

B.E. Semester: VII
Department of Civil Engineering

Subject Name: Detailing of RCC and Steel Structures (CV704-N-A)

Course Category: Program Course Elective – III(PCE)

A. Objectives of the Course:

- To equip students to understand basic requirements to enable to prepare neat and proportionate sketches to detail various structural members and connections between them
- To enable students to prepare neat drawings giving details, following sound engineering practices
- To enable students to guide, supervise and inspect the work carried out by draughtsman involved in preparing structural drawings
- To enable the students to identify the idealization of connection with respect to erection practices, its importance and its feasibility at site,
- To enable the students to understand the importance of splices in detailing of steel structures

B. Teaching & Evaluation Scheme:

Teaching Scheme				Credit	Evaluation Scheme					Total Marks
L	T	P	Total		Theory		IE	CIA	Pra/Viva	
hrs	hrs	hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
3	2	0	5	5	3	70	30	20	30	150

C. Detailed Syllabus:

1. Introduction:

Consequences due to Inadequate or Improper Detailing, General Detailing Requirements – cover, development length,

2. Detailing of Basic RC Structural Elements:

Detailing of Slab (One – Way Simply Supported, One – Way Continuous Slab, Two – Way Simply Supported Slab and Two – Way Continuous Slab and Cantilever Slab),

Detailing of Cross Section and Longitudinal Sections of Beams (Simply Supported Beam, Fixed Beam, Propped Cantilever Beam and Continuous Beam)

Detailing of Column

Detailing of Isolated Sloped Footing and Combined Footing

Detailing of Various Types of Stairs

Notes and Specifications

3. Detailing of RC Walls, Deep Beams and RC Brackets:

Behaviour of RC Walls, Deep Beams and RC Brackets, Detailing of Retaining Wall, Detailing of Lift Wall, Detailing of Corbels and Brackets

4. Detailing of Steel Elements:

Detailing of Truss with Welded Connections, Detailing of Truss with Bolted Connections, Detailing of Various Beam to Beam, Column to Beam, Column to Foundation, Beam to Slab Connections, and Introduction and Importance of various drawings prepared for steel structures like shop drawings, Structural Drawings, Fabrication Drawings etc., Idealization of Connection with respect to Erection Practices, Importance of Weld Connection and its Feasibility at Site, Introduction and Importance of Splices in Detailing

5. Principals of Design and Detailing of Formwork and Scaffolding:

Introduction, requirements of Good Formwork, Materials of Formwork, Choice of Formwork, Loads on Formwork, Concepts in Design of Formwork, Sketches for Formwork and shuttering for slabs, beams, columns and Sketches for Truss Type Shuttering for Flyovers

NOTE: All Designs will be according to Limit State Method as per IS 800, 2007

D. Lesson Planning:

Unit No	Title of the Unit	Minimum Hours	Weightage (%)
1	Introduction	01	05
2	Detailing of Basic RC Structural Elements	18	40
3	Detailing of RC Walls and RC Brackets	06	10
4	Detailing of Steel Elements	14	30
5	Principals of Design and Detailing of Formwork and Scaffolding	06	15
Total		45	100

E. Assignments:

- Draw neat sketches for each of the above individual RC elements in graph papers
- Collect and study drawings for various RC buildings from practicing engineers
- Prepare all necessary drawing sheets for (G + 2) RC frame residential building
- Collect and study drawings for various industrial steel roof trusses and buildings from practicing engineers
- Collect and study drawings for various industrial steel buildings from practicing engineers
- Prepare Drawing sheet for industrial steel roof truss for bolted connections
- Prepare Drawing sheet for industrial steel roof truss for welded connections
- Draw neat sketches for each of the connections for steel building elements in graph papers
- Draw neat sketches for form work and scaffolding for various RC elements in graph papers and also draw sheet for truss type scaffolding

NOTE: Graph Papers must be of A3 size

Use of any Drafting Software is NOT allowed until manual drawings are submitted

F. 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, practical and Tutorial which carries 05 Marks.
- At regular intervals assignments is given. In all, a student should submit all assignments of 05 marks each.
- Classroom participation and involvement in solving the problems in Tutorial rooms carries 05 Marks.
- Viva Voce will be conducted at the end of the semester of 05 Marks.
- One internal exam of 30 marks is conducted as a part of Mid Semester evaluation.

G. Students Learning Outcomes:

On the successful completion of this course

- students will understand basic requirements of detail various structural members and connections
- students will learn how to prepare drawings giving details, following sound engineering practices
- students will be able to guide, supervise and inspect the work carried out by draughtsman involved in preparing structural drawings

H. Recommended Study Materials:

a. Text book & Reference Books:

1. Reinforced Concrete Detailing by John A. Barker
2. Structural Detailing in Concrete by M. Y. H. Bangash
3. ACI 315: Manual of Standard Practice for Detailing of Reinforced Concrete Structures
4. Detailing of Concrete Structures for Fire Resistance, The Institute of Structural Engineers, United Kingdom
5. Reinforced Concrete Detailer's Manual by Brian Boughton
6. Standard Method of Detailing Structural Concrete, A Manual for Best Practice 3rd Edition, June 2006

7. Seismic Detailing of Concrete Buildings by David A. Fanella, Portland Cement Association (PCA)
8. Specialist Course on “Detailing of Reinforced Concrete Structures” OCT 12 to 17, 1995. Prof. S. K. Kaushik&Er. J. H. Chhadda, Indian Concrete Institute, Uttar Pradesh Local Centre, Roorkee
9. Proceedings of Workshop on “Detailing of Reinforced Concrete Structures” Vol.1 21-22nd April, 1986, Institute of Engineers (India) Roorkee Local Centre
10. Reinforced Concrete Structures by R. Park and T. Paulay, A Wiley – Interscience Publication, John Willey & Sons
11. Manual for Detailing Reinforced Concrete Structures to EC2 by Jose Calavera

b. Web Materials:

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

c. Indian Codes of Practice and Other Standards:

1. SP: 34 (S & T) – 1987: Handbook on Concrete Reinforcement and Detailing. Bureau of Indian Standards, S & T/1987

