	L	T	P	C
III Year I Semester				
Code: 17CE504	**3**	**1**	**0**	**3**

DESIGN OF REINFORCED CONCRETE STRUCTURES

Course Objectives:

1. Familiarize Students with different types of design philosophies
2. Equip student with concepts of design of flexural members
3. Understand Concepts of shear, bond and torsion
4. Familiarize students with different types of compressions members and Design
5. Understand different types of footings and their design

Course Outcomes:

The student must be able to

1. Understand Work on different types of design philosophies.
2. Carryout analysis and design of flexural members and detailing
3. Design structures subjected to shear, bond and torsion.
4. Understand load transfer and design of slabs.
5. Design different type of compression members .
6. Design different type of footings.

SYLLABUS

UNIT –I

Introduction:

a) **Working Stress Method**: Design codes and handbooks, loading standards – Dead, live, wind and earthquake loads, Elastic theory: design constants, modular ratio, neutral axis depth and moment of resistance for balanced, under-reinforced and over-reinforced sections. Design of singly and doubly reinforced beams.

b) Limit State Design: Concepts of limit state design – Basic statistical principles – Characteristic loads –Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress - block parameters – limiting moment of Resistance.

All units i.e. from unit II to unit VI are to be taught in Limit State Design.

UNIT –II

Design for Flexure: Limit state analysis and design of singly reinforced sectionseffective depth-Moment of Resistance- Doubly reinforced and flanged (T and L) beam sections- Minimum depth for a given capacity- Limiting Percentage of Steel- Minimum Tension Reinforcement-Maximum Flexural Steel- Design of Flanged Sections (T&L)- Effective width of flange –Behavior-Analysis and Design.

UNIT – III

Design for Shear, Torsion and Bond: 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: Deflection, cracking and code provision, Design of formwork for beams and slabs.

UNIT – IV

Slabs: Classification of slabs, design of one - way slabs, one way continuous slab using IS Coefficients (Conventional) –Design of two - way slabs-simply supported and various edge conditions using IS Coefficients .

UNIT – V

Design of Compression members: Effective length of a column, Design of short and long columns – under axial loads, uniaxial bending and biaxial bending – Braced and unbraced columns – I S Code provisions.

UNIT –VI

Footings: Different types of footings – Design of isolated footings – pedestal, square, rectangular and circular footings subjected to axial loads, uni-axial and bi-axial bending moments.

NOTE: All the designs to be taught in Limit State Method

Text Books:

1. Limit State Design, A. K. Jain
2. Design of Reinforced concrete Structures, N. Subrahmanyian
3. Reinforced Concrete Structures, S. Unnikrishna Pillai &DevdasMenon, Tata Mc.Graw Hill, New Delhi.

References:

1. R C C Design, B.C Punmia, A. K. Jain and A. K Jain. Lakshmi Publications
2. Reinforced Concrete Structures, N. Krishna Raju& R. N. Pranesh, New Age
3. Publications.

IS Codes:

1. IS -456-2000 Code of practice for Reinforced Concrete Structures (Permitted to use in Examination hall)
2. IS – 875
3. SP-16

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	3	3	2	2	1	1	3	3	2	3
CO2	3	3	3	3	2	3	2	1	2	1	1	3	3	2	3
CO3	3	3	2	3	2	2	2	2	2	2	1	3	3	2	3
CO4	3	2	3	2	2	2	2	2	1	1	2	3	3	1	3
CO5	3	2	3	2	2	2	2	2	1	1	2	3	3	1	3
CO6	3	2	3	2	2	2	2	2	1	1	2	3	3	1	3