DESIGN OF CONCRETE STRUCTURES-I

Lectures / Tutorials : 4 / 1 Periods/Week Sessional marks : 40
Semester End Exam. : 3 Hours Semester End Exam. marks : 60

Credits : 4

Course objectives:

- Course is designed to shape the concrete and use the steel bars for external loads on different building elements.
- To understand the codal recommendations for methods of design
- To understand the analysis and design of singly, doubly and flanged beams
- To understand the design for dog legged stair case
- To understand the design for shear, development length, deflection and cracking

Course outcomes:

- Students can handle the isolated design of individual elements independently
- Indian Standards of approach can be practiced by the student.

UNIT – I

Introduction

Role of structural engineer; Reinforced concrete; Structural elements ; Loads on structures ; Strength and serviceability ; Methods of design ; Codes of practice

Design of beams for Flexure (Working Stress Method)

Assumptions; Permissible stresses in concrete and steel; Transformed section; Analysis and design of beams for flexure of singly reinforced, doubly reinforced and flanged sections.

UNIT-II

Design of beams for Shear and Bond (Working Stress Method)

Shear in a homogeneous beam; Shear in R.C. beams; Diagonal tension and diagonal compression; Design for shear ; Anchorage bond; Flexural bond, Design for bond – Development length

Deflection and Cracking

Span/Effective depth ratio; Calculation of short-term deflection and long term deflection; Cracking; Bar spacing controls.

UNIT-III

Design for Flexure (Limit State Method)

Assumptions; Limit states; Partial safety factors; Modes of failure; Maximum depth of neutral axis; Analysis and design for flexure of singly reinforced, doubly reinforced and flanged sections.

Design of beams for Shear, Bond and Torsion (Limit State Method)

Design for shear ; Design for bond – Development length Torsion – Introduction, Effect of torsion, IS Code provisions.

UNIT-IV

Design and detailing of the following

a) Simply supported and Cantilever beams (Working stress method)

b) Simply supported and Cantilever beams (Limit State method)

c) Dog-legged stair case (Limit State method)

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Reinforced concrete , Vol.1 by H. J. Shah, Charotar publishing house Pvt. Ltd.,2012.

REFERENCES

1. Reinforced Concrete (limit state design) by Ashok K. Jain, 6th Edition, NemChand & Bros., Roorkee
2. Reinforced concrete design by Pillai and Menon, 2nd Edition,Tata Mc Graw- Hill

WEBREFERENCES:

For subject videos refer to www.nptel.iitm.ac.in