COURSE HANDOUT

DESIGN OF R.C.C STRUCTURE (CE-501)

B.E. (Civil) – V Semester

ACADEMIC YEAR (2024-25)

Mr. Abhishek Chandra

Asst. Professor

Department of CIVIL Engineering

Department of Civil Engineering

Model Institute of Engineering & Technology (Autonomous)

Kot Bhalwal, Jammu - 181122

www.mietjmu.in

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
CE-501	Design of RCC Structures	PCC	5	4	1	0	50	100	150

COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	Formulate RCC beams using limit state method.
CO2	Analyze the flexural member for shear, bond and torsion.
CO3	Interpret RCC slab and detailing using limit state method.
CO4	Design of RCC columns and footing using limit state method.
CO5	Describe the various construction techniques for High Rise Buildings.

Unit-I

Design stress-strain curve of concrete and reinforcing steel, Fundamental concepts of design of RC members (design philosophies): Working stress method and limit state method, Introduction to various related IS codes. Limit state design analysis and design of singly reinforced, doubly reinforced rectangular beams and flanged beams for flexure using codal provisions.

(10 Hrs)

Unit-II

Limit state of collapse in shear: Analysis and design for shear reinforcement and its detailing. Limit state of serviceability for deflection: control of deflection as per codal provisions of empirical coefficients. Limit state of collapse in bond, concept of bond stress, anchorage length and development length. Detailing and curtailment of reinforcement as per codal provisions.

(10 Hrs)

Unit III

Torsion: Analysis and Design of beams for torsion as per codal method. Slabs: Analysis and design of one way and two way slabs using LSM, Detailing of reinforcement. Check for shear and deflection

(10 Hrs)

Unit- lV

Columns: Analysis and design of axially loaded short columns using LSM for axial load and axial plus uniaxial moment. Introduction to Pu- Mu interaction curves and their use for eccentrically loaded columns**.** Footings: Analysis and design of isolated column footing for axial load. Introduction to combined footing for two columns.

(12 Hrs)

Unit V

High Rise Structures: Construction techniques for high rise buildings, chimneys, dams. Special problems of high-rise construction, Fire Resistance in Structures: Fire hazards in buildings and preventive measures, Low Cost Housing: Types, Design and advantages. Special Constructions: Pre-Cast and Pre-Fabricated Construction and Modular Construction.

(12 Hrs)

Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Reinforced Cement	Neelam Sharma	Katson books	2nd edition (2017)

	concrete design			
2	Reinforced Concrete Design	Pillai and Menon	Tata McGraw-Hill	3rd edition (2017)

Reference Books

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Design of Reinforced Concrete Structures	P.Dayaratnam	Oxford & IBH Pub	5th edition (2017)
2	Reinforced Concrete	I.C.Syal&A,K,Goel	S Chand Publishing	4th edition (2003)
3	Reinforced Concrete Design	S.N.Sinha	Tata McGraw-Hill	3rd edition (2017)

COURSE PLAN		
Unit-I Introduction to RCC Structures		
S.No	**Topics**	**Recommended Books**
1	Design philosophies:- Limit State Method knowledge of working stress method, Ultimate Load Method and Limit State Method in detail and its statistical back ground	Book 1, Ch.1
2	Knowledge of working stress method and Ultimate Load Method, its statistical back ground	Book 1, Ch.1
3	Analysis of singly reinforced beam by Limit state method.	Book 1, Ch.1
4	Design of singly reinforced beam by Limit state method	Book 2, Ch.2
5	Analysis of doubly reinforced beam by Limit state method	Book 2, Ch.2
6	Design of doubly reinforced beam by Limit state method	Book 2, Ch.2
7	Analysis of T-beam by Limit state method.	Book 2, Ch.2
8	Design of T-beam by Limit state method.	Book 2, Ch.2
9	Analysis of Cantilever beam by Limit state method	Book 2, Ch.2
10	Design of Cantilever beam by Limit state method	Book 2, Ch.2
Unit-II Design of Beams for deflection and shear		
11	Introduction to Limit state of collapse in shear	Book 2, Ch.2
12	Analysis for shear reinforcement and its detailing	Book 2, Ch.2
13	Design for shear reinforcement and its detailing	Book 2, Ch.2
14	Limit state of Serviceability for deflection	Book 2, Ch.2
15	Control of deflection as per codal provisions of empirical coefficients.	Book 2, Ch.2
16	Introduction to Limit state of collapse in bond,	Book 2, Ch.2
17	Design of Limit state of collapse in bond	Book 2, Ch.2
18	Concept of bond stress, anchorage length and development length.	Book 2, Ch.2

