CE 431 FOUNDATION ENGINEERING

Required Course

Fall 2008

Instructor:	*Name:*	Özer Çinicioğlu	Gökhan Baykal
	Office Hours:	T 3 Th 2	W2
	Office No.:	M 3041	M 3030
Course Data:	Hours:	**Section 1**: MM 12, W 1, ThTh 12 (PS) & **Section 2:** TTT 567, ThTh 12 (PS)	
	Room:	MM: M2152, W:M2100, ThTh: M2171 (PS)	

Course Description (Catalog):

CE431 Foundation Engineering **(3+0+2)4**

Application of soil mechanics and other related techniques to design of foundation. Methods and site and soil exploration; bearing capacity and settlements; shallow and deep foundation; bracing and retaining structures. Case studies.

Prerequisite: CE 332 Soil Mechanics

Course Objectives (Learning Outcomes):

To learn about types and purposes of different foundation systems and structures.

To provide students with exposure to the systematic methods for designing foundations.

To discuss and evaluate the feasibility of foundation solutions to different types of soil conditions considering the time effect on soil behavior.

To build the necessary theoretical background for design and construction of foundation systems.

Textbook:

Codute, D.P., "***Foundation Design, Principles and Practices***", Prentice Hall.

Reference Books:

Foundations and Earth Retaining Structures, M. Budhu, Wiley.

Curricular Context:

This course uses the basic principles of soil mechanics to design various foundation systems. The principles of statics and mechanics are used to form the necessary tools to solve geotechnical engineering problems concerning design. Estimated design content is 30%.

Laboratory and Computer Usage:

Numerical methods for the solution of foundation design problems will be introduced

Class Policies:

Homework: Each week homework problems will be given, however the solutions will neither be collected nor gradedThe solutions can be discussed in the office hours.

Short exams and projects: There will be three short exams and two term projects, 30% of the course grade.

Midterm exams: Two midterm exams, each 20% of the course grade.

Final exam: Comprehensive exam at the end of the semester, 30% of the course grade.

Contribution of the Course to Program Outcomes:

(a) An ability to apply knowledge of mathematics, science and engineering

(b) an ability to design and conduct experiments, as well as to analyze and interpret data

(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety,manufacturability, and sustainability

(e) An ability to identify, formulate and solve engineering problems

(i) A recognition of the need for, and an ability to engage in life-long learning

(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 assignment	Homework assignment	content
1	Introduction	Chapters 1 and 2	Homework 1	Introduction foundation engineering, performance requirements, strength and serviceability requirements
2	site exploration and characterization	Chapter 4	Homework 2	site exploration, laboratory and insitu testing, synthesis of laboratory and field data
3	shallow foundations	Chapters 5 and 6	Homework 3	Types of shallow foundations, bearing capacity, selection of soil strength parameters,
4		Chapter 7	Homework 4	Design requirements, settlement analysis methods, differential settlement
5		Chapter 8	Homework 5	Design of shallow foundations under different types of loading
6	deep foundations	Chapter 10	Homework 6	Design of mat foundations, rigid methods, nonrigid methods
7		Chapter 11	Homework 7	Types of deep foundations and definitions, load transfer
8		Chapter 13	Homework 8	axial load capacity: assessment and measurement
9		Chapter 14	Homework 9	axial load capacity based on analytical methods, toe bearing, side friction, upward load capacity, group effects, settlement of deep foundations
10			Homework 10	
11	earth retaining structures	Chapters 22 and 23	Homework 11	externally and internally stabilized systems, lateral earth pressures
12		Chapter 24	Homework 12	cantilever retaining walls, external stability
13		Chapter 25	Homework 13	sheet pile walls