SRI VIDYA COLLEGE OF ENGINEERING & TECHNOLOGY

COURSE PLAN (THEORY)

ACADEMIC YEAR: 2018-2019 EVEN

Subject Code	CE6601	L	P	T	C
Subject Title	Design of Reinforced Concrete Structures & Brick Masonry Structures	3	0	0	3
Year / Dept / Sem	III / CIVIL / VI	Regulation Year	2013		
Faculty Name / Desg / Dept	Mrs.Magarajothi G / Assistant Professor / CIVIL				
Course Prerequisite	1. The students must have more knowledge about basic fundamentals of mathematics. 2. The students must have more knowledge about strength of materials. 3. The students must have more knowledge about design of structural elements.				

Syllabus

CE6601 DESIGN OF REINFORCED CONCRETE STRUCTURES & BRICK MASONRY STRUCTURES **L T P C 3 0 0 3**

UNIT I RETAINING WALLS **9**

Design of Cantilever and Counterfort Retaining walls

UNIT II WATER TANKS **9**

Design of rectangular and circular water tanks both below and above ground level - Design of circular slab.

UNIT III SELECTED TOPICS **9**

Design of staircases (ordinary and doglegged) – Design of flat slabs – Principles of design of mat foundation, box culvert and road bridges

UNIT IV YIELD LINE THEORY **9**

Assumptions - Characteristics of yield line - Determination of collapse load / plastic moment - Application of virtual work method - square, rectangular, circular and triangular slabs – Design problems

UNIT V BRICK MASONRY **9**

Introduction, Classification of walls, Lateral supports and stability, effective height of wall and columns, effective length of walls, design loads, load dispersion, permissible stresses, design of axially and eccentrically loaded brick walls

TOTAL: 45 PERIODS

OUTCOMES:

The student shall have a comprehensive design knowledge related to various structural systems.

TEXT BOOKS:

1. Gambhir.M.L., "Design of Reinforced Concrete Structures", Prentice Hall of India Private Limited, 2012.
2. Dayaratnam, P., “Brick and Reinforced Brick Structures”, Oxford & IBH Publishing House, 1997
3. Punmia B.C, Ashok Kumar Jain, Arun K.Jain, "R.C.C. Designs Reinforced Concrete Structures", Laxmi Publications Pvt. Ltd., New Delhi, 2006.
4. Varghese.P.C., "Advanced Reinforced Concrete Design", Prentice Hall of India Pvt. Ltd., New Delhi, 2012.

REFERENCES:

1. Mallick, D.K. and Gupta A.P., "Reinforced Concrete", Oxford and IBH Publishing Company,1997
2. Syal, I.C. and Goel, A.K., "Reinforced Concrete Structures", A.H. Wheelers & Co. Pvt. Ltd.,1998
3.Ram Chandra.N. and Virendra Gehlot, "Limit State Design", Standard Book House, 2004.Subramanian. N., "Design of Reinforced Concrete Structures", Oxford University, NewDelhi, 2013.
4. Bhavikatti S.S.., "Advance R.C.C Design Volume II, New Age International Pvt.Ltd., Publishers,Chennai.,2009
5. Dr.Purusothamaraj.P and Dr.Ramasamy.V., "Design of Reinforced Concrete Structures and Brick Masonry Structures", Lakshmi Publication, Chennai, 2012.
6. Bhavikatti S.S.., "Design R.C.C structural elements Volume I, New Age International Pvt.Ltd., Publishers,Chennai.,2009
7.IS456:2000, Code of practice for Plain and Reinforced Concrete, Bureau of Indian Standards, New Delhi, 2007
8.IS1905:1987, Code of Practice for Structural use of Unreinforced Masonry Bureau of Indian Standards, New Delhi, 2002

