

1151CE109 (VTUR15)	DESIGN OF RC ELEMENTS	L	T	P	C
		2	2	0	3

Course Category: Programme Core

A. Preamble :

This course is useful for a detailed study of the techniques applied designing of RC elements

B. Prerequisites

- Nil

C. Links To Other Courses:

- Design of RC and Brick Masonry Structures

D. Course Educational Objective:

Upon the successful completion of the course, learners will be able to

- Understand the Concept of Elastic method, ultimate load method, working stress method and limit state method
- Design of flexural structural members under standard specifications within safe limit.
- Gain knowledge on design of footing and detailing.

E. Course Outcome:

Upon the successful completion of the course, learners will be able to

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's)
CO1	Illustrate the Concept and design procedure of Elastic method, ultimate load method and limit state method to design the flexural members.	K2
CO2	Design one way and two way rectangular slab subjected to uniformly distributed load for various boundary conditions	K3
CO3	Design of RC members in bond and Anchorage - shear and torsion - combined bending shear and torsion.	K3
CO4	Classify the types of column and design the column under uniaxial and biaxial bending	K2
CO5	Design the various types of footing under axially and eccentrically loaded point.	K3

F. Correlation of COs with POs

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	L	H	H					H	H	L	M
CO2	L	L	H	H					H	H	L	M
CO3	L	L	H	H					H	H	L	M
CO4	L	L	H	H					H	H	L	M
CO5	L	L	H	H					H	H	L	M

G. Course Content:

UNIT I METHODS OF DESIGN OF CONCRETE STRUCTURES

6+6

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 - Introduction to prestressed concrete.

UNIT II LIMIT STATE DESIGN FOR FLEXURE

6+6

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

UNIT III LIMIT STATE DESIGN FOR BOND, ANCHORAGE, SHEAR AND TORSION

6+6

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

6+6

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

6+6

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: 30 + 30 = 60 Periods

H. Learning Resources

a) TEXT BOOKS

1. Varghese P.C., Limit State Design of Reinforced Concrete, Prentice Hall of India, Pvt. Ltd.2009, New Delhi
2. Ramamrutham.S., Design of Reinforced Concrete Structures, Dhanpat Rai Publishing Company, 2007.

b) REFERENCES

1. Jain A.K., Limit State Design of RC Structures, Nemchand Publications, Roorkee.
2. Krishna Raju N., Design of Reinforced Concrete Structures, CBS Publishers & Distributors, 2012, New Delhi
3. Sinha S.N., Reinforced Concrete Design, Tata McGraw-Hill Publishing Company Ltd., New Delhi.
4. Unnikrishna Pillai S., Devadas Menon Reinforced Concrete Design, Tata McGraw-Hill Publishing Company Ltd., New Delhi.
5. IS: 456-2000, Plain and Reinforced Concrete Code of Practice, Bureau of Indian Standards, New Delhi-110002.
6. SP16: 1980 Design Aids to IS 456:1978

c) ONLINE RESOURCES

1. <http://ce-notes-vg.blogspot.in/2011/05/design-of-reinforced-concrete.html>