Course
CE 47800 – Design of Concrete Structures

Type of Course
Required for Civil Engineering Program. Formally CE 376.

Catalog Description
Flexural analysis and design of reinforced concrete beams including singly and doubly reinforced rectangular beams and T-beams, shear and diagonal tension, serviceability, bond, anchorage and development length, short and slender columns, slabs, footings, and retaining walls, including computer applications.

Credits
3

Contact Hours
3

Prerequisite Courses
CE 31500, CE 37500

Corequisite Courses
None

Prerequisites by Topics
Civil Engineering Materials, Structural Analysis

Textbook

Supplemental Materials
ACI 318-05 Building Code Requirements for Structural Concrete and Commentary, 2005.

Course Objectives
To introduce the students to the fundamentals of reinforced concrete design with emphasis on the design of rectangular and T beams, short and slender columns, slabs, and footings and foundations. In addition, student will learn how to analyze and design reinforced concrete structural members under bending, shear, and/or axial loads according to the ACI building code requirements (including computer applications).

Course Outcomes
Students who successfully complete this course will be able to:
1. Identify and compute the main mechanical properties of concrete and steel. (a, e)
2. Identify and calculate the design loads and distribution. (a, e)
3. Apply the strength method to design R.C. structural members. (a, c, e)
4. Analyze and design R.C. beams for flexure and shear. (a, c, e)
5. Analyze and design short and slender R.C. columns. (a, c, e)
6. Analyze and design R.C. slabs. (a, c, e)
7. Analyze and design R.C. footings. (a, c, e)
8. Apply relevant ACI Code provisions to ensure safety and serviceability of structural elements. (a, c, e, f, i)
9. Utilize advanced computer software packages (SAP2000 and/or ETABS) for the analysis and design of steel structures. (a, c, e, g, k)

**Lecture Topics**

1. Introduction to Engineering Design, Loads, and Design Codes
2. Flexural Analysis and Design of Beams
3. Shear and Diagonal Tension in Beams
4. Bond, Anchorage, and Development Length
5. Serviceability
6. Short Columns
7. Slender Columns
8. Analysis and Design of One and Two Way Slabs
9. Footings and Foundations

**Computer Usage**

- High

**Laboratory Experience**

- None

**Design Experience**

- High

**Coordinator**

- Mohammad Alhassan, Ph.D.

**Date**

- 1 October 2015