Course Objectives (CO)	CO1: To give an exposure to the design of continuous beams & slabs CO2: To give an exposure to the design of staircases. CO3: To give an exposure to the design of walls. CO4: To give an exposure to the design of brick masonry structures. CO5: To introduce yield line theory. CO6: To give an exposure to the design of flat slabs
Expected Course Outcomes (ECO)	At the end of the course, the students should be able to: ECO1: The student shall have a comprehensive design knowledge related to various structural systems. ECO2: To introduce various fundamental concepts, components & types of masonry works ECO3: To understand design features of brick masonry building ECO4: To understand basic concepts, components & types of water tank ECO5: To analyze of slabs ECO6: To perform structural design of reinforced wall

Mapping of CO & PO(Specify the PO's) - ***(Fill the col.s with the legend given below)***

PROGRAM OUTCOMES (Pos)

Engineering graduates will be able to:

1. ENGINEERING KNOWIEDGE: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. PROBLEM ANALYSIS: identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principals of mathematics, natural sciences and engineering sciences.
3. DESIGN/ DEVELOPMENT OF SOLUTIONS: Design solutions for complex engineering problems and design systems components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural societal, and environmental considerations.

4. CONDUCT INVESTIGATIONS COMPLEX PROBLEMS: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
5. MODERN TOOL USAGE: Create, select, and apply appropriate techniques resources, and modern engineering and it tools including production and modeling to complex engineering activities with an understanding of the limitations.
6.THE ENGINEERING AND SOCIETY: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practices.
7. ENVIRONMENT AND SUSTAINABLITY: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. ETHICS: Apply ethical principles and commit to professional and responsibilities and norms of the engineering practices.
9. INDIVIDUAL AND TEAM WORK: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary setting.
10.COMMUNICATION: Communicate effectively on complex engineering activities with the engineering community and with society at large such as being able to comprehend and write effectives reports and design documentations, make presentations, and give and receive clear instructions.
11.PROJECT MANGMENT AND FINANCE: Demonstrate knowledge and understanding of the engineering and management principals and apply these to ones own work as a member and leader in a team to manage project and in multidisciplinary environments.
12. LIFE LONG LEARNING: Recognize the need for, and have the preparations and ability to engage in independent and lifelong learning in the broadest context of technological change.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	-	-	1	-	-	-	-	1	1
CO2	3	1	2	-	1	-	-	-	-	-	-	-
CO3	2	3	2	1	-	1	-	-	-	2	-	1
CO4	3	1	1	-	-	-	-	-	-	-	-	2
CO5	3	3	2	-	-	-	-	-	-	-	-	1
CO6	2	2	2	1	-	-	-	-	1	2	-	1

1 – Slight 2 –Moderate 3 – High

Bridging the Curriculum Gap (Additional Topics beyond syllabus/Seminars/Assignments)	BCG1: Design of continuous beams BCG2: Water tank towers BCG3: Deep beams BCG4: Shear walls
Related Website URLs	W1:http://www.rejinpaul.com/2015/11/ce2401 W2:http://www.auupdates.com/2013/12/ce2401 W3: https://www.vidyarthiplus.com/vp/thread W4: http://www.sourcecodesolutions.in/2011/03/ce1401
Related Video Course Materials (min. 3 no.s)	*V1:* https://www.youtube.com/watch?v=I9sA7KrXknc *V2: https://www.youtube.com/watch?v=6LZiPNApaB8* *V3: https://www.youtube.com/watch?v=hxakW1miEcM* *V4:* ps://www.youtube.com/watch?v=pIdaC_I6H_M

