

**Lesson Plan- CE1011- Structural Design (Masonry and RCC)**  
**Academic year 2015-16**  
**(Semester commencing in February 2016)**

Instructional objectives no.	Instructional objectives (IO)
1	To design masonry structures like walls, columns, and foundation incorporating earthquake resistant features
2	To bring about an understanding of the behaviour of reinforced concrete, the design philosophies mix design
3	To design RCC beams and slabs, columns and footings including structural design of piles and pile caps
4	To design RCC columns and footings including structural design of piles and pile caps
5	To design RCC footings including structural design of piles and pile caps

**Student outcomes**

Student outcome number	Student outcome (SO)
a	an ability to apply knowledge of mathematics, science, and engineering
c	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
e	an ability to identify, formulate, and solve engineering problems

**Mapping of Instructional Objectives (IOs) with Student Outcomes (SOs)**  
**CE1011- Structural Design (Masonry and RCC)**

Instructional objectives	Student Outcomes		
	a	c	e
1. To design masonry structures like walls, columns, and foundation incorporating earthquake resistant features	X	X	X
2. To bring about an understanding of the behaviour of reinforced concrete, the design philosophies mix design	X	X	X
3. To design RCC beams and slabs, columns and footings including structural design of piles and pile caps	X	X	X
4. To design RCC columns and footings including structural design of piles and pile caps	X	X	X
5. To design RCC footings including structural design of piles and pile caps	X	X	X

CE1011	Structural Design (Masonry and RCC)	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Credits (C)
		2	2	0	3
	Prerequisites CE1004				

**Lesson Plan – 2015-16**

**Revision: 1 dated 12/02/2016**

Lecture No.	Topic	No. of hours	IOs	SO	Reference
1.	Introduction-overview of syllabus	1	1,2,3,4,5	a, c, e	1,2,3,4,5,6,7,8,9,10
<b>UNIT-II MIX DESIGN AND BEHAVIOUR OF RCC SECTIONS</b>					
2.	Grades of concrete- concrete mix design of nominal mix and design mix as per BIS codes	2	2	a,c,e	6
3.	Theories of basic design concepts, working stress method, limit state method of design	1	2	a,c	1,2,3,4,5
4.	Behaviour of RCC beams / slabs in flexure, shear	1	2,3	a,c	1,2,3,4,5
5.	General codal recommendations for limit state method	1	2,3	a	1,2,3,4,5
6.	Limit state method of design of one-way slabs	2	2,3	a,c,e	1,2,3,4,5
7.	Limit state method of design of two-way slabs	2	2,3	a,c,e	1,2,3,4,5
8.	Limit state method of design of continuous slabs	2	2,3	a,c,e	1,2,3,4,5
9.	Reinforcement detailing	1	2,3	a,c,e	1,2,3,4,5
	<b>Cycle Test -I</b>	2	2,3		
<b>UNIT-III LIMIT STATE METHOD OF DESIGN OF BEAMS AND SLABS</b>					
10.	Transfer of load from slab to beam	1	2,3	a	1,2,3,4
11.	Limit state method of design of Singly reinforced beams	2	2,3	a,c,e	1,2,3,4,5
12.	doubly reinforced beams	2	2,3	a,c,e	1,2,3,4,5
13.	Flanged beams ( T and L beams)	4	2,3	a,c,e	
14.	Design for torsion	1	2,3	a,c,e	1,2,3,4,5
15.	Design of Staircases	2	2,3	a,c,e	1,2,3,4,5
16.	Use of Design Aids (SP16)	1	2,3	a,c,e	1,2,3,4,5,7
17.	Use of SP34, reinforcement detailing	2	2,3	a,c	1,2,3,4,5

Lecture No.	Topic	No. of hours	IOs	SO	Reference
<b>UNIT-IV LIMIT STATE METHOD OF DESIGN FOR COLUMNS</b>					
18.	Limit state method of design of short and long columns, effective length, braced and unbraced columns	2	2,3,4	a,c,e	1,2,3,4,5
	<b>Cycle Test - II</b>	2			
19.	Uni-axial and biaxial bending using interaction curve(SP16)	4	2,3,4	a,c,e	1,2,3,4,5,7,9,10
20.	shear in columns, ductile detailing of columns	2	2,3,4	a	1,2,3,4,5
21.	Extension of design of columns to piles, Use of SP34, reinforcement detailing at beam, column joints	1	2,3,4	a,e	1,2,3,4,5
<b>UNIT-V LIMIT STATE METHOD OF DESIGN FOR FOUNDATIONS</b>					
22.	Limit state method of design of foundations, individual footings	3	2,3,4,5	a,c,e	1,2,3,4,5
23.	Combined footings	3	2,3,4,5	a,c,e	1,2,3,4,5
24.	Column- Foundation junction	1	2,3,4,5	a,e	1,2,3,4,5
25.	Pile foundation	2	2,3,4,5	a,c,e	1,2,3,4,5
26.	pile caps (4 piles)	2	2,3,4,5	a,c,e	1,2,3,4,5
27.	reinforcement detailing	1	2,3,4,5	a,c	1,2,3,4,5
<b>UNIT-III MASONRY</b>					
28.	Strength of bricks and masonry	1	1	a	8
29.	design of walls, piers, columns	4	1	a,c,e	8
30.	design of footings for walls and columns	2	1	a,c,e	8
31.	use of nomograms, earthquake resistant features in masonry buildings as per BIS codes	1	1	a,e	8
32.	Masonry retaining walls	2	1	a,c,e	8
	<b>Model Examination</b>	3			
	<b>Total hours</b>	60			

*The faculty members handling the course may conduct surprise test according to their convenience. However a question paper in hard copy as well as key shall be made available for the surprise test. The process shall be same as that of cycle tests.*

#### TEXT BOOKS

1. Varghese .P.C, "Limit State Design Of Reinforced Concrete", 2Nd Ed, PHI Learning Pvt. Ltd., 2004.
2. Unnikrishna Pillai .S and Deavadas Menon, "Reinforced Concrete Design," Tata MacGraw Hill Publishing Company Limited, Second Edition, New Delhi, 2003.
3. Krishnaraju .R, Pranesh .R.N, "Design of Reinforced concrete IS : 456-2000", New age International Publication (P) Ltd., New Delhi, 2003.

#### REFERENCE BOOKS

4. Gambhir .M.L, "Design of Reinforced Concrete Structures", Prentice Hall of India, Pvt. Ltd., New Delhi, 2008.
5. "Code of Practice for Plain and Reinforced Concrete", BIS, New Delhi, IS456-2000.
6. "Recommended guidelines for Concrete Mix Design", BIS, New Delhi, IS10262 1982.
7. "Design Aids for Reinforced Concrete to IS 456", Special Publication(SP16), BIS New Delhi, 1980.
8. "Code of Practice for Structural use of Unreinforced Masonry," BIS, New Delhi, IS1905-1987.
9. "Code of practice for Earthquake Resistant Design and Construction of Buildings" IS4326-1976, BIS, New Delhi.
10. "Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Forces – Code of Practice"-IS3920:1993, BIS, New Delhi.

**Course Coordinator**  
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