Course Code	Course Title	L	T	P	C
17CE005	ADVANCED REINFORCED CONCRETE DESIGN	3	0	3	5

Course Objectives:

1. To make the students be familiar with the limit state design of RCC beams and columns.
2. To design special structures such as Deep beams, Corbels, Deep beams, and Grid floors
3. To make the students confident to design the flat slab as per Indian standard.

Course Outcomes:
At the end of the course student will be able

1. Acquire knowledge on strength and serviceability of reinforced concrete elements.
2. Design special Reinforced Concrete elements such as deep beams, corbels, shear wall and grid floors.
3. Analyse and design the RC structures using software packages

Activities:
1. Design of reinforced concrete beam (Singly/Doubly)
2. Design of reinforced concrete slab (one-way/Two-way).
3. Analysis and design of multi storey buildings and Industrial building
4. Calculation of wind load as per IS 875 Part III.

Skills:
1. Ability to design of reinforced concrete beam
2. Ability to design of reinforced concrete slab
3. 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 and columns 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

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

UNIT-IV: Inelastic Behaviour of Concrete Beams
Moment – Curvature (M - φ) 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. P.C.Varghese, "Advanced Reinforced Concrete Design", Prentice Hall of India, 2008
2. N. Krishna Raju, "Advanced Reinforced Concrete Design", CBS Publishers and Distributors, 2007.
3. Punmia B.C, Ashok Kr. Jain, Arun Kr. Jain, "RCC Designs (Reinforced Concrete Design)" , 10th Edition, Lakshmi Publishers, 2006

REFERENCE BOOKS:
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

LABORATORY EXPERIMENTS

List of experiments:

Any 6 of the following experiments are to be carried out

1. Design of High Performance Concrete Mix
2. Strength test, Durability test, NDT.
3. Testing of Simply supported reinforced concrete beams for flexure.
4. Testing of Simply supported reinforced concrete beams for shear
5. Wind Analysis and design of multi storey buildings by using STAAD Pro
6. Analysis and design of earthquake resistant buildings by using STAAD Pro
7. Analysis and design of Industrial building by using STAAD Pro
8. Drawing and detailing of Beam/Column/Slab
9. Calculation of wind load as per IS 875 Part III by using Excel.