

CE 453 ASEISMIC DESIGN of STRUCTURES

Elective Course

Spring 2009

Instructor: Name: Semih S.Tezcan

Office Hours: All afternoons (Phone in and drop by)

Course Data: Hours: FFF 123 Room: M2200

Course Description (Catalogue):

CE453 Aseismic Design of Structures

(3+0+0) 3

Review of a seismic design codes; alternate philosophies in earthquake design principles; concept of ductile design, principles and regulations in reinforced concrete, steel and prefabricated structures; introduction to active and passive control in structures against seismicity.

Prerequisite: Consent of instructor

Course Objectives (Learning outcomes) :

Develop student's competency in reading, writing and oral communication; Provide practical experience which will enable students to utilize and enhance their engineering knowledge; Encourage the importance of working in teams, collaboration and interpersonal skills; Motivate the students towards contributing to the progress of science and technology; Teach the importance of ethics in social and professional life; Produce graduates with skills to assume a leadership role to meet the demanding challenges of the society.

Textbook: N/A

Reference Books:

Anonim "Afet Bölgelerinde Yapılacak Yapılar Hakkında Yönetmelik" Bayındırlık ve İskân Bakanlığı, 2007.

Anonymous, "American Building Code Requirements for Reinforced Concrete," ACI-318, 2005, American Concrete Institute, Detroit, Michigan, USA.

Tezcan, S. S., "Golden Rules of Ductile Design," Lecture Notes, Boğaziçi University Press, November 1993.

Curricular context:

The student is required to gain awareness towards the basic principles of safe earthquake design. The new concepts of performance base design are emphasized. In addition, the student acquires insight to the strong and weak points of the current Building Codes, available both nationally and internationally.

Computer Usage:

Computer application and familiarity with package programs are most essential. One or two homework is usually assigned to test this ability. SAP2000n or LUSAS Package Programs will be used.

Class Policies:

Attendance is essential. (30%). One or two midterm examinations may be set at only a week's notice (30%). A comprehensive final exam at the end of Semester (40%).

Contribution of the Course to 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,
- (g) An ability to communicate effectively,
- (i) A recognition of the need for, and an 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	Reading Assignments	Homework Assignment	Objectives
1	Concepts of Ductility and Energy Absorption, Philosophy of Aseismic Design,	The relevant topics in References	Sample Building Analysis	To familiarize the student with the principles of ductile design.
2	Load Combinations, Limiting beam dimensions and reinforcement,	The relevant topics in References	Sample Building Analysis	To introduce Code requirements.
3	Anchorage and splice distances, Shear forces in beams,	The relevant topics in References	Sample Building Analysis	To introduce the importance of shear.
4	Shear reinforcement in beams, Limiting column dimensions,	The relevant topics in References	Beam and Column Design	To present limiting sizes.
5	Column reinforcement, Strong column criterion,	The relevant topics in References	Beam and Column Design	To discuss column design principles.
6	Shear forces in columns, ties in columns,	The relevant topics in References	Beam and Column Design	To present skills in the design.
7	Junction design and lateral ties,	The relevant topics in References	Beam and Column Design	To introduce importance of junction design.
8	Material quality requirements,	The relevant topics in References	Weak storey examples	To present quality control.
9	Irregular buildings, Weak/soft storey criteria,	The relevant topics in References	Weak storey examples	To familiarize with weak points.
10	Weak points in the Turkish earthquake Code-1988,	The relevant topics in References	Weak storey examples	To discuss the relevant importance of Codes.
11	Base Isolation,	The relevant topics in References	Base Isolated Building	To present a high technology device.
12	Prefabricated Structures.	The relevant topics in References	Base Isolated Building	To discuss the special issues related to prefab.
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