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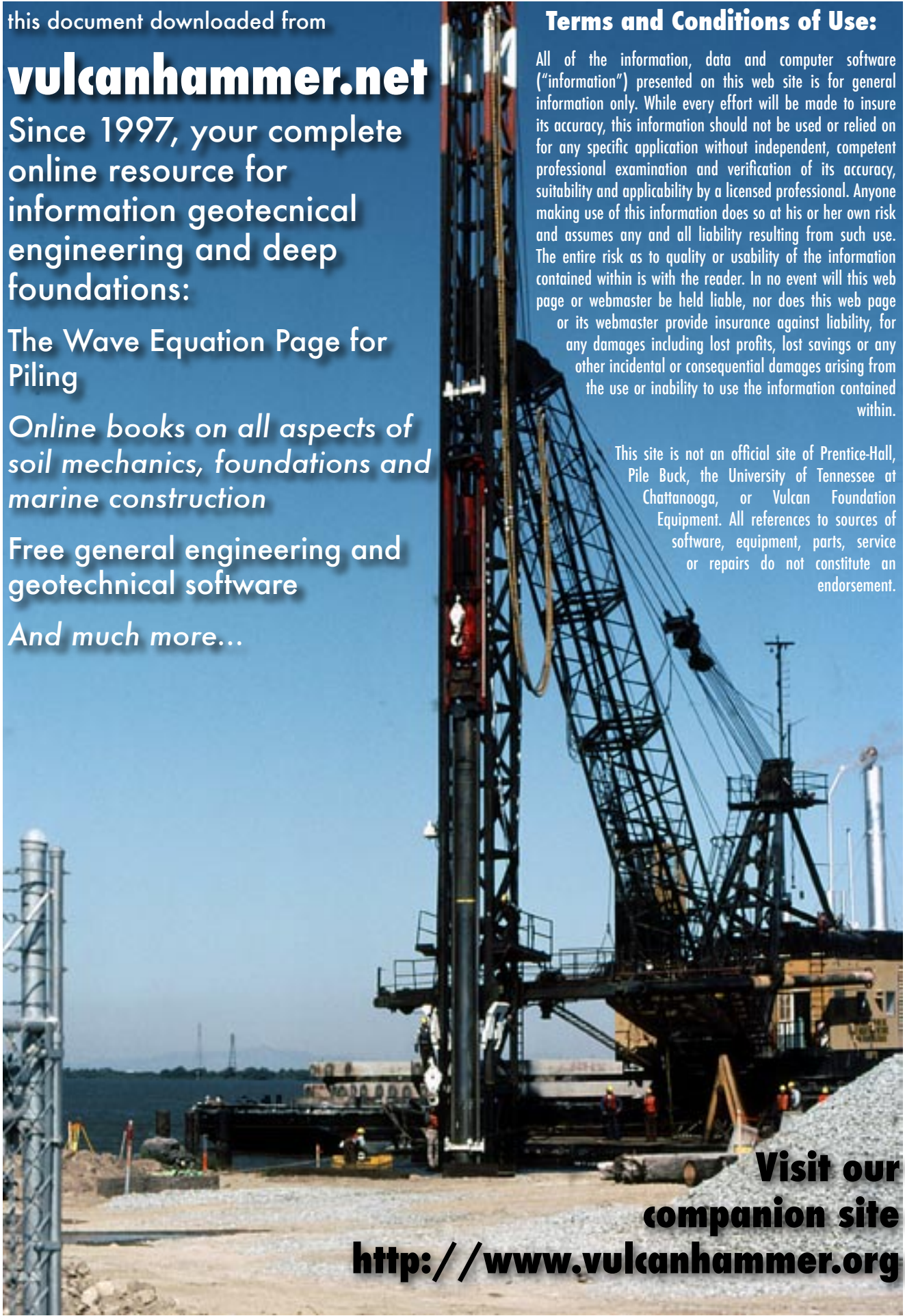
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# University of Tennessee at Chattanooga

## College of Engineering and Computer Science

### ENCE 461 - Foundation Analysis and Design (3)

#### Fall 2009

#### Catalog Description

Fundamentals of soil mechanics as applied to the analysis and design of foundation systems; subsurface investigations; design of shallow and deep foundations. Retaining structures and lateral earth pressures. Lecture 3 hours. Prerequisites: ENCE361 with a grade of C or better.

#### Instructor

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Website <http://www.vulcanhammer.net/utc/ence461/f2009/>

#### Textbook

Coduto, D.P. *Foundation Design: Principles and Practices*, 2<sup>nd</sup> ed. Upper Saddle River, NJ: Prentice Hall, 2001.

#### Reference Works<sup>1</sup>

NAVFAC DM 7.02, *Foundations and Earth Structures*. Naval Facilities Engineering Command, Alexandria, Virginia, 1986.

#### Course Objectives (numbers in parentheses indicate relationship to civil engineering program outcomes)

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

- ✓ Design a shallow foundation for maximum bearing capacity. (2, 3, 6)
- ✓ Design a spread footing for structural integrity. (2, 3, 6)
- ✓ Design a deep foundation for structural integrity. (2, 3, 6)
- ✓ Design a deep foundation for geotechnical capacity, and (for driven piles) evaluate drivability. (2, 3, 6)
- ✓ Design a retaining wall for structural and geotechnical capacity and integrity. (2, 3, 6)

#### Course Outline

- |   |  |
|---|--|
| 1. Introduction                           | 3. Soil Improvement                              |
| a) Foundations in Civil Engineering       | 4. Deep Foundations                              |
| b) Performance Requirements               | a) General                                       |
| 2. Shallow Foundations                    | b) Capacity, Static Methods                      |
| a) General                                | c) Capacity, Dynamic Methods                     |
| b) Bearing Capacity                       | d) Structural Considerations in Deep Foundations |
| c) Geotechnical Design of Spread Footings | e) Field Verification Methods                    |
| d) Structural Design of Spread Footings   | f) Design of Deep Foundations                    |
| e) Mat Foundations                        |  |

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<sup>1</sup> Reference materials can be downloaded (or hardcopies in some cases obtained if desired) from <http://www.vulcanhammer.net/utc/>

## 5. Retaining Walls

a) Lateral Earth Pressures

b) Types of Retaining Walls

c) Design Methods

### **Evaluation**

- Five (5) Homework Assignments @ 5% each: 25%
- Four (4) Unannounced Quizzes @ 4% each: 16%
- One (1) Mid-Term Test: 15%
- One (1) Design Project: 25%
- One (1) Final Examination: 19%

### **Course Policies**

- Due date for homework assignments will be announced when assignment is given. Homework turned in after due date will have 10% deducted from grade for each class period late. Homework turned in after last class session will be given a grade of zero.
- 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.
- All homework and tests must be on engineering paper. This comes in light green or buff color and is available with five squares to the inch from the UTC bookstore.
- 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, write down 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.
- You are encouraged to work homework with someone but your turned in work must be your own work.
- You are required to keep and assemble a three-ring (or other suitable binding) notebook with the following divisions in it:
  - Homework
  - Quizzes
  - Tests
  - Reports
  - Class Notes (Optional)

You will turn this notebook in at the final exam. It will be inspected and returned to you.

- 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.

### **Disabilities**

- If you are a student with a disability and think that you might need special assistance for a special accommodation in this class or any other class, call the Office for Students with Disabilities/College Access Program at 755-4006 or come by this office, 110 Frist Hall. Examples of disabilities might include blindness/low vision, communication disorders, deafness/hearing impairments, emotional/psychological disabilities, and other health impairments. This list is not exhaustive.