

3/4 B.Tech. SIXTH SEMESTER

CE6T1 DESIGN AND DRAWING OF CONCRETE STRUCTURES–II Credits: 3
Lecture: 3 periods/week Internal assessment: 30 marks
Tutorial: 1 period /week Semester end examination: 70 marks

Pre-requisites: Design and drawing of concrete structures I

Learning objectives:

- To design different types of footings, also design of some advanced conditions like, earthquake resistance.
- To have fundamental design concepts of Pre stressed concrete design.

Course outcomes:

At the end of course the student will be able to

1. Design reinforced concrete structural elements like footings and retaining walls
2. Design reinforced concrete elements like flat slabs and grid slabs.
3. Understanding the basics of ductility in earthquake resistant design.
4. Understanding the pre stressed concrete methods
5. Design and detailing of pre stressed concrete members for flexure and shear..

UNIT – I

ISOLATED AND COMBINED FOOTINGS

Different types of footings – Design of isolated, square, rectangular and circular Footings. Combined slab footing – combined beam and slab footing.

RETAINING WALLS

Types, stability of retaining walls, design of cantilever and counter fort retaining walls.

UNIT – II

FLAT SLABS

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

GRID SLABS

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

UNIT – III

DUCTILITY IN EARTHQUAKE RESISTANT DESIGN

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

INTRODUCTION TO PRESTRESSED CONCRETE

General principles of pre stressing, pre tensioning and post tensioning,- Advantages and limitations of pre stressed concrete,- Materials,- High strength concrete and high tensile steel, their characteristics.

UNIT – IV:

METHODS OF PRE STRESSING

IS code provisions, Methods and systems of pre stressing, pre tensioning and post tensioning methods, systems of pre stressing like Hoyer system, Magnel system, Fressinet system , Gifford and Udall system. Different losses in Pre stressed concrete.

UNIT – V:**ANALYSIS OF PRE STRESSED CONCRETE FOR FLEXURE**

Elastic analysis of concrete beams pre stressed with straight, concentric, bent and parabolic tendons.

DESIGN FOR FLEXURE AND SHEAR

Allowable stresses, Design criteria as per code, elastic design of simple rectangular and I- sections for flexure, shear and principal stresses, design for shear in beams.

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.
3. Prestressed concrete by Krishna raju N, (4th edition), Tata Mc Graw-Hill Education Pvt. Ltd., New Delhi.
4. Advanced Reinforced Concrete Design, (2nd edition) by Varghese P.C., PHI Learning Pvt. Ltd., New Delhi., 2008.

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.

e-learning resources:

NPTEL

IS CODE: IS: 456 –2000, IS:1343 -1980 and IS: 1893 (Part1)-2002

These codes are permitted in the examination