III B.Tech I Semester

15ACE20-DESIGN OF REINFORCED CEMENT CONCRETE STRUCTURES

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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.*

UNIT –I

Introduction: Introduction to Materials, Constituents of concrete, recommendation in IS 456 – 2000, grades of concrete, working stress method, design constants; Design singly reinforced and Doubly Reinforced beams.

UNIT –II

Limit State Design: Concepts of limit state design – Comparison between two methods- 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-Limit state design of singly reinforced, doubly reinforced.

UNIT –III

Beams:, T, L and Continuous beam sections by limit state method.

Shear, Torsion, Bond, & Serviceability: Limit state design of section for shear and torsion – concept of bond, anchorage and development length, Limit state design of serviceability for deflection, cracking and codal provision

UNIT –IV

Slabs:, Design of one way slab - Two-way slab, continuous slab.

UNIT – V

Columns & Footings

Short and long columns – under axial loads, uni-axial bending and **biaxial bending(Not for Examination)**, I S Code provisions. Different types of footings – Design of isolated, square, Rectangular, stepped and sloped footings,

Course Outcomes:

- *Students are able to know the working stress and limit state methods of design.*
- *Students are able to know the design concepts of flexural members.*
- *Students are able to know the design concepts of compression members.*
- *Students are able to know the serviceability requirements of the reinforced cement concrete structure.*
- *Students are able to understand the different types of footings and their design.*

TEXT BOOKS

1. 1.Design of Reinforced Concrete Structures (Limit State) – A.K.Jain, 1st Edition, NemchandBrothers,Roorkee.
2. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt.Ltd., New Delhi.
3. Reinforced concrete structures – I.C. Syal&A.K.Goel, S.Chand Publishers.
4. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

REFERENCE

1. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
2. Reinforced concrete design by S.UnnikrishnaPillai&DevdasMenon, Tata Mc.Graw Hill, New Delhi.
3. Limit state designed of reinforced concrete – P.C.Varghese, Prentice Hall of India, New Delhi..
4. Design of concrete structures – ArthusH.Nilson, David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill, 3rd Edition, 2005.
5. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers.