

University of Toledo

Construction Engineering Technology

Master Syllabus

Course Title: Soils, Foundations & Earth Structures

Course Code & Number: CET-4350

Credit Hour Total: 4 **Weekly Contact Hours Lecture:** 4 **Lab Hours:** 0

Prerequisite(s): CET-2220, CET-2250

Text: Soils and Foundations, 8th Ed.
Liu & Evett ISBN: 978-0135113905
(Special Custom Edition, Chapters 9-13)

Software: None

Course Coordinator: Mata

A. **Course Description** (Approved catalog description.)

This course covers the application of advanced soil mechanics topics which allow for proper design and analysis of foundations. Bearing capacity, shallow and deep foundations (both piles and drilled shafts) as well as soil settlement and slope stability are emphasized. Retaining wall design and OSHA excavation guidelines are also covered.

B. **Related Program Outcomes:**

Upon successful completion of the Construction Engineering Technology program, graduates will have:

ABET/Student Outcomes

- a. an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;
- b. an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
- f. an ability to identify, analyze, and solve broadly-defined engineering technology problems;

Program Criteria Outcomes

2. A development of mathematical skills sufficient to solve and analyze technical problems associated with construction projects including building, highway and heavy construction.
3. The ability to demonstrate a thorough knowledge of common construction methods and design procedures associated with building, highway and heavy construction projects.
8. An understanding of codes and specifications in the implementation of building and highway projects.
10. An understanding of the mechanics of structural design.

Evidence of the success of these outcomes is provided by the collection and analysis of:

- Deep & Shallow Foundation Problems
- Retaining Wall Design Problems
- OSHA Excavation Regulation Problems

C. Course Objectives:

At the completion of the course the student will have:

1. An understanding of the fundamental soil types with regards to design processes.
2. The ability to calculate horizontal earth pressures and skin friction values.
3. The ability to choose and design appropriate soils retaining structures.
4. The ability to design caisson and pile foundations.
5. The ability to design sheet piling structures.
6. The ability to design shaft and tunnel liners.
7. An understanding of OSHA excavation regulations.

D. Course Outline – Major Content Areas

1. Review of Engineering Properties of Soils, Stress Distributions and Settlement
2. Review of Shallow Foundations and Bearing Capacity
3. Pile Foundations
4. Drilled Caissons
5. Lateral Earth Pressure
6. Retaining Structures
 - i) Cantilever Walls
 - ii) MSE Walls
 - iii) Sheet Piling Structures
 - iv) Shaft & Tunnel Liners
7. Stability Analysis of Structures
8. OSHA Excavation Guide Lines

E. Suggested Laboratory Tests

None