Spring 2020

CE 341-004: Principles of Geotechnical Engineering

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JOHN A. REIF, JR. DEPARTMENT OF
CIVIL AND ENVIRONMENTAL ENGINEERING

NJIT New Jersey Institute of Technology

CE 341 Principles of Geotechnical Engineering **Spring 2020**
Sections: 002 and 004

Senior University Lecturer: Andrew J. Ciancia, P.E., LEED AP
Class Hours: Section 002, Tuesday - Thursday, 230 pm -340 pm
Section 004, Tuesday - Friday, 10 am- 1120 am
Office: Colton 209, via e-mail at ciancia@njit.edu
Office Hours: Tuesdays: 8 am - 930 am; Fridays: 8 am – 930 am, and by appointment

Text: Re: Das and Sobhan, 9th Edition, "Principles of Geotechnical Engineering", 2018

Prerequisite: MECH 237 with a grade of C or better or equivalent. Corequisite: CE 341A. A study of soil types and properties is made with the objective of developing a basic understanding of soil behavior. The methods of subsurface investigation and compaction are presented. Fundamentals pertaining to permeability, seepage, consolidation, and shear strength are introduced. Settlement analysis is also presented. Lab must be taken concurrently.

"Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:
http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

Lecture	Subjects to be Covered
Lecture 1	Chapter 1 Introduction and Origin of Soils
Lectures 2 & 4	Chapters 2 and 4 Particle Size and Plasticity
Lectures 5 & 6	Chapter 5 Soil Classification
Lectures 7 & 8	Chapter 3 Phase Relationships
Lectures 9 & 10	Chapter 6 Compaction
Lecture 11	Exam #1 (Chapters 1-6)
Lecture 12-14	Chapters 7 & 8 Permeability/Conductivity and Seepage/Drainage

Lecture 15-16	Chapter 9 Effective Stress
Lecture 17-18	Chapter 10 Stress Distribution
Lecture 19	Exam #2 (Chapters 7-10)
Lecture 20-23	Chapter 11 Consolidation
Lecture 24-27	Chapter 12 Shear Strength
Lecture 28	Chapter 17 Subsurface Exploration
	Exam #3 (Chapters 11,12 and 17)

POLICIES

Attendance: Attendance and class participation are mandatory. It is your responsibility to obtain the materials presented and submit homework as assigned on the date due. All homework assignments will be posted on Canvas.

Your overall grade will be based on the following:
20% - Quizzes/Class Participation, 10% - Homework, 70% - 3 Exams

Grading structure:
100 – 90: A; / 89 – 86 : B+; / 85 – 80: B; / 79 – 74: C+; / 73 – 70 : C ; / 69 – 60: D; / 59 – 0 : F

A quiz will be given in many classes based on each material covered in the previous class. A missed quiz (due to absence or tardiness to class) will be assigned a grade of zero. A minimum (average) passing grade of 70% for quizzes will be required to pass the course. Absence from 4 or more quizzes will result in a failing grade for the course.

All examinations will be open book, open notes.

5 full points from your final grade will be deducted if a cellphone is used during class; please step out to use phone if it is an emergency. You would not start using your phone in the middle of an important meeting at work- only one warning will be given.

There will be no extra credit available for this course.

HOMEWORK: Written assignments are to be submitted in class on paper ON OR BEFORE the due date. Electronic submission will not be accepted. Late homework on the due date will incur a 50% deduction, after the due date a 100% deduction will apply. All homework assignments shall be submitted with

accompanying figures, tables, drawings, calculations, etc. The following information shall be included:
1. Your name
2. Date
3. Course Title and Number
4. Person to whom it is being submitted.
5. A brief statement of the assignment purpose (what was requested, who authorized it and what you did).
6. Reference to any drawings, figures, charts etc. – identify and important information that they contain.
7. Description of what information was obtained and used to solve the problem.
8. Important results clearly identified.
9. Appropriate conclusions and recommendations, if required.
10. All sources cited
11. If you assume soil property value you need provide a justification and cite your source.

Additional requirements and notices:
A. Bring your textbook and a calculator to each class.
B. Students should read the chapter related to the topic that will be covered in the class before the class
C. Students are encourage to ask questions about the material covered in the class. This will be used as feedback and can be on a topic that was not clearly comprehended.
D. Zero points if engineering and graph papers are not used for your homework and exams.

Note: The NJIT Honor Code will be upheld, and that any violations will be brought to the immediate attention of the Dean of Students. Also, students will be consulted by the instructor and all must agree to any modifications or deviations from the syllabus throughout the course of the semester.

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• **Electronic versions of homework will not be accepted**.
• Please keep a copy of all your work until you received a final grade.
• Please save a copy of your homework before submitting it to the instructor, since it may not be always possible for the instructor to return the corrected homework back in time for you to study for quizzes and examinations.
• All work should be done in a professional manner.
• Homework is due at the beginning of class. Late homework will incur a 50% deduction if handed in the same day, and 100% deduction after that. **Online submissions will not be accepted.**
• The instructor may photocopy and save your assignments and tests, as part of the effort necessary to renew accreditation of our educational programs. The copies, which will be accessible only to faculty, administration, and external reviewers, will be destroyed afterwards.
• No make-up examination will be administered, unless approved by the Dean
• Switch off laptops and cell phones during quizzes and examinations. Plan on bringing a watch to keep time during examinations.
• No recording devices shall be used during class or examinations. Take notes.

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1: Identify the properties of soils and the basic principles of soil mechanics and develop the ability to apply these principles to solving problems in civil engineering.			
Introduce index properties of soils and subsurface investigations.	1	1	Homework, quizzes and exams.
Explore subsurface methods of investigation in design.	1	1, 2	Homework, quizzes, and problem solving in class.
Discuss professional design practice.	2, 7	1, 2	Class discussions and problem solving. Quizzes and exams.
Student Learning Outcome 2: Apply principles of seepage through porous media and effective stress.			
Introduce basic concepts and flow through soils.	1	1	Homework, quizzes and exams.
Apply these principles to problem solving.	1, 2	1	Homework, quizzes, and problem solving in class.
Discuss application of these principles to engineering problems.	2	1	Class discussions and problem solving. Quizzes and exams.
Student Learning Outcome 3: Apply principles of consolidation and shear strength.			
Introduce consolidation theory and shear strength principles	1	1	Homework, quizzes, and exams.
Discuss analytical methods to solve different types of settlement problems.	2	1	Homework, quizzes, and problem solving in class.
Discuss professional design practice.	2, 4	1, 2	Class discussions, problem analyses, and problem solving.

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 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 skills through professional growth and development activities such as 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

Revised: 12/26/19