PLAIN & REINFORCED CONCRETE-II

Course Code	Credit Hours
CE 310	3-1

Course Description

This course provides the knowledge and understanding of concrete as a structural material. Being second course in the area, the course introduces students with advanced properties and characteristics of hardened concrete. The course covers the importance of quality control to implement good concrete making practices. Advanced concrete properties like shrinkage and creep are covered in details and students are made to understand time dependent deformations in concrete. This course provides the knowledge and understanding of analysis and design of reinforced and pre-stressed concrete structures. This course aims to provide an understanding of, fundamentals of bond anchorage and development length; behavior and design of beams including design for shear; behavior and design of two-way slabs; behavior and design of eccentrically loaded short columns, an introduction to pre-stressed concrete with understanding of materials behavior and analysis of pre-stressed beams; and an introduction to precast concrete, and precast concrete structures.

Text Book:

1. Design of Concrete Structures (Latest Edition), by Arthur H. Nilson, David Darwin, and Charles W. Dolan, McGraw-Hill, New York, NY 10020.
2. ACI Building Code Requirement for reinforce concrete structures 318-11.

Reference Book:

1. Advanced Concrete Technology by John Newman
2. Reinforced Concrete - Mechanics and Design (5th edn) by James K. Wright and James G. MacGregor, Pearson-Prentice Hall, Upper Saddle River New Jersey NJ 07458.

Prerequisites :

CE 308 Plain and Reinforced Concrete-I.

ASSESSMENT SYSTEM FOR THEORY

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15
Assignments	10	5-10

Mid Terms	25	25
Project	-	5-10
End Semester Exam	50	45-50

ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assesment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1	Design Methodology
2 - 3	Limit state design concepts - Working Stress Method (Alternate Design Method), crack widths and deflection estimations
4 – 5	Beams – singly and doubly reinforced beams, by Ultimate Strength Design
6	Beams –rectangular and T-beams by Ultimate Strength Design
7	Shear and Diagonal Tension in Beams: Shear capacity of RC beams
8	Shear and Diagonal Tension in Beams: Shear design of RC beams, CEP
9	**Mid Semester Exam**
10	Bond and Development.
11	One Way Slab – design by co-efficient methods.
12	Two-way slabs- ACI Coefficients, flat slabs and plates
13	Short Columns under Axial & Flexure Loads (uniaxial Bending and bi-axial bending)
14	Footing Design
15	Prestressed and Precast Concrete
16	Term Project (based on complex engineering problems/activities)
17-18	**End Semester Exam**

Practical

Experiment No	Description
1	Effect of bond and anchorage on RC beams reinforced in Tension.
2	Testing of beams (Under-reinforced and over-reinforced) containing shear reinforcement and their comparison with the response of beams without shear reinforcement.
3	Determination and plotting of Load-Deflection curves, Moment Curvature relationships, and Strain Profiles for under-reinforced and over-reinforced beams.
4	Effect of shear reinforcement in simple beams

5	Determination of modulus of elasticity of concrete