

3/4 B.Tech. SIXTH SEMESTER

CE6T2 DESIGN AND DRAWING OF CONCRETE STRUCTURES – II Credits: 4

Lecture: 4 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Objectives:

- To design RCC deep beams, different types of slabs, Retaining walls, Footings and also design of some advanced conditions like fire resistance, earthquake resistance.

Learning outcomes:

At the end of course the student will be able to

- Design reinforced concrete structural elements like beams, columns, slabs, footings, piles and pile caps.
- Consider flexure, one way shear, two way shear, torsion, slenderness ratios, active and passive earth pressures, usage of bearing capacity of soils in the design of footings.
- Design and detailing of RCC structures as per code provisions.

UNIT – I

LIMIT STATE OF SERVICEABILITY:

Limit state design for serviceability for deflection, cracking and IS codal provisions.

UNIT – II

DEEP BEAMS:

Introduction-lever arm considerations for simply supported and continuous beams-reinforcement-IS codal provisions.

UNIT – III

FLAT SLABS:

Introduction-Proportioning-Bending moment-Shear-Direct design method-Slab reinforcement-IS codal provisions.

GRID SLABS:

Introduction-Method of design as per IS 456 -Reinforcement detailing.

UNIT – IV

COMBINED FOOTINGS:

Introduction-types-design of combined slab footing, combined beam and slab footing, raft foundation-IS codal provisions.

UNIT – V

RETAINING WALLS:

Types of retaining walls; Forces on retaining walls; Stability requirements; Design and detailing of cantilever type retaining wall and counter fort type retaining wall.

UNIT – VI

DETAILING AND CONSTRUCTION PRACTICES:

Introduction, serviceability failures, reasons for building failures, structural integrity - Design and detailing practices, reinforcement layout, design drawings, construction

details at connections, beam and column joints, construction joints, bar supports and cover, deflection control - Materials and construction practices.

UNIT-VII

DUCTILITY IN EARTHQUAKE RESISTANT DESIGN:

Importance of ductility in seismic design-concepts, computation of ductility, factors affecting ductility, design principles & codal provisions.

UNIT-VIII

FIRE RESISTANCE:

Introduction-factors influencing fire resistance ratings of RC assemblies-code requirements.

Learning resources

Text books:

1. Reinforced Concrete Design, (3rd edition) by Unni Krishna Pillai S. and Devdas Menon, Tata McGraw-Hill, 2012.
2. Reinforced Concrete (Limit State Method) Ashok Jain K., Nemchand & Bros., Roorkee, 2007.

Reference books:

1. Limit State theory and Design of reinforced concrete by Karve, S. R. and Dr. Shah V. L., Pune Vidyarthi Griha Prakasan, Pune, 2012.
2. Limit State Design of Foundations, (2nd edition) by Varghese P.C., PHI Learning Pvt. Ltd., New Delhi., 2008.
3. Advanced design of R.C. Structures, (2nd edition) by Bhavikatti S.S., 2009.
4. Design of concrete structures, (13th edition) by Arther Nilson H., Tata Mc Graw-Hill, 2010.

Web Reference books: NPTEL

IS CODE: IS 456 – 2000. This code is permitted in the examination