

Academic Course Description

BHARATH UNIVERSITY
 Faculty of Engineering and Technology
 Department of Civil Engineering
BCE060 Modern Construction Materials
 Sixth Semester, 2016-17 (Even Semester)

Course (catalogue) description

The purpose of this course is to learn the design concepts structures, the loads, systems, structural materials. Design procedures, repair and rehabilitation of systems

Compulsory/Elective course : Compulsory for Civil students

Credit & Contact hours : 3 credits & 45 hours

Course Coordinator : Mr.S.Vinothkumar

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@bharathuniv.ac.in)	Consultation
Mr.S.Vinothkumar	Final year Civil	Civil Block			9.00 - 9.50 AM

Relationship to other courses:

Pre –requisites : BCE303 Building Construction

Assumed knowledge : Basic knowledge in Modern Construction Materials

Following courses : BCE5L1 Construction Engineering Lab

Syllabus Contents

UNIT I SPECIAL CONCRETES	9
Concretes, Behaviour of concretes - High Strength and High Performance Concrete – Fibre Reinforced Concrete, Self compacting concrete, Alternate Materials to concrete.	
UNIT II METALS	9
Steels - New Alloy Steels – Aluminum and its Products –Coatings to reinforcement – Applications.	
UNIT III COMPOSITES	9
Plastics –Reinforced Polymers – FRP – Applications	
UNIT IV OTHER MATERIALS	9
Water Proofing Compounds – Non-weathering Materials – Flooring and Façade Materials	
UNIT V SMART AND INTELLIGENT MATERIALS	9
Smart and Intelligent Materials for intelligent buildings - Special features	

REFERENCES:

1. Santhakumar A.R., Concrete Technology, Oxford University Press, New Delhi. 2007.
2. Mamlouk, M.S. and Zaniewski, J.P., Materials for Civil and Construction Engineers, Prentice Hall Inc., 1999.
3. Ashby, M.F. and Jones.D.R.H.H. “Engineering Materials 1: An Introduction to Properties, applications and designs”, Elsevier Publications, 2005.
4. Shan Somayaji, Civil Engineering Materials, Prentice Hall Inc., 2001
5. Aitkens , High Performance Concrete, McGraw Hill, 1999
6. Deucher, K.N, Korfiatis, G.P and Ezeldin, A.S, Materials for Civil and Highway Engineers, Prentice Hall Inc., 1998.
7. Shetty M.S, Concrete Technology: Theory and Practice, S.Chand & Company Ltd., 2005.
8. ACI Report 440.2R-02, “Guide for the Design and Construction of Externally Bonded Rp Systems For Strengthening Concrete Structures”, American Concrete Institute, 2002.

Professional component

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

Broad area: Planning | Estimating | Scheduling |

Test Schedule

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

Mapping of Instructional Objectives with Program Outcome

H: high correlation, M: medium correlation, L: low correlation

This Course is to bring exposure to design concepts of various structures ,materials, repair and rehabilitation of systems	Correlates to program outcome		
	H	M	L
1. To Identify the types of concrete and their constituents and properties	a,e,	b,d	
2. To Identify the various types of metals,their properties and applications	b	e	
3. To Identify various composite materials,their properties and applications	a,e		
4. Understand the concept of water proofing and identify the purpose of flooring materials	a	d	
5. Design and develop smart intelligent buildings		e	

Draft Lecture Schedule

Session	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I	SPECIAL CONCRETE		
1.	Concretes	No	[R1,R2]
2.	Concretes	No	
3.	Behaviour of concretes	No	
4.	Behaviour of concretes	No	
5.	High Strength concrete	No	
6.	High Performance Concrete	No	
7.	High Performance Concrete	No	
8.	Fibre Reinforced Concrete	No	
9.	Self compacting concrete	No	
10.	Self compacting concrete	No	
11.	Alternate materials to concrete	No	
12.	Alternate materials to concrete	No	
UNIT II	METALS		
13.	Steels	No	[R1,R2]
14.	Steels	No	
15.	New alloy steels	No	
16.	New alloy steels	No	
17.	Aluminum and its products	No	
18.	Aluminum and its products	No	
19.	Coatings to reinforcement	No	
20.	Coatings to reinforcement	No	
21.	Applications	No	
22.	Applications	No	
UNIT III	COMPOSITES		
23.	Plastics	No	[R1,R2]
24.	Plastics	No	
25.	Reinforced polymers	No	
26.	Reinforced polymers	No	
27.	FRP	No	
28.	FRP	No	
29.	Applications	No	
30.	Applications	No	

UNIT IV	OTHER MATERIALS		
31.	Water proofing compounds	No	[R1,R2]
32.	Water proofing compounds	No	
33.	No Weathering materials	No	
34.	No Weathering materials	No	
35.	Flooring Materials	No	
36.	Flooring materials	No	
37.	Façade Materials	No	
38.	Façade materials	No	
UNIT V	SMART AND INTELLIGENT MATERIALS		
39.	Smart materials	No	[R1,R2]
40.	Smart materials	No	
41.	Intelligent materials	No	
42.	Intelligent materials	No	
43.	Intelligent Buildings	No	
44.	Intelligent Buildings	No	
45.	Special Features	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
- Tutorials, which allow for exercises in advance topics and also understanding lecture material.
- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction skills.
- Small periodic quizzes, to enable you to assess your understanding material concepts.

Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	5%
Assignment	-	5%
Attendance	-	10%
Final exam	-	70%

Prepared by: Mr.K.Vinothkumar Assistant Professor , Department of Civil

Dated :

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.

Course Teacher	Signature
Mr.K.Vinothkumar	

Course Coordinator

HOD/CIVIL