

## DESIGN OF REINFORCED CONCRETE STRUCTURES

**B.Tech. III Year I Sem.**  
**Course Code: CE502PC**

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**Pre-Requisites:** Structural Analysis I & II

**Course Objectives:** Structural elements are subjected to different loading to withstand the structures, for external loading we need to design the structures for its safety and serviceability.

**Course Outcomes:** At the end of the course, the student will be able to:

- Design RC Structural elements
  - Design the Reinforced Concrete beams using limit state
  - Design Reinforced Concrete slabs
  - Design the Reinforced Concrete Columns and footings
  - Design structures for serviceability
  - Design staircases, canopy

### UNIT – I

Concepts of RC. Design – Working Stress Method - Limit State method – Material Stress-Strain Curves – Safety factors – Characteristic values. Stress Block parameters – IS – 456 – 2000. **Beams:** Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections

### UNIT – II

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; Design of canopy.

### UNIT – III

Short and Long columns – under axial loads, uniaxial bending and biaxial bending – I S Code provisions.

### UNIT – IV

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

### UNIT - V

Design of one way slab, Two-way slabs and continuous slab Using I S Coefficients Limit state design for serviceability for deflection, cracking and codal provision. Design of dog-egged staircase.

### TEXT BOOKS:

1. Reinforced concrete design by S. Unnikrishna Pillai & Devdas Menon, Tata McGraw Hill, New Delhi.
2. Reinforced concrete design by N. Subrahmanian Oxford University Press.
3. Limit state design of reinforced concrete – P. C. Varghese, Prentice Hall of India, New Delhi.

### REFERENCES:

1. Design of Reinforced Concrete Structures by I. C. Syal and A. K. Goel, S. Chand & company.
2. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers
3. Design of concrete structures – Arthus H. Nilson, World David Darwin, and Charles. Dolar, Tata McGraw-Hill, 3rd Edition, 2005.

