapped	Strength of Mapping
BSTB01.01	CLO 1	Understand the stress-strain curve of high strength concrete.	PO3	2
BSTB01.02	CLO 2	Determine the correlation between cube strength and cylinder strength.	PO3	2
BSTB01.03	CLO 3	Determine the split tensile strength of concrete.	PO3, PO4	1
BSTB01.04	CLO 4	Determine the modulus of rupture of concrete.	PO3	2
BSTB01.05	CLO 5	Determine the correlation between compressive strength and cylinder strength.	PO3	2
BSTB01.06	CLO 6	Know the relation between compressive and modulus of rupture.	PO5,PO6	1
BSTB01.07	CLO 7	Determine the Non-Destructive testing of existing concrete members.	PO3	1
BSTB01.08	CLO 8	Understand the behavior of beams under flexure.	PO3, PO4	2

CLO Code	CLO's	At the end of the course, the student will have the ability to:	PO's Mapped	Strength of Mapping
BSTB01.09	CLO 9	Understand the behavior of beams under shear.	PO3	1
BSTB01.10	CLO10	Understand the behavior of beams under torsion.	PO3, PO4	1

3 = High; 2 = Medium; 1 = Low

IX. MAPPING COURSE LEARNING OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES:

(CLOs)	Program Outcomes (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CLO 1			2				
CLO 2			2				
CLO 3			2	1			
CLO 4			2				
CLO 5			2				
CLO 6					2	1	
CLO 7			1				
CLO 8			2	2			
CLO 9			1				
CLO 10			2	1			

3 = High; 2 = Medium; 1 = Low

X. ASSESSMENT METHODOLOGIES –DIRECT

CIE Exams	PO3, PO4, PO5, PO6	SEEExams	PO3, PO4, PO5, PO6	Assignments	-	Seminars	-
Laboratory Practices	PO3, PO4, PO5, PO6	Student Viva	PO3, PO4, PO5, PO6	Mini Project	-	Certification	-

XI. ASSESSMENT METHODOLOGIES -INDIRECT

✔	Early Semester Feedback	✔	End Semester OBE Feedback
✘	Assessment of Mini Projects by Experts		

XII. SYLLABUS

LIST OF EXPERIMENTS	
Week-1	**STRESS STRAIN CURVE FOR CONCRETE**
Study of stress-strain curve of high strength concrete.	
Week-2	**CORRELATION BETWEEN CUBE STRENGTH AND CYLINDER STRENGTH**
Correlation between cube strength and cylinder strength.	
Week-3	**DETERMINTION OF SPLIT TENSILE CONCRETE**
Split tensile strength.	
Week-4	**DETERMINTION OF MODULUS OF RUPTURE CONCRETE**
Modulus of rupture.	
Week-5	**RELATION BETWEEN COMPRESSIVE STRENGTH AND SPLIT STRENGTH**
Correlation between compressive strength and cylinder strength.	
Week-6	**RELATION BETWEEN COMPRESSIVE AND MODLUS OF RUPTURE**
Effect of cyclic loading on steel.	
Week-7	**NON – DESTRUCTIVE TEST (NDT)**
Non-Destructive testing of existing concrete members.	
Week-8	**FLEXURE STRENGTH TEST**
Behavior of Beams under flexure.	
Week-9	**SHEAR STRENGTH TEST**
Behavior of Beams under Shear.	
Week-10	**TORSION STRENGTH TEST**
Behavior of Beams under Torsion.	
Text Books:	
1. Concrete Technology, Shetty M. S., S. Chand and Co., 2006.	
Reference Books:	
1. Properties of Concrete, Neville A. M., Prentice Hall, 5th Edition, 2012.	
Web References:	
http://kec.edu.np/wp-content/uploads/2017/06/Advanced-Concrete-Technology.pdf.	
E-Text Books:	
http://alphace.ac.in/downloads/notes/cv/10cv81.pdf.	

XIII. COURSEPLAN:

The course plan is meant as a guideline. Probably there may be changes.

Week	Topics to be covered	Course Learning Outcomes (CLOs)	Reference
1	Study of stress-strain curve of high strength concrete.	CLO1	T1
2	Correlation between cube strength and cylinder strength.	CLO 2	T1
3	Determine the split tensile strength of concrete.	CLO 3	T1
4	Determine the modulus of rupture of concrete.	CLO 4	T1
5	Correlation between compressive strength and cylinder strength.	CLO 5	T1

Week	Topics to be covered	Course Learning Outcomes (CLOs)	Reference
6	Relation between compressive and modulus of rupture.	CLO 6	T1
7	Non-Destructive testing of existing concrete members.	CLO 7	T1
8	Behavior of Beams under flexure.	CLO 8	T1
9	Behavior of Beams under Shear.	CLO 9	T1
10	Behavior of Beams under Torsion.	CLO 10	T1

XIV. GAPS IN THE SYLLABUS - TO MEET INDUSTRY / PROFESSIONREQUIREMENTS:

S NO	Description	Proposed actions	Relevance with POs
1	Behavior of concrete under dynamic loading	NPTEL/ Videos	PO3, PO5, PO6
2	Applications in facture mechanics in concrete	NPTEL/ Videos	PO3, PO4, PO6

Prepared by:
Dr. Venu M, Professor, Department of Civil Engineering

HOD, CE