ELEVTIVE SUBJECTS
(CE507) ADVANCED REINFORCED CONCRETE DESIGN

Objective of the Course:
The main objective of is to provide students with a rational basis of the design of reinforced concrete members and structures through advanced understanding of material and structural behavior.

UNIT-I:
Serviceability design of Reinforced Concrete Elements
Deflection of Reinforced Concrete Beams and Slabs: Introduction, Short-term deflection of beams and slabs, deflection due to imposed loads, short-term deflection of beams due to applied loads, Calculation of deflection by IS 456. Estimation of Crack width in Reinforced Concrete Members: Introduction, Factors affecting crack width in beams, Calculation of crack width, simple empirical method, estimation of crack width in beams by IS 456, Shrinkage and thermal cracking.

UNIT-II:
Design of Flat Slabs
Direct Design Method- Distribution of moments in column strips and middle strip-Moment and shear transfer from slabs to columns-Shear in flat slabs-Check for one way shear- Introduction to the equivalent frame method. Limitations of direct design method-
Distribution of moments in column strips and middle strip.

UNIT-III:
Design of Reinforced Concrete Members for Fire Resistance
Introduction, ISO 834 standard heating conditions, grading or classifications, effect of high temperature on steel and concrete, the effect of high temperatures on different types of structural members, fire resistance of structural detailing from tabulated data, analytical determination of the ultimate bending moment, capacity of reinforced concrete beams under fire, other considerations.

UNIT-IV:
Design of RC elements
Design of Shear Walls: Analysis of shear walled structures, end-zone resisting moment: Truss Models: Design of Stair Slabs, Sizing: Stair Slabs spanning in the transverse direction, Stair slabs spanning longitudinally: Design of Grid Floor.

UNIT-IV:

Ductile Detailing of RC Elements

Detailing, Increased values of a seismic effect for vertical and horizontal projections, Proposed changes in IS1893 (Fifth revision). Ductile Detailing of Frames for Seismic Forces: Introduction, General principles, Factors that increase ductility, Specifications for material for ductility, ductile detailing of beams – Requirements.

TEXT BOOKS:

1. "Advanced Reinforced Concrete Design" by P.C.Varghese, 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. "Reinforced Concrete" by Park & Paulay , Robert Publisher,1975

2. "Reinforced Concrete", Ashok.K. Jain, Nem Chand & Bors. Tata McGraw-Hill Publishing Company Limited, New. Delhi, 2003