CE 534 Design of Earth Structures
Fall 2015

Instructor: Prof. Amy Rechenmacher, arechenm@usc.edu
KAP 230D
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Lectures: Wednesdays, 6:30-9:15 pm.

Office Hours: Tuesdays 1:30-4:30 pm, Wednesdays 3-5 pm, or by appointment (KAP 230D)

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

Textbook: there is no textbook for this course. Supplemental materials will be provided.

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), related to short-term versus long-term performance, will be emphasized throughout the semester.

Homework: There will be about 6-8 comprehensive homework assignments through the course of the semester. Each assignment will be due 1-2 weeks after it is assigned.

Examinations: There will be one midterm exam (date to be announced) and one final exam at the end of the semester.

Grading:

Homework:	30%
Midterm Exam:	35%
Final Exam:	35%

Outline of Course Topics:

I. Advanced soil strength concepts (Mohr circle, stress paths)
II. Horizontal Stresses in soils
  A. Limit state analysis
  B. Movements to mobilize limit states
III. Classical lateral earth pressure theories
  A. Active Pressures (Coulomb, Trial Wedge, Rankine)
  B. Passive Pressures
IV. Overview of types of retaining structures
V. Fill Walls
  A. Concrete/Gravity walls
  B. Mechanically Stabilized Earth (MSE) walls
VI. Supported Excavations (excavated/cut walls)
  A. Sheet pile walls

B. Internally braced excavations (struts)
C. Externally braced excavations (tieback excavations)
D. Basal Stability
E. Wall movements

VII. Slope Stability Analysis
A. Historical background
B. Methodology
1. Overall equilibrium
2. Method of slices (i.e. Bishop/Modified Bishop methods)
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 stress (ESA) vs. total stress (TSA)
3. Comparison ESA and TSA