III Year-I Semester
(20CE5010) Design & Drawing of Reinforced Concrete Structures

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

Pre- Requisites: Fundamentals of Strength of Materials, Structural Analysis& Concrete Technology

Course Objectives:

- Familiarize Students with different types of design philosophies
- Equip student with concepts of design of flexural members
- Understand Concepts of shear, bond and torsion
- Familiarize students with different types of compressions members and Design
- Understand different types of footings and their design

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 V are to be taught in Limit State Design.

UNIT–II:

Design for Flexure: Limit state analysis and design of singly reinforced sections effective 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.

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–III:

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–IV:

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–V:

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

Course Outcomes:

S.No	COURSE OUTCOMES	BTL
1	Understand Work on different types of design philosophies.	L2
2	Carryout analysis and design of flexural members and detailing Design structures subjected to shear, bond and torsion.	L4
3	Understand load transfer and design of slabs.	L2
4	Design different type of compression members.	L4
5	Design different types of footings.	L4

Correlation of COs with POs& PSOs:

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

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.

Reference Books:

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 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