

Course Code	Course Title	L	T	P	C
20SE005	ADVANCED REINFORCED CONCRETE DESIGN	3	0	3	5

PRE-REQUISITE COURSES: DESIGN OF REINFORCED CONCRETE STRUCTURES

COURSE OBJECTIVES:

The aim of this course is to keep students upto date with various advanced design. The students will be familiar with the limit state design of RCC beams and columns, and design special structures such as Deep beams, Corbels, Deep beams, and Grid floors as per Indian standard.

COURSE OUTCOMES:

At the end of the course student will be able to

CO's	Course Outcomes	PO's
1	To design the strength and serviceability of reinforced concrete elements.	1,2
2	Design special Reinforced Concrete elements such as deep beams, corbels, shear wall and grid floors	1,2
3	Analyse and design of slabs and grid floor	2
4	To design the inelastic behaviour of concrete beams	1,2
5	Analyse and design the RC structures using software packages.	3

SKILLS:

- ✓ Ability to design of reinforced concrete beam
- ✓ Ability to design of reinforced concrete slab
- ✓ Ability to analysis and design of multi storey building and Industrial building

UNIT-I:

DESIGN OF RC ELEMENTS AND SERVICEABILITY CRITERIA: Limit State Design - Beams, Slabs, Columns and Shear, according to IS Codes - Calculation of deflection and crack width according to IS Code.

UNIT –II:

DESIGN OF SPECIAL RC ELEMENTS: Design of RC walls – Ordinary and shear walls – Design of corbels – Design of deep beams, detailing of Deep Beams.

UNIT-III:

FLAT SLABS AND GRID FLOOR: Design of flat slabs and flat plates – Limitations - Analysis and design of Grid floors -Yield line analysis of slab- Development length of reinforcement.

UNIT-IV:

INELASTIC BEHAVIOUR OF CONCRETE BEAMS: Moment – Curvature ($M - \phi$) relation of Reinforced Concrete Sections - Moment redistribution – Advantages and Disadvantages of Moment Redistribution.

UNIT-V:

DESIGN LOADS OTHER THAN EARTHQUAKE LOADS: Dead Loads – Imposed Loads (IS 875 Part 2) – Loads due to Imposed Deformations – General Theory of Wind Effects on Structures. Application of software packages and computer programming.

TEXT BOOKS:

1. Varghese. P.C., “Advanced Reinforced Concrete Design”, Prentice Hall of India, 2008.
2. Varghese. P.C., “Design of Reinforced Concrete Structures”, Prentice Hall of India, 2004.
3. Krishna Raju. N., “Advanced Reinforced Concrete Design”, CBS Publishers and Distributors, 2007.
4. Unnikrishna Pillai and Devdas Menon ,Reinforced Concrete Design, Tata McGraw Hill Publishers Company Ltd., New Delhi, 2006.
5. Punmia B.C, Ashok Kr. Jain, Arun Kr. Jain, RCC Designs (Reinforced Concrete Design) , 10th Edition, Lakshmi Publishers, 2006.

REFERENCES:

1. Park & Paulay , “Reinforced Concrete”, Robert Publisher,1975
2. Ashok.K. Jain, Nem Chand & Bors. “Reinforced Concrete”, Tata McGraw-Hill Publishing Company Limited, New. Delhi, 2003.
3. Sinha. N. C. and Roy S. K., “Fundamentals of Reinforced Concrete”, S. Chand and Company Limited, New Delhi, 2003.

LABORATORY EXPERIMENTS

List of Experiments:

Any 6 of the following experiments are to be carried out:

1. Testing of Simply Supported Reinforced Concrete beams for flexure
2. Testing of Simply Supported Reinforced Concrete beams for shear
3. A study of behavior of under-reinforced and over-reinforced beams
4. A study on the effect of span to depth ratio on the failure pattern of RC beams
5. A study of the effect of pre-stressing on the flexural behavior of beams
6. Analysis and design of simply supported beams, cantilever beams and fixed beams by using STAAD Pro
7. Analysis and design of multi storey buildings by using STAAD Pro
8. Analysis and design of Industrial building by using STAAD Pro
9. Calculation of wind load as per IS 875 Part III by using EXCEL.