

University of Tennessee at Chattanooga
College of Engineering and Computer Science
ENCE 3610 - Soil Mechanics (3)
22035—Spring 2017
TH 0925-1040, EMCS 401

1 Catalog Description

Geological overview, soil composition, soil type and structure, index properties, classification, site investigation, subsurface flow, flow nets, drainage, subsurface stresses, settlement, shear strength, and slope stability. Spring semester. Lecture 3 hours. Prerequisites: ENGR 2460 and 2460L with minimum grades of C or department head approval. Co-requisites: ENCE 3610L. Laboratory/studio course fee will be assessed. Supplementary Course Fee Assessed.

2 Instructor

Don C. Warrington, P.E., PhD., M. A.S.C.E.
Office: SimCenter 211

Hours posted on Blackboard

Email cbv526@mocs.utc.edu

Phone (423) 488-8590 (leave voice message if necessary)

Website for course slides and links to other resources:

<http://www.vulcanhammer.net/utc/ence361/>

3 Textbooks¹

1. Verruijt, A., *Soil Mechanics*. Delft, The Netherlands: VSSD, 2012.
2. NAVFAC DM 7.01, *Soil Mechanics*. Naval Facilities Engineering Command, Alexandria, Virginia, 1986.
3. Fellenius, Bengt. *Basics of Foundation Design*. (The “Red Book”.) February 2014 (Downloadable)

¹ The first two textbooks can be purchased in hard copy. The last one is a free download.

4 Course Objectives (numbers in parentheses indicate relationship to civil engineering program outcomes at end of syllabus)

At the completion of the course, students will have demonstrated the ability to:

- ✓ Perform phase calculations on soil/water/air mixtures. (1)
- ✓ Determine groundwater flow through a homogeneous, isotropic soil. (1)
- ✓ Determine stress in a soil induced by surface load away from point or area of load. (5)
- ✓ Determine effective stress of a soil assuming hydrostatic conditions. (5)
- ✓ Predict consolidation settlement in a cohesive soil. (1)
- ✓ Determine Mohr-Coulomb failure envelope from triaxial test results. (5)

5 Course Outline

1. Introduction; Engineering Geology
2. Soil Classification
3. Site Exploration and Classification
4. Soil Composition
5. Effective Stress
6. Groundwater
7. Settlement and Volume Expansion
8. Mohr's Circle and Combined Stresses
9. Induced Stresses by External Loads

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- 10. Shear Strength
- 11. Lateral Earth Pressures
- 12. Stability of Earth Slopes

6 Evaluation

- ✓ Homework: Five (5) assignments @ 10% each = 50%
- ✓ Two in-class tests (including Mid-Term) @ 16% each = 32%
- ✓ Final Examination: 18%

7 Course Policies

- Due date for homework assignments will be announced when assignment is given, and posted on Blackboard. No late homework will be accepted.
- Homework must be turned in as follows:
 - The homework should be in **one** Adobe Acrobat pdf file, Version 7.0 or earlier.
 - The file name must include your name and the assignment designation.
 - It must be submitted via the UTC Learn system. This is for your protection as much as mine: the submission time is noted, which establishes whether your homework was on time or late.
 - If you scan your homework, make sure your scans are legible and have enough contrast to be read. (If your homework isn't legible before you scan it, take care of that first.) Bad camera

phone photos are a sure way to reduce credit on homework.

- Paper submissions, or email submissions, are not acceptable.

➤ Letter Grading System:

- ❖ 90 – 100: A
- ❖ 80 – 90: B
- ❖ 70 – 80: C
- ❖ 60 – 70: D
- ❖ < 60: F

- Attendance is required with the exception of special arrangements made before class as the only excused absences.
- When applicable, all problems must include a figure. All figures are to be neat and legible. Also when applicable, all problems must include a) Given b) Find c) Solution. On the first page of each problem set or test, in the upper right hand corner write a) Your Name, b) Course Number and c) Problem Set or Test Number. *Any problem set or test that does not follow these rules or is not neat will receive reduced credit.*
- Each time you use an equation, tell me what it is: don't just put a bunch of numbers on the page and expect anyone to know what you did. This too will result in reduced credit.

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- You are encouraged to work homework with someone but your turned in work must be your own work.
 - All quizzes and exams are open book(s) and open notes. You obviously may use a calculator, but no laptops or any other internet-accessing devices (iPhone, iPad, iPod Touch, Droid, etc.) can be used during a quiz or exam (see following paragraph for penalty.)
- You are studying now so that you may enter and practice the engineering profession later. The engineering profession is highly regarded by the public because those who practice it do so with ethical and social consciousness. The same is expected of students in this course. Any direct copying of homework, tests or exams will be considered a violation of the honor code and a course grade of “F” will be given.

8 Student Outcome Objectives

1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
4. An ability to function on multidisciplinary teams
5. An ability to identify, formulate, and solve engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
9. A recognition of the need for, and an ability to engage in life-long learning
10. A knowledge of contemporary issues
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.