

## Academic Course Description

<p><b>BHARATH UNIVERSITY</b>  Faculty of Engineering and Technology  Department of Civil Engineering</p> <p><b>BEC051 CONCRETE TECHNOLOGY</b>  <b>Fifth Semester, 2017-18 (odd Semester)</b></p>
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### Course (catalog) description

To study the properties of concrete making materials, tests, mix design, special concretes and various methods for making concrete.

**Compulsory/Elective course** : Compulsory for Civil students

Credit/ Contact hours : 3 credits/ 45 hours

Course Coordinator : Dr. R. Venkata Krishnaiah, Assistant Professor

**Instructors** :

Name of the instructor	Class handling	Office location	Office phone	Email (domain: @bharathuniv.ac.in)	Consultation
Dr. R. Venkata Krishnaiah	IV Year civil	Civil Block	04422290742		9.00 - 9.50 AM
K.Venkat Raman	IV Year civil	Civil Block	04422290742	kvenkat26@gmail.com	12.45 - 1.15 PM

### Relationship to other courses:

Pre –requisites : Construction Technology  
Assumed knowledge : Basic knowledge in Building Construction

Following courses : Construction Planning, Scheduling and Control

### Syllabus Contents

<b>UNIT I CONCRETE MAKING MATERIALS</b>	<b>9 HOURS</b>
Aggregates, IS Specifications, Properties, Grading, Methods of combining aggregates, specified grading. Cement, Grades of cement. Chemical composition, Hydration of cement, structure of hydrated cement, Special cements - Water Chemical admixtures. Mineral admixtures	
<b>UNIT II CONCRETE</b>	<b>9 HOURS</b>
Properties of fresh concrete, Hardened concrete, Strength, Elastic properties, Creep and shrinkage. Variability of concrete strength. Concrete testing Methods: Non destructive tests ultrasonic pulse velocity, Rebound Hammer test. Pullout tests.	
<b>UNIT III MIX DESIGN</b>	<b>9 HOURS</b>
Principles of concrete mix design. Methods of concrete mix design. Indian standard Recommended Method. IS 10262-82	
<b>UNIT IV SPECIAL CONCRETE</b>	<b>9 HOURS</b>
Light Weight concrete, Fly ash concrete, Fibre reinforced concrete, Polymer Concrete, Super plasticised concrete, Epoxy resins and screeds for rehabilitation - Properties and Applications-High performance concrete.	
<b>UNIT V CONCRETING METHODS</b>	<b>9 HOURS</b>
Process of manufacturing of concrete, methods of transportation, placing and curing - Extreme weather concreting, special concreting methods. Vacuum dewatering underwatering concrete, Ready mix concentrate.	

**TEXT BOOKS:**

1. Neville, A.M. Properties of Concrete, Pitman Publishing Limited, Lnclon
2. Shetty M.S., Concrete Technology, S. Chand and Company Ltd. Delhi.
3. Rudhani G., Light Weight Concrete Academic Kiado, Publishing Home of Hungarian Academy of Science, 1963.

**Computer usage:** Concrete materials, Mix design and Methods

**Professional component**

General	-	0%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	0%
Professional subject	-	100%

**Broad area :** Building Construction

**Test Schedule**

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	August 1 <sup>st</sup> week	Session 1 to 14	2 Periods
2	Cycle Test-2	September 2 <sup>nd</sup> week	Session 15 to 28	2 Periods
3	Model Test	October 2 <sup>nd</sup> week	Session 1 to 45	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

H- High correlation, M- Medium Correlation, L- Low correlation

**Mapping of Instructional Objectives with Program Outcome**

To study the properties of concrete making materials, tests, mix design, special concretes and various methods for making concrete.	Correlates to program outcome		
	H	M	L
1. To learn about concrete making material IS specifications.	A,c,d		
2. To know about properties of fresh concrete and hardened concrete. underpinning and formwork structures in construction	a,d,c,d,e	b	
3. To understand the principles and methods of concrete mix design	A,c,d,f	b	
4. To know about the various types of special concrete.	A,c,d		
5. To understand process of manufacturing of concrete.	A,c,d,e	b	

