New York University - Tandon School of Engineering
Department of Civil and Urban Engineering
Course Outline: CE-UY 3153 - GEOTECHNICAL ENGINEERING
Spring 2017

Instructor: Mohsen Hossein, Ph.D.       Office: RH 412-B
Email: mhossein@nyu.edu        Office Hours: Monday 12:30 – 1:30 P.M.
Telephone: (646) 997-3766            Thursday: 3:30 – 4:30 P.M
                                          (or by appointment)

Teaching Assistant: Prof. Ivan Guzman, Ph.D., P.E.
E-Mail guzman@nyu.edu
Office: RH-415
Office Hours: Wednesday – 12:30 P.M. – 2:00 P.M.

Prerequisite: Mechanics of Materials, CE-2123 or Equivalent
Fluid Mechanics and Hydraulics, CE-2213 or Equivalent

Course Description: Introduction to soil mechanics and foundation engineering, including origin of soils; volume/weight phase relationships; Soil classification (AASHTO and USCS); Soil permeability and seepage; effective stress; soil consolidation; and shear strength.

Course Objectives

a) Introduce students to the principles that governs the use and application of soil as an engineering material in Civil Engineering,
b) Develop proficiency in the classification and quantitative evaluation of soil engineering properties,
c) Develop an understanding of principles of Effective stress, Stress component parameters, Soil stress analysis,
d) Introduce the concept of Consolidation and Shear,
e) Analyze soil mechanics related engineering problems using theoretical and empirical geotechnical methods, and
f) Experiment with standard laboratory soil testing equipment to determine soil properties.

Course Outcomes:

At the conclusion of the course the students will be able to:

• Design and Conduct Experiments, as well as to Analyze and Interpret Experimental Data (ABET Outcome b);
• Exhibit an Understanding and Knowledge of Contemporary Geotechnical Issues (ABET Outcome j); and
• An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (ABET Outcome k).

These outcomes are based on the accreditation requirements from the Accreditation Board for Engineering and Technology, Inc. (ABET).
Required Textbooks:


Supplemental Reference:

- Lecture Notes, Collection of manuals, reports, technical papers, web contents, and other relevant data that will be provided by the instructor, either in the class or through NYU Classes

Class Time: Monday and Wednesday 10:30 – 11:50 AM

Students are required to check the Notice Board on NYU Classes for changes in class schedule and other relevant information.

Take thorough notes during the lecture, because you are responsible for what is presented verbally as well as textbook. After each lecture you should review your notes and study appropriate readings and work examples in the textbook.

Attendance: Attendance in this course is mandatory. Missing more than five (5) lectures without a supported, documented and excused absence (i.e. Doctor, court, religious holidays, etc) will lower your final grade by 5% (calculated from the total grade obtained in the course). Missed laboratory sessions will result in obtaining grade 0 for that session.

Late Arrival: If you are more than 15 minutes late, please do not come to class. It is disruptive.

Homework Assignments: Homework will be assigned and collected regularly (typically due in one week). The homework assignments will be posted on the course NYU Classes. Students will submit their homework at the beginning of the lecture, a week from the time that it was assigned. Only selected problems will be graded (Typically, only 2 problems will be randomly selected from each assignment and graded). Solutions to homework problems will be posted on NYU Classes. Because the teaching assistant may not have enough time to finish grading your homework before an exam, you are advised to make a duplicate copy of your homework before you turn it in. You are required to turn in your homework on time.

Students are welcome to discuss the problems with each other, but all homework submittals must be done individually. Late homework assignments will be graded with late penalty; unless prior arrangements are made before the due date (requires a documented justifiable reason).

HOMEWORK GUIDELINES MUST BE FOLLOWED FOR FULL CREDIT.

- Staple pages together.
- Do your work neatly on one side of 8.5” x 11” engineering paper.
- Put your name, the assignment number, and the date the assignment is due at the top right corner of the front page.
- Box your answers.

You are expected to write as neatly and legibly as possible. Your final answer should be clearly indicated. Points will be deducted, if the grader has difficulty reading or finding your answer.
Late Turn-Ins:
0-24 hr late: Deduct 50%
24- hr late: no credit

**Quizzes:** Unannounced quizzes may be given at any time during the semester. Quizzes will assess students on recent lecture and homework topics. **No make-up quizzes will be administered.**

**Midterm Examination:** A mid-term examination will be given during the class period. Tentative date is Monday March 20, 2017. Actual date will be announced in class. Exam will be based on lecture and homework materials. The examination will contain numerical problems, and may also contain short answer questions and essays.

**Important Note:** To receive a passing grade in the course, a student must demonstrate proficiency in the subjects covered. Any quiz or test missed without a documented and excused absence (i.e. Doctor, court, religious holidays, etc) will represent a zero grade.

**Academic honesty:**
The University Academic Honesty Policy applies and can be found in the undergraduate calendar. This policy covers plagiarism, cheating, fabrication, and facilitating dishonesty. Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty.

**Plagiarism** – intentionally or knowingly representing the words or ideas of another as one’s own in any academic exercise; failure to attribute direct quotation, paraphrase, or borrowed facts or information.

