

B.E. Semester: V

Department of Civil Engineering

Subject Name: Advanced Construction Technology – I (CV501-N)

Course Category: Program Course Core (PCC)

A. Objectives of the Course:

- To give an experience in the implementation of new technology concepts applied in the field of advanced construction.
- To study different methods of construction to successfully achieve the structural design with recommended specifications
- To involve the application of scientific and technological principals of planning, analysis, design and management to construction technology
- To study of construction equipments and temporary works require to facilitate the construction process
- To provide a coherent development to the students for the courses in sector of advance construction technology

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	1	0	4	4	3	70	30	20	30	150

C. Detailed Syllabus:

1. Special Formwork:

Introduction to IS 14687, Proprietary Formwork (PERI, DOKA, ACROW or equivalent brands), Modular Formwork, Permanent Formwork (Lost Formwork), Tunnel Formwork, Aluminium Formwork, Jump Formwork, Slip Formwork

2. Precast Concrete Technology:

Classification of Precast Concrete Elements, Advantages and Disadvantages, Types of Precast Concrete Non-Building Elements (Manufacturing Process, Casting Yard Set up and Facilities, Uses, Installation and IS Standards), Types of Precast Concrete

Building Elements and its Fabrication (Casting Yard Set up – Facilities and Equipments), Application and Installation Including all Points to be Considered such as Marking, Lifting, Placing etc., Joints in Precast Buildings

3. Construction of Steel Structures:

Introduction to Various steel Sections Available as per IS Standards, Built-Up Section, Collection of Structural and Fabrication Drawing, Understanding of Detailing and Fabrication Drawing, Fabrication and Marking of Various Steel Building Elements, Lifting and Placing of Steel Building Elements, Fabrication of Steel Columns, Truss, Girders, Gantry Girders, Riveted and Welded Connections

4. Industrial Roof and Flooring:

Vacuum Dewatered Concrete, IPS Water Proofing, Types of Roofs, Profile Roofing, Industrial Flooring, Mezzanine Floor, Composite Flooring, Profile Roofing, Shear Connectors, Wind Bracing, Cleat and Purlins

5. Construction of Special Foundations:

Dewatering System: Pumping Well Points, Bored Wells, Electro – Osmosis, Injection with Cement, Clays and Chemical, Freezing Process, Vibro – Flotation, Construction of Pile Foundation - Introduction, Types of Piles, Pile Cap and Pile Shoe, Pile Driving, Pulling of piles, Loads on Piles, Causes of Failures of Piles, Reverse and Direct Mud Circulation Method, Pile Driving Formulas, Bentonite and Polymer for Soil Stabilisation in Piles, Construction of Raft Foundation, Diaphragm Wall Construction, Pore Pressure Release in Raft, Well Foundation, Tremie Concreting, Jack Down Method, Temperature Measurement and Control in Mass Concreting

D. Lesson Planning:

Unit No	Title of the Unit	Minimum Hours	Weightage (%)
1	Special Formwork	11	23
2	Precast Concrete Technology	11	23
3	Construction of Steel Structures	09	21
4	Industrial Roof and Flooring	05	12
5	Construction of Special Foundations	09	21
Total:		45	100

E. List of Practical/Assignments:

- Minimum 5 theory questions on each topic
- Reports on site visits for each non – building precast elements
- Case study and presentation on casting of precast segmental super structures
- Case study and presentation on casting of precast beam and box girder
- Major case study and presentation on precast building and stadiums
- Case study and presentation on each formwork method
- Case study and presentation on dewatering
- Case study and presentation on construction of each type of foundation
- Case study and presentation on industrial roofing including truss supporting system
- Case study and presentation on erection of industrial structure (beam column type) including gantry girder

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 carry 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

- The students will gain an experience in the implementation of new construction technology on engineering concepts which are applied in field of advanced construction technology.

- The students will get a diverse knowledge of advanced technology practices applied to real life problems
- The students will learn to understand the theoretical and practical aspects of new technology in civil engineering along with design and management applications

H. Recommended Study Materials:

a. Text book & Reference Books:

1. S.P. Arora & S.P. Bindra, A Text Book of Building Construction, Dhanpat Rai & Sons, New Delhi
2. S.K. Sarkar and S. Saraswati, Construction Technology, Oxford University Press, New Delhi
3. B.C. Punamia, Building Construction, Laxmi Publications, New Delhi
4. S.C. Rangwala, Building Construction, Charotar Publication Pvt Ltd. Anand
5. R. Chudley, Construction Technology Vol. I, II, III, IV, Longman Group Limited, London, 1st Edition, 1977
6. R. Chudley (revised by R. Greeno), Building Construction Handbook, Addison Wesley, Longman Group, England, 3rd ed., 1999
7. S.S. Ataev, Construction Technology, Mir Publishers, Moscow, 1985
8. Foundation Design and Construction by M. J. Tomlinson
9. Pile Design and Construction Practice by M. J. Tomlinson, Fourth Edition, E & FN Spon
10. Construction, Planning, Equipment and Methods by R.L.Peurifoy
11. Formwork for concrete structures by Jha, Kumar Neeraj Published by : McGraw Hill Education (India) Pvt. Ltd. (New Delhi)

b. Indian Standards:

1. IS: 456: 2000 Plain and Reinforced Concrete Code of Practice
2. IS 875 (Part 1): 1987 Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures – Dead Loads – Unit Weights of Building Materials and Stored Materials
3. IS 875 (Part 2): 1987 Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures – Imposed Loads
4. IS 14687: 1999 False Work for Concrete Structures – Guide lines
5. IS: 2750: 1964 Specification for Steel Scaffoldings

6. IS: 15916 – 2011, Building Design and Erection Using Pre Fabricated Concrete – Code of Practice
7. IS: 458: 2003, Precast Concrete Pipes (With and Without Reinforcement) – Specifications
8. IS: 784: 2004, Prestressed Concrete Pipes (Including Specials) – Specifications
9. IS: 12592: 2002, Precast Concrete Manhole Cover and Frame – Specifications
10. IRS T39:2016 Indian Railway Standards Specification for Pre-tensioned and Prestressed Concrete Sleepers for Broad gauge and Metre gauge

c. Web Materials:

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