Underground Construction
CEE 495

Fall Quarter, 2015

2:00 – 3:50 MW
Room M177

Course Outline

I. Introduction

II. Stress distributions and deformations around openings
   - A. Elastic solutions
   - B. Elasto-plastic solutions
   - C. Ground reaction curves

III. Design of tunnel liners
   - A. Types of support systems
   - B. Factors affecting performance
   - C. Ground-structure interaction
     1. Rigid and flexible liner responses
     2. Empirical solutions
     3. Relative stiffness solutions
   - D. Recommended design procedures

IV. Soft ground tunnels
   - A. Construction methods
     1. Advancing the tunnel
     2. Ground water control
   - B. Ground movements
     1. Sources of movements
     2. Ground surface settlements
     3. Relation between movements into tunnel and ground surface settlements
   - C. Case studies

V. Shafts
   - A. Construction methods
     1. Supported excavations
     2. Self-sinking caissons
   - B. Design methodology
   - C. Case studies

VI. Design of openings in rock
   - A. Rock classification for engineering purposes
   - B. Unreinforced openings
   - C. Reinforced openings
     1. Steel Sets
     2. Rock bolts
     3. Shotcrete
     4. NATM

Course Grading

Class participation	10%
Homework	20%
Midterm	20%
Final Exam	50%

Final exam is scheduled for Monday December 7