

Tennessee Technological University  
Department of Civil & Environmental Engineering  
CEE 4800 – Geotechnical Engineering I  
Required  
Fall Semester 2007, Spring Semester 2008

2007 Catalog Data: CEE 4800: Geotechnical Engineering I. Lecture 3. Credit 3. Soil physical properties, classification, permeability and seepage, consolidation, design and analysis of foundations. Prerequisites: CEE 3030, GEOL 3210.

Textbook: Braja M. Das, *Foundation Engineering*, Sixth edition, PWS Publishing, 2007

Reference: None

Coordinator: E.P. Ryan, Associate Professor of Civil Engineering

Goal: The goal of CEE 4800 “Geotechnical Engineering” is to introduce the student to the theories and methods used in analysis and design of foundations of structures.

Course learning objectives:

1. The student is to become aware of the principles of soil mechanics.
2. The student is to become knowledgeable about the use of soil mechanics principles in the analysis and design of various foundation systems.

Course measurable outcomes:

Students will be expected to:

1. understand engineering properties of soils;
2. understand the flow of water through soils;
3. understand the consolidation and settlement of soils;
4. understand the shear strength of soil;
5. understand the analysis and design of shallow foundations;
6. understand lateral earth pressure;
7. understand retaining wall stability; and
8. understand the analysis and design of pile foundations.

Topics covered: (Three lecture classes per week, 55 minutes each)

1. Nature of soils, soil volume-weight relations, soil classification (4 classes)
2. Flow of water in soil, permeability and seepage, flow nets. (6 classes)
3. Stresses in a soil mass, effective stress, Boussinesq equation, Newmark influence chart, 2:1 method pressure distribution (2 classes)
4. Consolidation of clays, settlement analysis (6 classes)
5. Subsurface exploration (2 classes)
6. Design of foundations on clay, footings, piles, piers (6 classes)
7. Design of foundations on sand, footings, piles, piers (6 classes)
8. Footings subjected to moment (4 classes)
9. Earth pressure and retaining walls (4 classes)
10. Examinations (2 classes)

Contribution of the course to meeting professional component:

This course is a part of engineering topics of the curriculum.

ABET category content as estimated by faculty member who prepared this course description:

Engineering Science: 1 credit or 33%  
Engineering Design: 2 credits or 67%

Relation of course to program outcomes:

- Outcome 1: The graduates will have a broad understanding of the relevant principles of mathematics, science, and engineering.
- Outcome 2: The graduates will have a general comprehension of four technical areas appropriate to civil engineering.
- Outcome 4: The graduates will be capable of design activities and have the ability to identify, formulate, and solve civil engineering problems.

Relation of course to ABET Criteria:

General Criteria

Bloom's Level of Achievement

- |      |   |   |
|------|---|---|
| (3a) | Knowledge of math, science, engineering             | 2 |
| (3c) | Design a system, component or process               | 4 |
| (3e) | Identify, formulate, and solve engineering problems | 4 |

Program Criteria

Bloom's Level of Achievement

- |    |   |   |
|----|---|---|
| 1. | Apply knowledge of math and sciences  | 2 |
| 2. | Apply knowledge of four technical areas appropriate to civil engineering          | 3 |
| 3. | Design a system, component, or process in more than one civil engineering context | 4 |

Computer usage: None

Laboratory projects: None

Prepared by: E.P. Ryan

Date: September 2007