REINFORCED CONCRETE STRUCTURES- I

Course Code: 13CE1115

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Course Educational Objectives:

- To impart basic concepts of design of individual elements of reinforced concrete structures using limit state and working stress methods.
- To understand the principles of limit state design and design of singly and doubly reinforced beams.
- To enable the students to design columns and footings

Course Outcomes:

- Student will demonstrate an ability to design beams, columns and foundations for given loads.
- Student will be able to design one-way and two-way slabs

UNIT-I (10 Lectures)

INTRODUCTION TO WORKING STRESS METHOD:

Introduction – Design for bending –Analysis and design of singly reinforced and doubly reinforced beams.

UNIT-II (12 Lectures)

INTRODUCTION TO LIMIT STATE DESIGN :

Concepts of limit state design- Characteristic loads-Characteristic strength- Partial loads and Material Safety factors- Representative stress- Strain curves- Assumptions in limit state design – Stress block parameters – Limiting moment of resistance.

SINGLY AND DOUBLY REINFORCED BEAMS:

Limit state analysis and design of singly reinforced, doubly reinforced beams.

UNIT-III (12 Lectures)

FLANGED SECTIONS:

Design of T and L beam sections.

SHEAR, TORSION AND BOND:

Limit state analysis and design of sections for shear and torsion – Concept of bond, anchorage and development length, I.S Code provisions. Design examples in simply supported and continuous beams.

UNIT-IV (15 Lectures))

SLABS:

Design of one way slabs – Two way slabs –Continuous slabs using IS coefficients.

UNIT-V (12 Lectures)

COLUMNS:

Short and long columns – Uni axial loads – Uni - axial bending and bi-axial bending – I.S code provisions.

FOOTINGS:

Footings: Different types of footings–Design of isolated, square, rectangular and circular footings.

NOTE: All the designs to be taught in Limit State Method. Following plates should be prepared by the students.

1. Reinforcement particulars of T-beams and L-beams.
2. Reinforcement detailing of continuous beams.
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, two way and Continuous slabs.

TEXT BOOKS:

1. Pillai & Devdas Menon, *"Reinforced concrete design"*, 3rd Edition, Tata McGraw Hill, New Delhi, 2009.
2. A.K.Jain, *"Reinforced Concrete dDesign"*, 5th edition, Charotor Publications, 2010.

REFERENCES:

1. N.C. Sinha and S.K Roy, *"Fundamentals of Reinforced Concrete"*, 4th Edition, S. Chand publishers, 2002
2. N. Krishna Raju and R.N. Pranesh, *"Reinforced Concrete Design"*, 8th Edition, New age International Publishers, New Delhi, 2004.