4SE43: ADVANCED DESIGN OF CONCRETE STRUCTURES
CREDITS - 3 (LTP: 2,0,1)

Course Objective:

1. To enhance the understanding of Behaviour of RCC members subjected to complex loading.
2. To understand the effects of gravity and lateral loads on multi-storied RCC framed structure.
3. To evaluate the design provisions in water storage and Earth retaining structures.

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	
2	0	2	3	30	20	20	30	100

Course Contents:

Unit No.	Topics	Teaching Hours
1	**Introduction** Design philosophy: Introduction to Design codes, Concepts of loading and load combinations as per different IS codes.	**1**
2	**Limit State Design for Torsion** Design of rectangular sections for torsion, shear and bending.	**4**
3	**Limit State Design of Retaining Wall** Stability and design of cantilever retaining wall, Design concepts of counterfort, buttress and gravity retaining walls.	**4**
4	**Grid Floors** Analysis and Design of grid floor by Rankine Grashroff Classical equivalent and IS 456 Design method.	**4**
5	**Flat Slabs** Direct design method, Analysis and design of column strip and middle strip as per IS 456: 2000, Shear in flat slabs, check for deflection.	**4**
6	**Underground and Ground supported Water Tanks** a) Introduction to IS: 3370, permissible stresses and uncracked design concepts, Design of circular and Rectangular underground water tanks. b) Seismic Analysis and design of Ground supported circular and Rectangular water tanks.	**8**
7	**Design of Foundations** Design of Strip footing, Raft and Pile cap	**5**
	Total	**30**

List of References:

1. S. N. Sinha, "*Reinforced Concrete Design*", Tata McGrawhill

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. KrishanaRaju N.,"*Advanced Design of Concrete Structures*", Tata Mc-Graw Hill, Delhi
6. Dr. H.J. Shah, "*Reinforced Concrete",Vol-II*; Charotar Pub. Anand
7. IS: 456 - Indian Standard Code of Practice for Plain and Reinforced Concrete
8. IS: 875 - (Part I to V) –Indian Standard Code of Practice for Structural Safety of Building Loading Standards
9. SP:16 – Design aids for Reinforced Concrete
10. IS1893-Part-1- Indian Standard Criteria for Earthquake Resistant Design of Structures (General Provisions and Buildings)
11. IS1893- Part-2-Criteria for Earthquake Resistant Design of Structures (Liquid Retaining Tanks)
12. IS1893- Part-3- Criteria for Earthquake Resistant Design of Structures (Bridges and Retaining Walls)
13. IS 3370 (All parts)- Concrete Structures for Storage of Liquids - Code of Practice
14. IS: 13920 - Indian Standard Code of Practice for Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Forces.
15. IS: 13827 - Indian Standard Guidelines for Improving Earthquake Resistance of Earthen Buildings.

Course Outcomes (COs):

At the end of this course students will be able to …

1. Design Grid Floor and Flat slab.
2. Design suitable foundation for different structures.
3. Design water tanks and earth retaining structures.