

CE2306 - DESIGN OF RC ELEMENTS

OBJECTIVES:

- This course covers the different types of Design of Reinforced Concrete Structures
- WSM, ULM, Limit State Method is used for designing of structures
- The design of slab with reference to Indian standard code of practice
- Beam, column and footing can be designed by using IS code books and other design aids
- Reinforced Concrete Structures and Design Aids are included.
- At the end of course the student shall be in a position to design the basic elements of reinforced concrete structures.

OBJECTIVE

This course covers the different types of philosophies related to Design of Reinforced Concrete Structures with emphasis on Limit State Method. The design of Basic elements such as slab, beam, column and footing which form part of any structural system with reference to Indian standard code of practice for Reinforced Concrete Structures and Design Aids are included. At the end of course the student shall be in a position to design the basic elements of reinforced concrete structures.

UNIT I METHODS OF DESIGN OF CONCRETE STRUCTURES 12

Concept of Elastic method, ultimate load method and limit state method – Advantages of Limit State Method over other methods – Design codes and specification – Limit State philosophy as detailed in IS code – Design of flexural members and slabs by working stress method – Principles of Design of Liquid retaining structures – Properties of un-cracked section – Calculation of thickness and reinforcement for Liquid retaining structure

UNIT II LIMIT STATE DESIGN FOR FLEXURE 12

Analysis and design of one way and two way rectangular slab subjected to uniformly distributed load for various boundary conditions and corner effects – Analysis and design of singly and doubly reinforced rectangular and flanged beams

UNIT III LIMIT STATE DESIGN FOR BOND, ANCHORAGE SHEAR & TORSION 12

Behaviour of RC members in bond and Anchorage - Design requirements as per current code - Behaviour of RC beams in shear and torsion - Design of RC members for combined bending shear and torsion.

UNIT IV LIMIT STATE DESIGN OF COLUMNS 12

Types of columns – Braced and unbraced columns – Design of short column for axial, uniaxial and biaxial bending – Design of long columns

UNIT V LIMIT STATE DESIGN OF FOOTING AND DETAILING 12

Design of wall footing – Design of axially and eccentrically loaded rectangular footing – Design of combined rectangular footing for two columns only – Standard method of detailing RC beams, slabs and columns – Special requirements of detailing with reference to erection process.

TOTAL: 60 PERIODS**TEXT BOOKS**

1. Varghese, P.C., "Limit State Design of Reinforced Concrete", Prentice Hall of India, Pvt. Ltd., New Delhi 2002.
2. Krishna Raju, N., "Design of Reinforced Concrete Structures", CBS Publishers & Distributors, New Delhi, 2003.

REFERENCES

1. Jain, A.K., "Limit State Design of RC Structures", Nemchand Publications, Rourkee
2. Sinha, S.N., "Reinforced Concrete Design", Tata McGraw-Hill Publishing Company Ltd., New Delhi.
3. Unnikrishna Pillai, S., Devdas Menon, "Reinforced Concrete Design", Tata McGraw-Hill Publishing Company Ltd., New Delhi.

MICRO LESSON PLAN

CE2306 - DESIGN OF RC ELEMENTS

Week	Hrs	Lecture Topics	Book	
UNIT I - METHODS OF DESIGN OF CONCRETE STRUCTURES				
I	1	Concept of Elastic method, ultimate load method and limit state method	T-1	
	2	Advantages of Limit State Method over other methods		
	3-5	Design codes and specification		
II	6	Limit State philosophy as detailed in IS code		
	7-9	Design of flexural members and slabs by working stress method		
	10	Principles of Design of Liquid retaining structures		
III	11	Properties of un-cracked section		
	12	Calculation of thickness and reinforcement for Liquid retaining structure		
UNIT II - LIMIT STATE DESIGN FOR FLEXURE				
III	13-15	Analysis and design of one way rectangular slab		R-2
IV	16-18	Analysis and design of two way rectangular slab subjected to uniformly distributed load for various boundary conditions and corner effects		
	19-21	Analysis and design of singly and doubly reinforced rectangular beams		
V	22-24	Analysis and design of singly and doubly reinforced flanged beams		
UNIT III - LIMIT STATE DESIGN FOR BOND, ANCHORAGE SHEAR & TORSION				
V	25-27	Behaviour of RC members in bond and Anchorage	R-2	
VI	28-30	Design requirements as per current code		
	31-33	Behaviour of RC beams in shear and torsion		
VII	34-36	Design of RC members for combined bending shear and torsion		

UNIT IV - LIMIT STATE DESIGN OF COLUMNS			
VIII	37	Types of columns	R-2
	38-39	Braced and un-braced columns	
IX	40-42	Design of short column for axial bending	
	43-45	Design of short column for uniaxial and biaxial bending	
X	46-48	Design of long columns	
UNIT V - LIMIT STATE DESIGN OF FOOTING AND DETAILING			
X	49-51	Design of wall footing	R-2
XI	52-54	Design of axially and eccentrically loaded rectangular footing	
	55-57	Design of combined rectangular footing for two columns only	
XII	58	Standard method of detailing RC beams, slabs and columns	
	59-60	Special requirements of detailing with reference to erection process	

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