Course Description: An in-depth study of physical and mechanical properties of soils. Topics include clay mineralogy, shear behavior and compressibility of fine and coarse grained soil; and in-situ measuring techniques such as Vane shear, core penetration and pressure meter. Laboratory work includes consolidation test and triaxial test, with emphasis on analysis, interpretation and application of data to design problems.

Co-requisite or Pre-requisite: approved undergraduate course in soil mechanics within last five years.

Instructor: Dr. Jay N. Meegoda, Ph. D, PE, FASCE
Office: 221 Colton Hall
Office Hours: T: 4:00 to 6:00 PM and any other time by email request
Email: meegoda@njit.edu


COURSE SCHEDULE:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Mitchell and Soga Book Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Soil Formation and Soil Mineralogy</td>
<td>2 and 3</td>
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<tr>
<td>2</td>
<td>Soil Composition and Soil Fabric</td>
<td>4 and 5</td>
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<tr>
<td>3</td>
<td>Granular Interactions</td>
<td>7 and 8</td>
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<tr>
<td>4-6</td>
<td>Soil-Water-Chemical Interactions</td>
<td>6</td>
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<td>7</td>
<td>Soil Compaction and Field Applications</td>
<td>Notes</td>
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<td>8</td>
<td>Midterm Examination</td>
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<tr>
<td>9-10</td>
<td>Conduction Phenomenon and Field Applications</td>
<td>9</td>
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<tr>
<td>11-12</td>
<td>Volume Change Behavior and Field Applications</td>
<td>10</td>
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<tr>
<td>13-14</td>
<td>Shear Strength/Deformation and Field Applications</td>
<td>11</td>
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<tr>
<td>15</td>
<td>Final Exam</td>
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</tbody>
</table>

Grading Policy: Grading: Homework = 25%, Term Paper = 25%, Mid-term = 25%, Final = 25%

Grading Scale:
- A: 100-90
- B+: 89-85
- B: 84-80
- C+: 79-75
- C: 74-70
- D: 69-60
- F: Below 60
Attendance Policy: Students are required to attend all classes. If there is a conflict they should inform the instructor prior to the class.

Withdrawals: In order to ensure consistency and fairness in application of the NJIT policy on withdrawals, student requests for withdrawals after the deadline will not be permitted unless extenuating circumstances (e.g., major family emergency or substantial medical difficulty) are documented. The course Professors and the Dean of Students are the principal points of contact for students considering withdrawals.

NJIT University Policy on Academic Integrity:
The NJIT Honor Code will be upheld; any violations will be brought to the immediate attention of the Dean of Students. The Honor Code can be found at (https://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf).

Assignment Policy:
- Carefully review the notes and example problems in your textbook.
- Homework is due at the beginning of the class following the start of a new topic. Late homework carries 50% penalty.
- You are encouraged to ask questions about homework problems before or after the class, and discuss with classmates outside of class, post to emails for classmates to comment and my response, but homework problems should not be done together.
- The midterm and final composed of in class multiple choice questions and take home exam
- Please select one publication from the following for your term paper. You need to select your topic (first come first serve before January 29). Then you need to download the paper and also related publications and select five other publications and send to me for approval by February 26. On March 26 you need to develop an outline and a draft abstract. Draft paper is due on April 30 and final paper on May 7. Your paper should be professional quality with a minimum of five pages of single space lines with a list of supporting references. In you term paper you are supposed to critique the original paper.

Syllabus Information:
The dates and topics of the syllabus are subject to change; however, students will be consulted with and must agree to any modifications or deviations from the syllabus throughout the course of the semester.

Email Policy: The instructor will be communicating with you via your NJIT email

Items Required for this Course: Weekly homework and term paper.

<table>
<thead>
<tr>
<th>Strategies, Actions and Assignments</th>
<th>ABET Student Outcomes (1-7)</th>
<th>Program Educational Objectives</th>
<th>Assessment Measures</th>
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<tbody>
<tr>
<td>Student Learning Outcome 1: Select appropriate laboratory and field methods for determining mechanical properties of coarse grained and fine grained soils interacting with the environment.</td>
<td>1,2,3,4,5,6,7</td>
<td>1,2</td>
<td>HW, Term Paper and Exams</td>
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<tr>
<td>Class presentation, class discussions, Homework</td>
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<tr>
<td>Student Learning Outcome 2: Estimation or measurement of such based on laboratory and field tests and use of such in geotechnical designs.</td>
<td>1,2,3,4,5,6,7</td>
<td>1,2</td>
<td>HW, Term Paper and Exams</td>
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<tr>
<td>Class presentation, class discussions, Homework</td>
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<tr>
<td>Student Learning Outcome 3: Interpretation of laboratory or field tests.</td>
<td>1,2,3,4,5,6,7</td>
<td>1,2</td>
<td>HW, Term Paper and Exams</td>
</tr>
<tr>
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CEE Mission, Program Educational Objectives and Student Outcomes

The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- to encourage research and scholarship among our faculty and students
- to promote service to the engineering profession and society

Our Program Educational Objectives are reflected in the achievements of our recent alumni:

1. Engineering Practice: Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working toward safe, practical, sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.

2. Professional Growth: Alumni will advance their technical and interpersonal skills through professional growth and development activities such as a graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as business and law through further education.

3. Service: Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Our Student Outcomes are what students are expected to know and be able to do by the time of their graduation:

1. an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics

2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors

3. an ability to communicate effectively with a range of audiences

4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts

5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives

6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies