

**Çankaya University**  
**Department of Civil Engineering**  
**CE 382 REINFORCED CONCRETE STRUCTURES**  
**2014 Spring Semester**

Instructor: Mr. Polat Gülkan      Section: 01      Rm. N-A18  
Ph.: 233 1403  
[polatgulkan@cankaya.edu.tr](mailto:polatgulkan@cankaya.edu.tr)

T.A.: Mr. H.İ. Andiç  
Rm. N-A10  
Ph.: 233 1409  
[hiandic@cankaya.edu.tr](mailto:hiandic@cankaya.edu.tr)

**COURSE OUTLINE:**

<u>Week</u>	<u>Subject</u>
1	<b>Introduction</b> Introduction to reinforced concrete structural systems Material response for concrete and steel under uni-axial state of stress
2	<b>Concept of structural safety, load and material factors</b> Design procedures specified in TS500 Load factors and load combinations
3	<b>Flexural behavior and nominal strength of beam sections</b>
4	<b>Flexural design of beam sections</b> Determination of size/reinforcement for bending capacity
5	<b>Shear in beams</b> Behavior of beams failing in shear Analysis and design of RC beams for shear (TS500 and EC2)
6	<b>Development, anchorage and splicing of reinforcement</b> Mechanism of bond transfer Development length, bar cutoffs Structural integrity requirements
7	<b>Serviceability</b> Cracking Deflections of concrete beams Consideration of deflections in design
8	<b>Continuous beams and one-way slabs</b> Continuity in reinforced concrete structures Design of girders Joist floors
9-10	<b>Columns: combined axial load and bending</b> Tied and spiral columns Interaction diagrams for short columns Contributions of steel and concrete to column capacity
11	<b>Slender columns</b> Restrained columns in non-sway frames, design of such columns Behavior of restrained columns in sway frames, design of such columns

- 12 Two-way slabs**  
Analysis of moments in two-way slabs  
Direct design approaches
- 13 Footings**  
Soil pressure under footings  
Strip and spread footings
- 14 Earthquake resistance**  
Reversed loading, design of non-degradation of capacity. Earthquake code requirements.

### **TEXT BOOKS/REFERENCES (partial list):**

- U. Ersoy, G. Özcebe: Reinforced Concrete, Evrim, 2001  
 Z. Celep: Betonarme Yapılar, Beta, 2011 (978-975-95405-3-3)  
 J.K. Wight, J.G. MacGregor: Reinforced Concrete: Mechanics and Design, Prentice Hall, 2009 (978-0-13-2288141-6)  
 S. Brzev and J. Pao: Reinforced Concrete Design: A Practical Approach, Pearson-Prentice Hall, 2006. (0-13-039125-5)
- TS500: Betonarme Yapıların Tasarım ve Yapım Kuralları, TSE, (2000).  
 ACI 318-11: Building Code Requirements for Structural Concrete, ACI, 2011.  
 CEN Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings CEN 2003.

### **COURSE EVALUATION:**

<b>Grading Policy</b>								
<i>List the assessment tools and their percentages that may give an idea about their relative importance to the end-of-semester grade.</i>								
Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage
Homework	4	4x2-1/2=10	Case Study			Attendance	14	5
Quiz	-	-	Lab Work			Field Study	-	
Midterm Exam	2	2x22.5=45	Class Participation			Project		
Term Paper	-	-	Oral Presentation			Final Exam	40	

- The lectures will be given at times announced by the department. There will be an additional problem solving tutorial of two hours taught by either the instructor or the teaching assistant. There will be two term tests and one final examination. These will be supplemented by four homework assignments. Tentatively, the grading will be based on 22.5 % for each midterm exam, 40 % for the final exam, 5 % for attendance and 10% for the homework assignments. Attendance is strongly urged. The instructors will take attendance sheets at random times, and these will be evaluated in awarding your grades.
- All homework assignments will be considered in grading. Homework assignments submitted past the deadline will be accepted subject to a 20 percent deduction per day.
- Do not collaborate in solving assignments. You may see your submission returned with no grade assigned to it.
- Collaborate with the instructor during and after classes. This is the only way you learn anything.
- Information regarding the course can be found at the web site [ce382.cankaya.edu.tr](http://ce382.cankaya.edu.tr). Homework assignments and additional examples may be downloaded from here.
- Computer based homework assignments may be e-mailed to [ce382@cankaya.edu.tr](mailto:ce382@cankaya.edu.tr) or as a hard-copy document.