**GRADING:**
You will receive a letter grade according to the standards of this course at the end of the semester. The course standards of accomplishments are:

<table>
<thead>
<tr>
<th>Points</th>
<th>Letter Grade</th>
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<tbody>
<tr>
<td>86 - 100</td>
<td>A(including -)</td>
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<tr>
<td>73 – 85</td>
<td>B (including +/-)</td>
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<tr>
<td>60 – 72</td>
<td>C (including +/-)</td>
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<tr>
<td>55 – 59</td>
<td>D (including +)</td>
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<tr>
<td>Below 55</td>
<td>F</td>
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The following grade distribution will be applied:

- **Home Work** 8 %
- **Term Paper** 2 %
- **Quiz** 15 %
- **Mid-Term** 20%
- **Laboratory** 25 % (20% Report, 5% Laboratory Examination)
- **Final Exam** 30 %
Lectures Outline

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Topic</th>
<th>Text Chapters</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Structure of Soil, Clay Mineralogy</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Classification of Soil, Soil Plasticity</td>
<td>4, 5</td>
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<tr>
<td>4</td>
<td>Phase Diagram and Weight Volume Relationship</td>
<td>3</td>
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<tr>
<td>5</td>
<td>Soil Compaction</td>
<td>6</td>
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<td>6</td>
<td>Flow of Water In Soils, Permeability</td>
<td>7</td>
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<td>7</td>
<td>Seepage and Flow Nets</td>
<td>8</td>
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<td>8</td>
<td>Mid-Term Examination</td>
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<tr>
<td>9</td>
<td>Effective Stress, Total Stress, and Pore Water Pressure</td>
<td>9</td>
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<tr>
<td>10</td>
<td>Stresses in Soil Mass</td>
<td>10</td>
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<tr>
<td>11</td>
<td>Consolidation and Settlement</td>
<td>11</td>
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<tr>
<td>12</td>
<td>Shear Strength</td>
<td>12</td>
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</tbody>
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(Schedule Permitting: Lateral Earth Pressure, Will be discussed (Text Book Chapter 13)

Changes to above schedule, if any, will be announced on NYU Classes.

**Cell phones Use and Texting are not Allowed during the class and laboratory times.**

Late Arrival: Students should not enter the lecture room or laboratory 15 minutes after the start of the session.

Good Luck
Guidelines for Submission of Class Term Paper

Each student must manifest ability to research a contemporary geotechnical engineering topics. For this purpose, each student will review a Geotechnical Engineering Journal, available on-line or at the library, and will select an article related to subjects discussed during the term. Each student will write a short term-paper summarizing the significance of the article.

Documentation Style

Paper should not exceed 4 pages (excluding cover page and table of contents and the reference page). Paper must be typed, double -space all pages of the paper with one inch top, bottom, left, and right margins. The font size should be Times Roman 12.

You must use two articles (at least one article must be selected from a peer-reviewed journal) for your term paper. The text of the paper should clearly identify the sentences directly quoted from any of the references.

The paper is to include a title page, a table of contents, the body of the paper, references. The reference page list works alphabetically by each author’s last name that is directly referenced in the paper. Place the references on a separate page. Begin the first line of each reference at the left margin; indent subsequent lines of the same reference one-half inch from the left margin.

The term paper is due on or before May 1, 2017. Late submission will not be accepted. Papers should be submitted on paper (hard copy) and electronically on NYU Classes.

Layout of the Paper

a. Cover Page (including table of contents,
b. Body including introduction, technology description, and conclusions, and
c. Bibliography/References.

- The Introduction of your paper will state your thesis and relevant main points that you will be addressing in the body of the paper.
- The Body of your paper will review the technology and the literature that you have used in your research.
- The Conclusion of your paper will summarize the Introduction and Body while making conclusions regarding how you now understand your topic and the potential areas that can be explored for further study and understanding of that topic.

Laboratories

Attend Laboratory Section every week according to your registration: Room RH-417, Soil Laboratory

Important: You must attend every laboratory to pass this course. Please only attend your lab at the assigned time

NOTE: Some experiments will require that you take readings and be present at the laboratory at additional time other than assigned schedule.

All Laboratory reports should be prepared individually and follow the recommended format. All Laboratory reports are due a week after completion of the respective experiment. Laboratory reports must be typed.
Tentative Laboratory Schedule (Schedule Might Change, please check NYU Classes for Update)

<table>
<thead>
<tr>
<th>Date</th>
<th>Subject</th>
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<tbody>
<tr>
<td>Friday January 23</td>
<td>No Laboratory</td>
</tr>
<tr>
<td>Friday February 3</td>
<td>Introduction to Geotechnical Laboratory, Laboratory Safety</td>
</tr>
<tr>
<td>Friday February 10</td>
<td>Soil Water Content and Atterberg Limits</td>
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<tr>
<td>Friday February 17</td>
<td>Soil Gradation and Sieve Analysis</td>
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<tr>
<td>Friday February 24</td>
<td>Soil Compaction Test</td>
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<tr>
<td>Friday March 3</td>
<td>No Laboratory</td>
</tr>
<tr>
<td>Friday March 10</td>
<td>Permeability Test</td>
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<tr>
<td>Friday March 17</td>
<td>Spring Break</td>
</tr>
<tr>
<td>Friday March 24</td>
<td>Consolidation Test</td>
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<tr>
<td>Friday March 31</td>
<td>Consolidation Test</td>
</tr>
<tr>
<td>Friday April 7</td>
<td>Direct Shear Test</td>
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<tr>
<td>Friday April 14</td>
<td>Unconfined Compression Test</td>
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<td>Friday April 21</td>
<td>Triaxial Test</td>
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<td>Friday April 28</td>
<td>Review Session</td>
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<tr>
<td>Monday May 5</td>
<td>Laboratory Final Examination</td>
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