

CE 334 SOIL MECHANICS LABORATORY

Required Course

Spring 2009

Instructor: *Name:* Gökhan Baykal
 Office No.: M 3030
Course Data: Hours: ThThThTh 5678
 Room: Th5: M2181 Th678: Soil Mechanics Laboratory

Course Description (Catalog):

CE334 Soil Mechanics Laboratory

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Basic laboratory experiments: specific gravity, Atterberg limits, grain size distribution, compaction, permeability, consolidation, unconfined compressive strength, CBR, direct shear and triaxial compression tests. Application of Principals treated in CE 332.

Course Objectives (Learning Outcomes):

To help students in understanding the soil mechanics concepts given in CE 332 Soil Mechanics course with hands on experience

To be able to carry out all soil mechanics fundamental experiments according to standards.

To collect, analyze and interpret experimental data

To use communication skills to transfer their findings in a formal report format.

To have a feeling of engineering properties of geomaterials.

Textbook:

Bowles, J.E., “*Engineering Properties of Soils and Their Measurement*”, McGraw Hill, 3rd Edition.

Bardet, J. P., “*Experimental Soil Mechanics*”, Prentice Hall, 1997.

Reference Books:

“manual of soil laboratory testing” Vol 1,, KH Head, ELE International Limited

“manual of soil laboratory testing” Vol 2, KH Head, ELE International Limited

Curricular Context:

This course reviews the basic theory of soil mechanics and describes the experiments which determine soil properties in the laboratory.

Laboratory and Computer Usage:

Each lecture is followed by a laboratory session. Worksheet usage is recommended but not enforced.

Class Policies:

Laboratory: Each student is expected to conduct the experiments to gain hands on experience.

Attendance: Full attendance to lecture and laboratories is compulsory

Projects: There will be two projects, %40 of the course grade.

Midterm exam: One midterm exam, 30% 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:

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

(g) an ability to communicate effectively.

(k) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Course Assessment:

The project given in the last month of the course is aimed to assess whether the students have understood the fundamentals of soil mechanics laboratory.

Week	Topics	Reading Assignments	Homework Assignment	Objectives
1	Introduction and Orientation	Bardet CH 8		To demonstrate safety issues in the laboratory
2	Specific Gravity Test, Water Content Deter.	Bowles Exp 7; Bardet CH 1	Laboratory Report	To familiarize the student with a general method of obtaining the specific gravity
3	Grain Size Analysis	Bowles Exp 5-6 ; Bardet CH 1	Laboratory Report	To introduce the student to the methods of making a mechanical and hydrometer grain-size analysis
4	Atterberg Limit Tests, Classification	Bowles Exp 3 ; Bardet CH 2	Laboratory Report	To introduce the student to the procedure for determining the liquid and plastic limits of a soil.
5	Compaction Test & Field Compaction Control	Bowles Exp 9 ; Bardet CH 3	Laboratory Report	To familiarize the student with the laboratory compaction
6	Hydraulic Conductivity Test	Bowles Exp 11-12; Bardet CH 4	Laboratory Report	To introduce the student to two methods of determining the coefficient of permeability
7	Consolidation Test	Bowles Exp 13 ; Bardet CH 6	Laboratory Report	To introduce the student to the procedure of conducting consolidation test and reduction of collected data
8	Consolidation Test	Bowles Exp 13 ; Bardet CH 6	Laboratory Report	
9	Direct Shear Test	Bowles Exp 17; Bardet CH 7	Laboratory Report	To familiarize the student with a procedure for rapidly determining the strength parameters internal friction angle and cohesion for a soil
10	Unconfined Compression Test, CBR Test	Bowles Exp 14,19 ; Bardet CH 7	Laboratory Report	To introduce the student to an approximate procedure for evaluating the shear strength of a cohesive soil.
11	Triaxial Test	Bowles Exp 15 ; Bardet CH 7	Laboratory Report	To introduce the student to the basic procedure for determining the soil parameters internal friction angle and cohesion of a soil.
12	Triaxial Test: pore pressure measurement and dynamic parameters	Bowles Exp 16 ; Bardet CH 7	Laboratory Report	To present the basic procedures for obtaining pore-water pressure and/or volume changes during a triaxial shear test.
13	Electronic measurement, data acquisition and experimental control techniques	Bardet CH 9	Laboratory Report	To familiarize the student with recent technologies in data acquisition and experiment control