CE 534 Design of Earth Structures  
Fall 2007  
** Course Information **

Instructor: Prof. Amy Rechenmacher  
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Lectures: M 6:30 to 9:10 pm, KAP 138

Office Hours: TBA and by appointment

Course Website: via Blackboard, CE 534 on https://blackboard.usc.edu/

Course Description: The course focuses on analysis and design of geotechnical retaining structures (gravity walls, braced/supported excavations) and slope stability. Considerable emphasis will be placed on understanding soil behavioral concepts related to lateral earth pressure theories and the mobilization of soil failure for use in limit state design applications. Differences between total stress and effective stress analyses (and related strength parameters) will be emphasized throughout the semester.

Project: (tentative, depends on class enrollment) Each student will be assigned a scientific publication that covers a concept, example, or case history that compliments material covered in the class. The student will be expected to read and understand the paper, and provide a 20-30 minute “lecture” to the class (i.e. via a Power Point presentation), to “teach” the class the concepts covered in the paper. Likely we will group the presentations over 2-3 class periods, to be conducted towards the latter half of the semester. Note, the material covered in these presentations is intended to be part of the course content, and will be potentially covered on exams.

Homework: There will be about 5-6 “homework” assignments through the course of the semester. Each assignment will be due 2 weeks after it is assigned. The assignments will be timed to follow the course lecture content, so to keep up with the fresh material, please strive to not turn in assignments late.

Examinations: There will be one final exam at the end of the semester, date and time to be determined.

Tentative Grading:  
Homeworks: 30%  
Project: 35%  
Final Exam: 35%
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** Course Outline **

I. Introduction

II. Review of soil strength concepts (Mohr circle, stress paths)

III. Review of earth pressure theory
   A. Concepts
   B. Active Pressures (e.g. Coulomb, Rankine)
   C. Passive Pressures
   D. Movements to mobilize limit states

IV. Overview: types of retaining structures

V. Fill Walls
   A. Concrete/Gravity walls
   B. MSE walls

VI. Supported Excavations (excavated/cut walls)
   A. Sheet pile walls
   B. Internally braced excavations (struts)
   C. Externally braced excavations (tieback excavations)

VII. Methods of Slope Stability Analysis
   A. Historical background
   B. Methodology
      1. Overall equilibrium
      2. Method of slices (i.e. Bishop/Modified Bishop
      3. Sliding wedge and block approach
   C. Effect of water forces
   D. Soil shear strength selection
      1. Types of shear strength
      2. Types of analysis (effective vs. total stress)
      3. Comparison ESA vs. TSA
   E. Factors of Safety