PENNSTATE

Civil and Environmental Engineering at Penn State

# Syllabus
# CE 512 Soil Mechanics II
# Fall 2006


**Instructor:** Dr. Angelica Palomino

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**Lecture:** MWF 1:25 – 2:15pm

110 Walker

**Office Hours:** MW 2:15 – 4pm, or by appointment

**ANGEL:** https://cms.psu.edu/

The ANGEL system will be used for communication, postings, and other course-related items as the need arises.

**Text:** (Recommended, not required) Holtz, R.D. and Kovacs, W.D. (1981), *An Introduction to Geotechnical Engineering*, Prentice-Hall, Englewood Cliffs, NJ.

****Class Notes and references provided during the semester will be the primary resources****

**Reference Texts:** The following items are held on reserve in the Engineering Library (325 Hammond Building) for CE 512:

- An introduction to geotechnical engineering / Robert D. Holtz, William
- Soil mechanics, *SI version* / T. William Lambe, Robert V. Whitman
- Soil mechanics *(English units version)*/ T. William Lambe, Robert V. Whitman.

## Course Evaluation

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|---|---|---|---|
| Midterm | 15% | Project Report | 30% |
| Final Exam | 25% | Project Presentation | 10% |
| | | Homework | 20% |

Every student is responsible for upholding the academic integrity policy. For more information, see http://www.engr.psu.edu/CurrentStudents/acadinteg.asp

## Course Goals

Evaluation of Engineering Properties of soils and Theoretical Analyses to predict behavior by:

1. Identifying the basic characteristics and properties of single particles and particle systems (e.g. soils)
2. Understand the steady-state flow of water through soils
3. Understand the concept of effective stress in soils
4. Understand stress-strain behavior of soils
5. Apply soil mechanics concepts to stability and settlement analyses

## Course Topics

| Part | Topic |
|---|---|
| I | **Introduction**<br>Failures, History of Geotechnical Engineering<br>Materials and internal spatial scales |
| II | **Nature of Soil: Introductory Concepts**<br>soil formation and types, properties of a single particle; characteristics of particulate media, Phases and phase relations, index properties, classification systems<br>**Coarse-grained soils**<br>packing and fabric<br>**Fine-grained soils**<br>clay-water forces, interparticle forces, fabric |
| III | **Dry soil**<br>Mohr's Circle, Stress Paths, Elastic Stress Distribution, stress-strain and strength behavior of sands, bearing capacity of sands, settlement of sands |
| IV | **Saturated Soil (No or Steady State Flow)**<br>Capillarity, effective stress principle, one- and two-dimensional flow, Coefficient of Permeability, Stress-strain and strength behavior of clays, drained shear behavior, strength principles, lateral earth pressure, slope stability and bearing capacity |
| V | **Saturated Soil (Transient Flow)**<br>Pore Pressure Parameters, Undrained Shear Behavior of Clays, Strength Principles, consolidation of fine-grained soils, evaluation of stability, settlement analysis |