S.No.	Topic Name	Book	Page no	Mode of delivery	No of hrs	Cumulative hrs
UNIT I - RETAINING WALLS						
1	Retaining walls introduction	R4	180	PPT	1	1
2	Design of Cantilever Retaining walls	R4	180 & 186	Class room teaching	1	2
2a	Design of toe & heel slab	R4	190 -191	Class room teaching	1	3
2b	Design of stem	R4	188 -189	Class room teaching	1	4
2c	Stability check	R4	187 -188	Class room teaching	2	6
3	Design of Counterfort Retaining walls	R4	192 - 193	Class room teaching	1	7
3a	Design of toe & heel slab	R4	197-199	Class room teaching	2	9
3b	Design of stem	R4	195 – 196	Class room teaching	1	10
3c	Stability check	R4	194	Class room teaching	1	11
3d	Design of counterforts	R4	199	Class room teaching	1	12
UNIT II - WATER TANKS						
1	Design of rectangular water tanks below ground level – introduction	R4	272	Class room teaching	1	13
1a	Design of tank wall & base slab	R4	275-282	Class room teaching	1	14
2	Design of rectangular water tanks above ground level	R4	263	Class room teaching	1	15
2a	Design of tank wall & base slab	R4	267 -269	Class room teaching	2	17
3	Design of circular water tanks below ground level	R4	283-288	Class room teaching	2	19
4	Design of circular water tanks above ground level	R5	2.44-2.45	Class room teaching	1	20
4a	Design of tank wall, dome, base slab & ring beam	R5	2.48-2.49	Class room teaching	2	22
5	Design of circular slab	R4	24 - 40	Class room teaching	2	24
UNIT III - SELECTED TOPICS						
	Staircase & flat slab introduction	R6 & R4	221 & 1	PPT	1	25
1	Design of staircases (ordinary)	R6	221 – 228	Class room teaching	1	26

1a	Design of doglegged staircases	R6	228-234	Class room teaching	2	28
2	Design of flat slab – introduction	R4	1 – 2	Class room teaching	2	30
2a	Design of flat slab	R4	8 - 12	Class room teaching	2	32
3	Principles of design of mat foundation	R4	178 - 179	Class room teaching	1	33
4	Principles of design of box culvert	R4	350 - 357	Class room teaching	1	34
5	Principles of design of road bridges	R5	8.1-8.24	Class room teaching	1	35
UNIT IV - YIELD LINE THEORY						
1	Assumptions, Characteristics of yield line	R4	52 - 53	Class room teaching	1	36
2	Determination of collapse load / plastic moment	R4	56	Class room teaching	1	37
3	Application of virtual work method	R4	56	Class room teaching	2	38
4	Square slabs – Design problems	R4	70 - 72	Class room teaching	2	40
5	Rectangular slabs – Design problems	R4	72 - 75	Class room teaching	2	42
6	Circular slabs – Design problems	R4	77	Class room teaching	2	44
7	triangular slabs – Design problems	R4	75 - 76	Class room teaching	2	46
UNIT V BRICK MASONRY						
1	Introduction	R5	10.1-10.3	PPT	1	47
2	Classification of walls	R5	10.4-10.6	PPT	1	48
3	Lateral supports and stability	R5	10.8-10.9	Class room teaching	1	49
4	effective height of wall and columns	R5	10.10-10.11	Class room teaching	1	50
5	effective length of walls, design loads	R5	10.11-10.17	Class room teaching	2	52
6	load dispersion, permissible stresses,	R5	10.17-10.21	Class room teaching	1	53
7	design of axially loaded brick walls	R5	10.22-10.24	Class room teaching	2	55
8	design of eccentrically loaded brick walls	R5	10.24-10.36	Class room teaching	2	57

	Prepared by	***Approved by***
Signature		
Name	Mrs.G.Magarajothi	Dr.P.GANESAN
Designation	Assistant Professor / CIVIL	HOD (CIVIL)
Signed date		

LEGEND:

METHODOLOGY TO MAP OBJECTIVE WITH OUTCOME

Course outcomes are achieved through

- **a.** Suitable Analogies.
- **b.** Class room teaching.
- **c.** Assignments.
- **d.** Tutorials
- **e.** Weekly, monthly and model exams.
- **f.** Brain storming.
- **g.** Group discussion and role play.
- **h.** Seminars