## Draft Lecture Schedule

S.NO	Topics	Problem solving (Yes/No)	Text / Chapter
<b>UNIT I CONCRETE MAKING MATERIALS</b>			
1.	Introductions to concrete	No	[T1] -1
2.	Properties of concrete	No	
3.	Grading, Methods of combining aggregates, specified grading	No	
4.	Cement, Grades of cement.	No	
5.	Chemical composition,	No	
6.	Hydration of cement	No	
7.	Structure of hydrated cement	No	
8.	Special cements	No	
9.	Water Chemical admixtures. Mineral admixtures	No	
<b>UNIT II CONCRETE</b>			
10.	Properties of fresh concrete	No	[T1] -2
11.	Hardened concrete	No	
12.	Strength, Elastic properties	No	
13.	Creep and shrinkage	No	
14.	Variability of concrete strength	No	
15.	Concrete testing Methods:	No	
16.	Non destructive tests ultrasonic pulse velocity	No	
17.	Rebound Hammer test	No	
18.	Pullout tests.	No	
<b>UNIT III MIX DESIGN</b>			
19.	Principles of concrete mix design.	No	[T1] -3
20.	Theory of mix design	No	
21.	Different grades of mix design	yes	
22.	Problems in mix design	No	
23.	Problems in mix design-different grades	No	
24.	Methods of concrete mix design	No	
25.	Indian standard Recommended Method. IS 10262-82	yes	
26.	Indian standard Recommended Method. IS 10262-82	yes	
27.	Indian standard Recommended Method. IS 10262-82	yes	
<b>UNIT IV SPECIAL CONCRETE</b>			
28.	Light Weight concrete	No	[T1] -3
29.	Fly ash concrete	No	
30.	Fibre reinforced concrete	No	
31.	Polymer Concrete	No	
32.	Super plasticised concrete	No	
33.	Epoxy resins and screeds for rehabilitation -	No	
34.	Properties and Applications-High performance concrete	No	
35.	Uses of High performance concrete	No	
36.	Types of concrete	No	
<b>UNIT V CONCRETING METHODS</b>			
37.	Process of manufacturing of concrete	No	[T1] -3
38.	Types of concrete	No	
39.	Application of concrete	No	
40.	Methods of transportation, placing and curing -	No	
41.	Extreme weather concreting	No	
42.	special concreting methods	No	
43.	Vacuum dewatering underwatering concrete,	No	
44.	Ready mix concrete	No	
45.	Ready mix concrete-Uses	No	

## Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures
- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.

## Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	5%
Assignment	-	5%
Attendance	-	5%
Final exam	-	70%

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**Prepared by:** Dr. R. Venkata Krishnaiah, Assistant Professor , Department of Civil

**Dated :**

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**Addendum****ABET Outcomes expected of graduates of B.Tech / Civil/ program by the time that they graduate:**

- a. An ability to apply knowledge of mathematics, science, and engineering
- b. An ability to design and conduct experiments, as well as to analyze and interpret data
- c. An ability to design a hardware and software system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d. An ability to function on multidisciplinary teams
- e. An ability to identify, formulate, and solve engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively
- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- i. A recognition of the need for, and an ability to engage in life-long learning
- j. A knowledge of contemporary issues
- k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

**Program Educational Objectives****PEO1: PREPARATION**

Civil Engineering graduates will have knowledge to apply the fundamental principles for a successful profession and/or for higher education in Civil Engineering based on mathematical, scientific and engineering principles, to solve realistic and field problems that arise in engineering and non engineering sectors

**PEO2: CORE COMPETENCE**

Civil Engineering graduates will adapt to the modern engineering tools and construction methods for planning, design, execution and maintenance of works with sustainable development in their profession.

**PEO3: PROFESSIONALISM**

Civil Engineering Graduates will exhibit professionalism, ethical attitude, communication and managerial skills, successful team work in various private and government organizations both at the national and international level in their profession and adapt to current trends with lifelong learning.

**PEO4: SKILL**

Civil Engineering graduates will be trained for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

**PEO5: ETHICS**

Civil Engineering graduates will be installed with ethical feeling, encouraged to make decisions that are safe and environmentally-responsible and also innovative for societal improvement.

<b>Course Teacher</b>	<b>Signature</b>
Dr. R. Venkata Krishnaiah	
K.Venkat Raman	

**Course Coordinator**

**HOD/CIVIL**