19	Detailing of reinforcement as per codal provisions	Book 2, Ch.3
20	Curtailment of reinforcement as per codal provisions	Book 2, Ch.3
	Unit-III Design of Slabs	
21	Introduction to Torsion in beams	Book 2, Ch.4
22	Analysis of beams for torsion	Book 2, Ch.4
23	Codal Provision for the Design of beams for torsion	Book 2, Ch.4
24	Design of beams for torsion as per codal method	Book 2, Ch.4
25	Introduction to One way slab	Book 2, Ch.4
26	Analysis of One way Slabs	Book 2, Ch.4
27	Design of one way Slab	Book 2, Ch.4
28	Introduction to Two way slab	Book 2, Ch.4
29	Analysis of Two way Slabs	Book 2, Ch.4
30	Design of Two way Slab	Book 2, Ch.4
31	Detailing of reinforcement. Check for shear and deflection	Book 2, Ch.4
	Unit-IV Design of Columns	
32	Introduction to Columns	Book 2, Ch.5
33	Analysis of axially loaded short columns using LSM for axial load	Book 2, Ch.5
34	Design of axially loaded short columns using LSM for axial load	Book 2, Ch.5
35	Design of axially loaded short columns using LSM for axial plus uniaxial moment	Book 2, Ch.5
36	Introduction to Pu- Mu interaction curves	Book 2, Ch.5
37	Design of eccentrically loaded long columns	Book 2, Ch.5
38	Introduction to Footings	Book 2, Ch.5
39	Analysis of isolated column footing for axial load	Book 2, Ch.5
40	Design of isolated column footing for axial load	Book 2, Ch.5
41	Introduction to combined footing for two columns	Book 2, Ch.5
	Unit-V Design of Column Bases	
42	Introduction of High Rise Structures	Book 2, Ch.9
43	Construction techniques for high rise buildings, chimneys, dams	Book 1, Ch.9
44	Special problems of high- rise construction	Book 2, Ch.9
45	Fire Resistance in Structures: Fire hazards in buildings and preventive measures	Book 1, Ch.9
46	Low Cost Housing introduction and Techniques	Book 2, Ch.9
47	Types, Design and advantages of Low cost housing	Book2, Ch. 11
48	Introduction to Special Constructions	Book2, Ch. 11
49	Pre-Cast and Pre-Fabricated Construction	Book2, Ch. 11
50	Modular Construction techniques and advantages	Book2, Ch. 11

ADDITIONAL WEB RESOURCES

1.	**NPTEL:** Video lectures on Design of Reinforced Concrete structures Lecture series by Prof. N. Dhang Department of Civil Engineering, IIT Kharagpur NPTEL :: Civil Engineering - Design of Reinforced Concrete Structures NPTEL :: Civil Engineering - Design of Concrete Structures

GRADING AND ASSESSMENT

- **Sessional Test**: 20 marks
- **Assignment**: 20 marks
- **Attendance**: 10 marks
- **Final Examination**: 100 marks

COURSE POLICIES

- **Attendance**: Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity**: MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions**: Assignments and projects must be submitted by the specified timelines.

FACULTY INFORMATION

- **Office Hours**

  Monday (12:05 PM - 12:55 PM)
  Friday (12:05 PM - 12:55 PM)

- **Contact Information**
  abhishek.civ@mietjammu.in