Academic Course Description

BHARATH UNIVERSITY
Faculty of Engineering and Technology
Department of Civil Engineering

BCE 602- REINFORCED CONCRETE STRUCTURES – II
Sixth Semester, 2016 – 17 (Even Semester)

Course (catalog) description

To give an exposure to the design of continuous beams, slabs, staircases, walls and bridge structures and to introduce yield line theory

Compulsory/Elective course : Compulsory for Civil students

Credit/ Contact hours : 4 credits / 60 hours

Course Coordinator : Ms. R.J.Rinu Isah Assistant Professor

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
MEIKANDAAN.T.P	**III YEAR A,B C**	**Civil block**			9.00 - 9.50 AM
R.CHITRA	**III YEAR D**	**Civil block**			12.45 - 1.15 PM

Relationship to other courses:

Pre –requisites : Reinforced Concrete Structures – I

Assumed knowledge : Basic knowledge in Design of structures

Following courses : BEC 701 Estimation & Costing

Syllabus Contents

UNIT I RETAINING WALLS 12
Retaining Walls – Design of cantilever and counter fort types using working stress method.

UNIT II WATER TANKS 13
Water Tanks – Underground rectangular tanks – Domes – overhead circular and rectangular tanks – Design of staging and foundations.

UNIT III BRIDGES 13
Bridges – slab Bridge – Distribution of concentrated loads by effective width and Pigeaud's method. Load distribution in interconnected girders by Courbon's method – T – Beam Bridge.

UNIT IV PRE STRESSED CONCRETE 11
Principles of Pre–stressing – Materials for pre–stressed Concrete – Different methods and systems – uniform and non-uniform pre-stressing – losses in pre-stress – Analysis of simply supported beams with straight and parabolic tendons.

UNIT V YIELD LINE THEORY 11
Yield Line Theory: Application of virtual work method to square, rectangular, and Triangular slabs.

TEXT BOOKS:

N.Krishnaraju, Design of R.C.Structures, CBS Publishers and Distributors. Delhi, 1989

REFERENCE:

1. Mac Ginley, T.J. Reinforced Concrete Design, Theory and Examples, E and N.Spon. Umited London, 1978
2. Jaikrishna and Jain O.P, Plain and Reinforced Concrete Vol. I & II",Nem Chand & Bros., 1958
3. Krishna Raju N, Bridge Engineering" Oxford and IBH Publishing,2010
4. Park R. and Paulay T. Reinforced Concrete Structures John Wiley and Sons, 1975.
5. Neville A.M. Properties of Concrete, Pitman Pub., 1981

Computer usage: Auto cadd

Professional component

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

Broad area : Reniforced concrete 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

	Correlates to program outcome		
	H	**M**	**L**
CO1 Design counter-fort and cantilever retaining walls	D	c	
CO2 Design underground and overhead water tanks	d	c	
CO3 Design bridges and flat slab	d	c	
CO4 Different methods and systems – uniform and non-uniform pre-stressing design	d	c	
CO5 Design Slab using yield line theory	d	c	

S.NO	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I RETAINING WALLS			
1.	Introduction to Retaining Walls	No	[T1,R1 & R4]
2.	Design procedure of Retaining Walls	No	
3.	Types of Retaining Walls	No	
4.	Problems on Retaining Walls	Yes	
5.	Introduction to working stress method	No	
6.	Introduction to cantilever Retaining Walls	No	
7.	Design procedure of cantilever Retaining Walls	No	
8.	Problems on cantilever Retaining Walls	Yes	
9.	Introduction to counter fort Retaining Walls	No	
10.	Design procedure of counter fort Retaining Walls	No	
11.	Problems on counter fort Retaining Walls	Yes	
12.	Discussion on IS 456 code book	No	
UNIT II WATER TANKS			
13	Introduction to Water Tanks	NO	[T1,R1 & R4]
14	Types of Water Tanks	NO	
15	Introduction to Underground rectangular tanks	NO	
16	Design procedure of Underground rectangular tanks	NO	
17	Problems on Underground rectangular tanks	Yes	
18	Introduction to Domes	No	
19	Design procedure of Domes	No	
20	Problems on Domes	Yes	
21	Design procedure of overhead circular tanks	No	
22	Design procedure of rectangular tanks	No	
23	Problems on overhead circular and rectangular tanks	Yes	
24	Design of staging	No	
25	Design of foundations.	No	
UNIT III BRIDGES			
26	Introduction to Bridges	No	[T1,R3 & R4]
27	Types of Bridges	No	
28	Introduction to slab Bridge	No	
29	Design procedure of slab Bridge	No	
30	Problems on slab Bridge	Yes	
31	Distribution of concentrated loads by effective width	No	
32	Pigeaud's method	No	
33	Problems using Pigeaud's method	Yes	
34	Load distribution in interconnected girders by Courbon's method	No	
35	Problems using Courbon's method	Yes	
36	T – Beam Bridge.	No	
37	Design procedure of T – Beam Bridge.	No	
38	Problems on T – Beam Bridge.	Yes	

UNIT IV PRE STRESSED CONCRETE			
39	Introduction to pre stressed concrete	No	[T1,R4 & R5]
40	Principles of Pre–stressing	No	
41	Materials for pre–stressed Concrete	No	
42	Different methods pre stressed concrete	No	
43	Different systems pre stressed concrete	No	
44	uniform and non-uniform pre-stressing	No	
45	Problems on uniform and non-uniform pre-stressing	Yes	
46	losses in pre-stress	No	
47	Analysis of simply supported beams	No	
48	Problems on simply supported beams	Yes	
49	Parabolic tendons.	No	
UNIT V YIELD LINE THEORY			
50	Introduction to Yield Line Theory	No	[T1,R4 & R5]
51	Introduction to virtual work	No	
52	Application of virtual work method	No	
53	Design procedure of virtual work method	No	
54	Virtual work method to square slabs.	No	
55	Problems on square slabs.	Yes	
56	Virtual work method to rectangular slabs.	No	
57	Problems on rectangular slabs.	Yes	
58	Virtual work method to Triangular slabs.	No	
59	Problems on Triangular slabs.	Yes	
60	Discussion on IS code books	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 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, Ms. R.J.Rinu Isah 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
T.P Maikandaan	
R.Chitra	

Course Coordinator

HOD/CIVIL