

## REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING

<b>V Semester: CE</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
ACE009	Foundation	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
<b>Contact Classes: 45</b>		<b>Tutorial Classes: 15</b>		<b>Practical Classes: Nil</b>			<b>Total Classes: 60</b>	
<p><b>COURSE OBJECTIVES:</b>  <b>The course should enable the students to:</b></p> <ol style="list-style-type: none"> <li>I. Identify, formulate and solve engineering problems of RC elements.</li> <li>II. Differentiate between working stress design and limit state design.</li> <li>III. Understand the importance of limit state design in reinforced concrete structures.</li> <li>IV. Design of different structural members like beam, slab, column, footing and stair case.</li> </ol> <p><b>COURSE OUTCOMES (COs):</b></p> <p>CO 1: Describe the Concepts of RC design, material Stress–Strain curves, Safety factors, characteristic values, Stress block parameters, Working Stress Method, Limit state analysis and design of singly reinforced, doubly reinforced T, and L beam sections.</p> <p>CO 2: Understand Limit state analysis and design of section for shear and torsion, concept of bond, anchorage and development length, I.S. code provisions.</p> <p>CO 3: Explore the design concept of two-way Slabs, one-way slabs, continuous slabs using I.S. coefficients, Cantilever slab/ Canopy slab.</p> <p>CO 4: Design of short and long column, Axial loads, uni-axial and bi-axial bending I.S. Code provisions.</p> <p>CO 5: Design footings–Isolated (square, rectangle) and Combined Footings. Design of Stair Case.</p> <p><b>COURSE LEARNING OUTCOMES (CLOs):</b></p> <ol style="list-style-type: none"> <li>1. Describe the basic concepts of RC design.</li> <li>2. Understand the concept material Stress–Strain curves, Safety factors.</li> <li>3. Understand the concept Stress block parameters.</li> <li>4. Use the design concept of Working Stress Method.</li> <li>5. Design of singly reinforced, doubly reinforced sections.</li> <li>6. Design of, T, and L beam sections.</li> <li>7. Understand Limit state analysis and design of section for shear.</li> <li>8. Understand Limit state analysis and design of section for torsion.</li> <li>9. Concept of bond, anchorage.</li> <li>10. Concept of development length.</li> <li>11. Illustrate the I.S. code provisions.</li> <li>12. Understand the design concept of one-way slabs.</li> <li>13. Understand the design concept of two-way Slabs.</li> <li>14. Understand the design concept of continuous slabs.</li> <li>15. Calculate the I.S. coefficients for Cantilever slab.</li> </ol>								

16. Calculate the I.S. coefficients for Canopy slab. 17. Discuss the concept of short and long column. 18. Understand the concept of Axial loading. 19. Understand the concept of uni-axial and bi-axial bending. 20. Apply I.S. Code provisions. 21. Design concept for isolated footing. 22. Design concept for combined footing. 23. Understand the Design procedure for Stair Case. 24. Types of staircase.		
<b>UNIT-I</b>	<b>DESIGN OF BEAMS</b>	<b>Classes: 09</b>
Concepts of RC Design – Limit state method – Material Stress–Strain curves – Safety factors – Characteristic values – Stress block parameters – IS-456:2000 – Working Stress Method. BEAMS: Limit state analysis and design of singly reinforced, doubly reinforced, T, and L beam sections.		
<b>UNIT-II</b>	<b>SHEAR TORSION AND BOND</b>	<b>Classes: 09</b>
Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing Limit state design for serviceability for deflection, cracking and codal provision.		
<b>UNIT-III</b>	<b>DESIGN OF SLABS</b>	<b>Classes: 09</b>
Design of Two-way Slabs, one-way slabs, Continuous slabs using I.S. coefficients, Cantilever slab/ Canopy slab.		
<b>UNIT-IV</b>	<b>DESIGN OF COLUMNS</b>	<b>Classes: 09</b>
SHORT AND LONG COLUMN – Axial loads, uni-axial and bi-axial bending I.S. Code provisions.		
<b>UNIT-V</b>	<b>DESIGN OF FOOTINGS</b>	<b>Classes: 09</b>
FOOTINGS–Isolated (square, rectangle) and Combined Footings. Design of Stair Case.		
<b>Text Books:</b>		
1. Dr. B. C. Punmia, “Limit state design of reinforced concrete”, Laxmi Publications, NewDelhi. 2. S. Unnikrishna Pillai and Devdas Menon, “Reinforced concrete design”, Tata Mc. Graw Hill, New Delhi. 3. N. Krishna Raju and R. N. Pranesh, “Reinforced Concrete Design”, New Age International Publishers, New Delhi. 4. P. C. Varghese, “Limit state design of reinforced concrete”, Prentice Hall of India, New Delhi.		
<b>Reference Books:</b>		
1. M. L. Gambhir, “Fundamentals of reinforced concrete design”, Printice Hall of India Pvt. Ltd, New Delhi. 2. P. Purushotham, “Reinforced concrete structural elements – behaviour, Analysis and design”, Tata McGraw Hill, 1994.		

**Web References:**

1. <http://www.nptel.ac.in/courses/105105105/>
2. <http://www.nptel.ac.in/courses/105105104/>

**E-Text Books:**

1. [http://weccivilians.weebly.com/uploads/2/4/6/2/24623713/design\\_of\\_reinforced\\_concrete\\_9th\\_edition\\_-\\_jack\\_c.\\_mccormac.pdf](http://weccivilians.weebly.com/uploads/2/4/6/2/24623713/design_of_reinforced_concrete_9th_edition_-_jack_c._mccormac.pdf)<http://www.faadooengineers.com/threads/13449-Engineering-Maths-II-eBooks>