

CE 452 REINFORCED CONCRETE II

Elective Course

Fall 2008

Instructor: Name: Prof. Cengiz Karakoç

Office Hours: M 15:00-17:00

Course Data: Hours: WThTh 278, Room: M2230, M2231

Course Description (Catalog):

CE452 Reinforced Concrete II

(3+0+3) 3

Analysis and design of reinforced concrete deep beams, shells and folded plate members, substructures, retaining walls, chimneys, tanks, silos and bridges. Principles of prestressed concrete: Creep, shrinkage and temperature effects. Special provisions for aseismic design of reinforced concrete elements. Precast concrete. Analysis and design of reinforced concrete.

Prerequisite: CE 354

Course Objectives:

An ability to design a system, component, or process to meet desired needs in the context of reinforced concrete, especially considering the requirements of the related codes and standards.

Textbook:

A.H. Nilson, D. Darwin, C.W. Dolan, “*Design of Reinforced Concrete Structures*,” 13th Ed., McGraw-Hill, 2003.

Ref. Books:

Park and Paulay, “*Reinforced Concrete*,” John Wiley & Sons, 1975.

Ersoy, Özcebe, Tankut “*Reinforced Concrete*,” METU, 2008.

TS 500, “*Betonarme Yapıların Tasarım ve Yapım Kuralları*,” Türk Standartları Enstitüsü, Şubat 2000.

ACI, “*American Concrete Institute Building Code*,” ACI, 2008

Curricular context:

This course builds on the fundamentals of reinforced concrete principles taught in previous courses and introduces design issues the students are likely to encounter in their professional life. Design problems are given as homework assignments in addition to the term project which includes a complete design of a specific structural system.

Computer Usage: N/A

Laboratory Sessions: N/A

Class Policies:

Homework: at least 4 will be given, total for 30% (of which 20% for the term project) of the final grade, Midterm: two exams, 20% each of the final grade, Final Exam: 30% of the final grade

Contribution of the Course to Program Outcomes:

This course is intended to contribute to the following program outcomes:

- ✓ (a) An ability to apply knowledge of mathematics, science and engineering
- ✓ (c) An ability to design a system, component, or process to meet desired needs
- ✓ (e) An ability to identify, formulate and solve engineering problems
- ✓ (f) An understanding of professional and ethical responsibility
- ✓ (i) A recognition of the need for, and ability to engage in life-long learning
- (j) A knowledge of contemporary issues
- ✓ (k) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Course Assessment:

Course will be assessed on the basis of the accomplishments regarding the course objectives and the contributions to the program outcomes. The evaluation will consist mainly of the responses from the students, who will provide their comments to various course related questions in the final week of the semester.

Week	Topics	Suggested Problems	Objectives
1	Introduction		To motivate the students for the earthquake resistant design and behavior of RC members
2	Design of foundations and retaining walls		To introduce some general information about retaining walls and foundations
3	Design of foundations and retaining walls	Design of a single footing	To introduce calculation methods of foundations
4	Design of foundations and retaining walls (Hw#1)	Design of a two wall footing	To introduce code requirements and problems
5	Design of foundations and retaining walls		To introduce calculation methods of retaining walls
6	Design of foundations and retaining walls MIDTERM I	Design of a retaining wall	To introduce code requirements and problems
7	Shear walls.(Hw#2)		To introduce shear walls
8	Shear Friction Design Method, Deep beams		To introduce Shear Friction Design Method and deep beams
9	Slender columns	TERM PROJECT : Design of a retaining wall (full project) (To be submitted on the day of final exam)	To introduce slender columns
10	Introduction to and the principles of prestressed concrete, MIDTERM I I		Introduction to prestressed concrete
11	The principles of prestressed concrete		Slide show and examples of Prestressed concrete applications
12	Code requirements for prestressed concrete		To introduce problems of prestressed concrete.
13	Review		To present some real life case studies