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SOIL MECHANICS I
FALL QUARTER 2017

8:00-10:00 AM
Mon/Wed
Room LG 72

COURSE OUTLINE

- I. Introduction
 - A. Limit Versus Deformation Analyses
 - B. Factor of Safety in Geotechnical Engineering

- II. Shear Strength of Soils
 - A. Background
 - 1. Stress systems and stress space
 - 2. Stress paths
 - 3. Definition of failure
 - B. Laboratory Tests
 - C. Shear Strength of Granular Soils
 - 1. Drained behavior
 - a. Components of drained strength
 - b. Volume change behavior
 - 2. Consolidated undrained behavior
 - 3. Comments on uniqueness of critical state
 - 4. Comparison between drained and undrained behavior
 - 5. Cyclic behavior of sands
 - D. Shear Strength of Clays
 - 1. Drained Behavior -- Intrinsic vs. Natural Parameters
 - 2. Pore Pressure Parameters
 - 3. Undrained behavior
 - a. Factors affecting undrained strength
 - b. SHANSEP
 - 4. Cyclic behavior of clays

- III. Consolidation
 - A. Hydrodynamic effect in 1-D compression
 - B. Rate Effects
 - C. Secondary Compression

- IV. Stress-strain behavior
 - A. Critical State Soil Mechanics (idealized)
 - B. Differences between idealized and actual behavior
 - 1. Strain-dependent moduli
 - 2. Anisotropy
 - 3. History dependence

COURSE GRADING

Class participation	10%
Homework	15%
Midterm	30%
Final Exam	45%

SOURCES OF INFORMATION (a sampling)

- Journal of Geotechnical and Geoenvironmental Engineering, ASCE
formerly known as Journal of Geotechnical Engineering, Journal of the Geotechnical Engineering Division and Journal of Soil Mechanics and Foundations Division
- Canadian Geotechnical Journal
- Geotechnique
- Soils and Foundations
- Computers and Geotechnics
- Acta Geotechnical
- Italian Geotechnical Journal
- Proceedings of Specialty Conferences in Geotechnics, ASCE
- Proceedings of International Conferences on Soil Mechanics and Foundation Engineering
- Proceedings of Regional Conferences on Soil Mechanics, i.e., European, Asian, etc.
- Geotechnical Testing Journal, ASTM
- Transactions of ASCE
- Proceedings of Rapid Excavation and Tunneling Conferences
- International Journal for Numerical and Analytical Methods in Geomechanics
- Journal of Engineering Mechanics, ASCE
- Journal of Construction Engineering, ASCE
- Bulletin of the Association of Engineering Geologists
- Engineering Geology

Two classic reference books:

NAVFAC DM-7.1 Soil Mechanics

NAVFAC DM-7.2 Foundations and Earth Structures

Can be downloaded for free from <http://www.geolinks.com/ttl.php>

The Federal Highway Administration makes available engineering publications that are quite useful and cover many topics in Geotechnics. Many can be downloaded for free from: http://fhwa.dot.gov/enigneering/library_listing.cfm