3SE04: DESIGN OF RC STRUCTURES
CREDITS – 4 (LTP: 3,1,0)

Course Objectives:

1. To impart the concepts of design philosophies and material behavior.
2. To introduce design of basic RCCelements as per IS codes of practice.

Teaching and Assessment Scheme:

Teaching Scheme (Hours per Week)			Credits	Assessment Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	CE	ESE	CE	150
3	1	0	4	60	40	20	30	

Course Contents:

Unit No.	Topics	Teaching Hours
1	**Introduction:** Design philosophy: Working stress method, Limit state method, Introduction to analysis, design and detailing of RC structures, review of Concepts of loading and load combinations as per IS:875. Materials of RC, Strength and stress-strain curves of concrete and steel, Introduction to IS:456, SP16.	02
2	**Bond and Development Length:** Concepts and codal provisions, bond and development length in beams, slab, columns and footings.	02
3	**Multistory building:** Load transfer mechanism, Gravity load analysis	04
4	**Limit State Design of RC Flexural Elements:** Beams: Singly and doubly reinforced rectangular and flanged beams, under reinforced and over reinforced sections, shear reinforcement design, Slabs: One way and two way slabs, simply supported and continuous slabs.	14
5	**Limit State Design of RC Compression Elements:** Design of columns: Axial load, uniaxial and biaxial bending	10
6	**Limit State Design of Footings:** Design of isolated pad footing, Design of isolated sloped footing. Design of rectangular beam type combined footing and design concepts of rectangular slab type combined footing, Introduction to other types of footings such as trapezoidal, strap beam, raft.	11
7	**Introduction to Precast Elements:** Design of Short columns: Axial load, uniaxial and biaxial bending Design of Long columns: Axial load, uniaxial and biaxial bending	02
	Total	**45**

List of References:

1. S. N. Sinha, "*Reinforced Concrete Design",* Tata McGraw Hill
2. A. K. Jain, "*Design of Concrete Structures*", Nemchand Publication
3. V. L. Shah & S. R. Karve,"*Limit State Theory & Design of Reinforced Concrete*", Structure Publishers, Pune
4. V. L. Shah & S. R. Karve, "*Design of Multi-storied Building (G+3)*", Structure Pub., Pune
5. KrishanaRajuN.,"*Advanced Design of Concrete Structures*", Tata Mc-Graw Hill, Delhi
6. Dr. H.J. Shah, "*Reinforced Concrete*",Vol-I & II; Charotar Pub. Anand

7. Charles E. Reynolds, James C. Steedman (Author), Anthony J. Threlfall, "*Reinforced Concrete Designer's Handbook*"; CRC press-Taylor and Francis.
8. Krishna Raju, R.N. Pranesh, "*Reinforced Concrete Design: IS: 456-2000 Principles and Practice",* New age International publishers.
9. Varghese P.C, "*Limit State Design of Reinforced Concrete*"; PHI learning
10. Kim S. Elliott, "*Precast Concrete Structures";* CRC press-Taylor and Francis.
11. IS: 456 - Indian Standard Code of Practice for Plain and Reinforced Concrete
12. IS: 875 - (Part I to V) – Indian Standard Code of Practice for Structural Safety of Building Loading Standards
13. SP:16 - Design aids for Reinforced Concrete
14. SP:34 – Handbook on Concrete Reinforcement and Detailing

Course Outcomes (COs):

1. Understand design philosophies and material behavior of RC elements.
2. Understand the load distribution mechanism and Behaviour in RC multi-storied structures.
3. Design RC elements as per IS codes of practice.
4. Design suitable foundation for different structures.