INTRODUCTION

Soil is one of the most important engineering materials. Determination of soil conditions is the most important first phase of work for every type of civil engineering facility. Soil properties are determined by both field and laboratory test methods. In this course, you will learn several laboratory tests that are very commonly performed to determine different properties of soils. These properties are essential for the design of foundation and earth structures.

In this course, different laboratory tests will be conducted to determine the following important index and mechanical properties of soils:

- Water Content
- Organic Matter (Content)
- Unit Weight (Density)
- Specific Gravity
- Relative Density
- Atterberg Limits
- Grain Size Distribution (Sieve Analysis and Hydrometer Analysis)
- Visual Classification
- Moisture-Density Relationship (Compaction)
- Hydraulic Conductivity (Constant Head Method)
- Consolidation
- Shear Strength
    - Unconfined Compression Test
    - Direct Shear Test

In addition to conducting the above tests, the following tests and procedures will be demonstrated:

- Triaxial Tests: Shear Strength (UU/CU/CD) and Hydraulic Conductivity
- Field Exploration
- Engineering Classification, Boring Logs and Soil Profiles Preparation

Because of the time constraints, several experiments will be combined and the tentative schedule for each laboratory class during the semester is given below:

Week	Assigned Tasks
1	During this class, you will be given a soil sample obtained from field. You will be asked to determine the moisture content and organic content of this soil. Read Experiment 1 and Experiment 2 before coming to the lab.
2	During this class, you will be given a sand sample and a clay sample (both are relatively undisturbed field samples). You will be asked to determine unit weight and specific gravity of these soils. In addition, you will be asked to determine the relative density of the sand sample. Read Experiments 3, 4 and 5 before coming to the lab.
3	During this class, you will be given a soil sample obtained from the field. You will be asked to determine grain size distribution of this soil by performing sieve analysis as well as hydrometer analysis. Read Experiment 6 before coming to the lab.
4	During this class, you will be given a soil sample obtained from the field. You will be asked to determine Atterberg limits of this soil. Read Experiment 7 before coming to the

	lab.
5	During this lab, you will be given 10 different soil samples. You will be asked to visually classify these soils. Read Experiment 8 before coming to the class.
6	During this class, you will be given a soil sample obtained from field. You will be asked to determine moisture-density relations using either Standard Compaction or Modified Compaction procedures. Read Experiment 8 before coming to the class.
7	During this class, you will be given a sandy soil sample. You will be asked to determine hydraulic conductivity of the soil under specified density using the constant head permeameter test. Read Experiment 9 before coming to the class.
8	During this week, you will be given an undisturbed clay sample. You will be asked to determine the consolidation properties of this soil using 1-D consolidation test. Read Experiment 10 before coming to the class.
9	During this week, you will be given an undisturbed clay sample. You will be asked to determine undrained shear strength of the soil by conducting unconfined compression test. Read Experiment 11 before coming to the class.
10	During this week, you will be given a sandy soil. You will be asked to determine shear strength of this soil under specified density by conducting direct shear tests. Read Experiment 12 before coming to the class.
11	Triaxial Testing Demonstration: UU/CU/CD Shear Strength and Hydraulic Conductivity

12	Field Exploration Methods-Demonstration
13	Engineering Classification, Boring Logs and Soil Profiles-Practice Examples

A short report which details the weekly experiment will be due 1 (one) week after the completion of the lab. You will work in teams, but everyone must submit an individual report. The body of each lab report shall consist of no more than three 8-1/2 x 11 pages of typed text. Any text beyond the first three pages shall be disregarded, so be concise! As many figures as deemed necessary can accompany the 3 pages of text in the report body. All raw data and calculations should be appended to the body of the report. Remember neatness counts. Prepare your report according to the format shown below.

I.	Introduction	Include: (1) brief description of what you did in lab and (2) the purpose of the lab.
II.	Procedures	Read the ASTM standard for the test(s) you conducted and note any differences between ASTM recommended procedure(s) and the procedure(s) that actually used in the lab.
III.	Results	Present the results of the lab in this section. Refer to figures or tables when necessary.
IV.	Discussion	Describe your results. Do they seem reasonable? Include analyses of possible errors and any recommendations that you have for improving the test procedure.

V. Conclusions — Draw your conclusions and present them in this section.

. Tables (in order)

. Figures (in order)

APPENDIX: Include raw data and calculations in Appendix.

NOTES: 1. You must refer to each Table and Figure in the TEXT.

2. Remember that Sections I-V can only be a maximum of three 8-1/2 x 11 in. pages in length. So be concise (this does not mean to omit anything).