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


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**

Shin-Chung Max Yen, Ph.D.

**Date**

1 June 2017