Academic Course Description

BHARATH UNIVERSITY
Faculty of Engineering and Technology
Department of Civil Engineering
BCE070 - CONCRETE STRUCTURES
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Sixth Semester, 2016 -17 (Even Semester)

Course (catalog) description

The purpose of this course is to develop an in-depth knowledge in the area of design of concrete structure with the latest code of practice as per the Indian Standard. On completion of this course student gain good confidence in designing major concrete structures like buildings structures like water tanks, support structures, high rise chimneys and pre-engineered structures

Compulsory/Elective course : Compulsory for Civil students

Credit / Contact hours : 3 credits / 45 hours

Course Coordinator : Ms. T.Arthi Harini
Instructors : Dr.S.J.Mohan,

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
Dr.S.J.Mohan,	Final year Civil	Civil Block		mohansjm@yahoo.com	2.30 – 3.30 PM

Relationship to other courses:

Pre –requisites : BCE057 - DESIGN OF R.C.FRAMED STRUCTURES

Assumed knowledge : Basic knowledge in CONCRETE DESIGNAL

Following courses : -Nil-
Syllabus Contents

UNIT I   INTRODUCTION   9
Review of limits state design of beams, Slabs and columns according to IS: 456-2000 Calculation of deflection and crack width according to IS 456-2000.

UNIT II   DESIGN OF SPECIAL RC ELEMENTS   11
Design of Slender columns - Design of Rewalls - Ordinary and shear walls - Design of Corbels - Deep beams and grid floors.

UNIT III FLAT SLABS AND FLAT PLATES   10
Design of flat slabs and flat plates according to ACI method - Design of shear load - reinforcement and edge (Spandrel) beams - Yield line theory and Hillerberg method of design of slabs.

UNIT IV INELASTIC BEHAVIOUR OF CONCRETE BEAMS   9
In elastic behavior of concrete beams - moment - rotation curves - moment redistribution - Baker's method of plastic design, Design of cast in situ Joints in frames.
UNIT V GENERAL   6
Detailing for ductility - Fire resistance of buildings - field control of concrete.

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TEXT BOOK AND REFERENCES:

1. Purushothaman P, Reinforced Concrete Structural Elements: Behaviour Analysis and Design, Tata McGraw Hill, 1986.
2. Varghese P. C., Limit State Design of Reinforced Concrete, Prentice Hall of India, 1995.
3. Krishna Raju, N. Advanced Reinforced Concrete Design, CBS Publishers and Distributors, 1986.
4. N. C. Sinha, S. K. Roy, Fundamentals of Reinforced concrete, S. Chand & Company Ltd, 2001.
5. Varghese. P. C. Advanced Reinforced concrete design, Prentice Hall of India, 2005.

Computer usage: Planning, marking Auto Cad

Professional component

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

Broad area: Design|Analysis| Structures

Test Schedule

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

Mapping of Instructional Objectives with Program Outcome

This Course is to introduce the principles of various design methods and applications to Civil Engineering projects.	Correlates to program outcome		
	H	M	L
1. Study the materials associated with formwork.	e	C,f	
2. Study the design aspects of formwork under various requirements.	e	C,f	h
3. Know the design of forms and shores	e	C,f	
4. Study the planning and erection aspects of form work for buildings.	e	C,f	
5. Understand few other special types of forms.	e	C,f	

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

Session	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I	INTRODUCTION		
1.	Review of limits state design of width according to IS 456-2000.	No	[T1, R2]
2.	Review of limits state design of beams	Yes	
3.	Review of limits state design of slab	Yes	
4.	Review of limits state design of column	Yes	
5.	Concept of Calculation of deflection	No	
6.	Calculation of deflection	Yes	
7.	Problem solved Calculation of deflection	Yes	
8.	crack width according to IS 456-2000	No	
9.	Problems solved crack width according to IS 456-2000	Yes	
UNIT II	DESIGN OF SPECIAL RC ELEMENTS		
10.	Design of Slender columns	No	
11.	Concept of Design of Rewalls	Yes	[T2, R4]
12.	Problems solved Rewalls	Yes	
13.	Concept of Ordinary and shear walls	Yes	
14.	Problems solved Ordinary and shear walls	Yes	
15.	Design of Corbels	Yes	
16.	Problems solved corbels	Yes	
17.	Design of Deep beam	Yes	
18.	Problems of deep beam	Yes	
19.	Concept of grid floors	yes	
20.	Problems grid floors	yes	
UNIT III	FLAT SLABS AND FLAT PLATES		
21.	Design of flat slabs	yes	[T1, R3]
22.	Problems of flat slabs	Yes	
23.	flat plates according to ACI method	No	
24.	Design of shear load	Yes	
25.	Problems of shear load	Yes	
26.	reinforcement and edge (Spandrel) beams	Yes	
27.	Yield line theory	NO	
28.	Concept of Yield line theory	NO	
29.	Problems of Yield line theory	Yes	
30.	Hillerberg method of design of	YES	
UNIT IV	INELASTIC BEHAVIOUR OF CONCRETE BEAMS		

31.	In elastic behavior of concrete beams -	Yes	[R1]
32.	Concept Of moment curves	Yes	
33.	Problems of moment curves	Yes	
34.	moment redistribution methods	Yes	
35.	Problems of moment redistribution methods	Yes	
36.	Baker's method of plastic design,	Yes	
37.	Problems of Baker's method of plastic design	Yes	
38.	rotation curves	Yes	
39.	Problems of rotation curves	Yes	
UNIT V			
40.	Detailing for ductility of structures	Yes	[T1, R3]
41.	Problems for Detailing for ductility of structures	Yes	
42.	Fire resistance of buildings	Yes	
43.	Concept of Fire resistance of buildings	Yes	
44.	Field control of concrete.	yes	
45.	Concept of field control of concrete.	Yes	

Draft Lecture Schedule

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 problem solving and allow time for students to resolve problems in understanding of lecture material.

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

- Small periodic quizzes, to enable you to assess your understanding of the concepts.

Evaluation Strategies

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

Prepared by: Dr. S.J.Mohan 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
Dr. S.J.Mohan	

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Course Coordinator   **HOD/CIVIL**