

B.E. (Civil) Semester: VI
Subject Name: DESIGN OF REINFORCED CONCRETE STRUCTURES
(CV603)

A. Course Objective:

- To provide a coherent development to the students for the courses in sector of Reinforced Concrete Designing
- To present the foundations of many basic engineering concepts related designing of structures
- To give an experience in the implementation of designing concepts which are applied in field of structural engineering
- To involve the application of scientific and technological principles of design of buildings according to limit state method of design

B. Teaching /Examination Scheme

Teaching scheme				Total Credit	Evaluation Scheme					Total
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract/ Tut.	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
04	02	00	06	06	03	70	30	20	30	150

C. Detailed Syllabus:

UNIT-I Introduction to Designing Process and Design Material

- Structural Layout – Analysis – Designing – Detailing
- Stress – Strain Curves for Concrete and Steel, Grade of Steel, Grade of Concrete
- Function of Concrete and Steel in RC Structures, Under Reinforced Section, Over Reinforce Section

UNIT-II Introduction to Design Methods

- Working Stress Method – Introduction, Assumptions
- Ultimate Strength Method – Introduction, Assumptions
- Limit State Method – Introduction, Assumptions

UNIT-III Design of Slab

- Function of slab, Types of Slab (One – Way Slab, Two – Way Slab, Flat Slab, Continuous Slab)

- Design of One – Way Simply Supported Slab, One – Way Continuous Slab (With appropriate checks)
- Design of Two – Way Simply Supported Slab, Continuous Slab (With appropriate checks)
- Design of Straight Staircase Slab

UNIT IV Design of Beam

- Function of Beam, Types of Beam (Singly Reinforced Beam, Doubly Reinforced Beam, Flanged Beam)
- Calculation of Moment Carrying Capacity of Beam Section
- Design (Flexure, Shear & Torsion) of Rectangular and Flanged beam, Singly Reinforced Section and Doubly Reinforced Section (With appropriate checks)

UNIT V Design of Column

- Function of Column, Types of Column (Short Column & Long Column)
- Design of Axially Loaded Short Column
- Generation of $P_u - M_u$ Interaction Diagram
- Design (Flexure & Shear) of Axially Loaded Column, Uni – Axially Loaded Column, Bi – Axially Loaded Column

UNIT VI Design of Foundation

- Function of Foundation, Types of Foundation
- Design (Flexure and Shear) of Isolated Column Footing & Combined Footing

NOTE: All Designs will be according to Limit State Method

D. Lesson Planning

Unit no	Title of the Unit	Minimum Hours	Weightage (%)
I	Introduction to Designing Process and Design Material	02	03
II	Introduction to Design Methods	06	09
III	Design of Slab	11	19
IV	Design of Beam	15	25
V	Design of Column	15	25
VI	Design of Foundation	11	19
TOTAL		60	100

E. Instructional method and pedagogy (Continuous Internal Assessment Scheme) (CIA)

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures and practical which carries marks.
- At regular intervals assignments will be given. Students should submit all assignments during given period.
- Classroom participation and involvement in solving the problems in Tutorial rooms carries marks
- Internal exam of 30 marks will be conducted as a part of mid semester evaluation.
- Experiments shall be performed in the field related to course contents.
- The course includes a practical, where students have an opportunity to build an appreciation for the concept being taught in lectures.

F. Students Learning Outcomes:

- The students will gain an experience in the implementation of designing on engineering concepts which are applied in field Structural Engineering.
- The students will get a diverse knowledge of design practices applied to real life problems

G. Term Work

Minimum 10 examples on each element design
(Excel Sheet is Compulsory for each element design)

H. Recommended Study Materials

A. Reference Books and IS Codes:

1. Shah and Kurvey; Limit State theory & Design of Reinforced Concrete
2. Dr. B.C.Punamia, A.K. Jain; RCC Designs; Laxmi Publication
3. S.N.Sinha ; Reinforced Concrete Design, Tata McGrawhill
4. A.K.Jain; Design of Concrete Structures, Nemchand Publication
5. IS: 456
6. IS 875 (Part 1, 2,)
7. SP 16

B. Web Materials:

1. <http://www.cdeep.iitk.ac.in/nptel>
2. <http://www.nptel.iitm.ac.in>