CIVENV 450-2, Soil Mechanics II – Foundation Engineering
Winter Quarter, 2016
Mondays 5:00 – 9:00 PM, Tech LXXX

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Class Dates: 1/4, 1/11, 1/25, 2/1, 2/8, 2/15, 2/22, 2/29, 3/7, 3/14 (Final Exam) + 1 Floating Night/Day Session (to be scheduled to replace MLK Day)

COURSE SYLLABUS

I. INTRODUCTION
   A. Loading on Foundations
   B. Terminology – Ultimate vs. Allowable (Working), Capacity vs. Resistance
   C. Factors of Safety
   D. LRFD/Reliability-based Design Concepts

II. SELECTION OF PARAMETERS FOR FOUNDATION DESIGN (SELF-REVIEW OF 450-1)
   A. Shear Strength
   B. Deformation

III. BEARING CAPACITY OF SHALLOW FOUNDATIONS
   A. Terzaghi’s B.C. Theory and the General B.C. Equation
   B. Effects of Groundwater Table
   C. Eccentrically Loaded Foundations
   D. Foundations with Rigid Base at Shallow Depth
   E. B.C of Layered Soils
   F. B.C. of Foundations on/near Slopes
   G. Foundations on Rock

IV. SETTLEMENT OF SHALLOW FOUNDATIONS
   A. Stresses in Soil Mass Caused by Foundation Loads
   B. “Elastic” Settlements
   C. Consolidation Settlements
   D. Tolerable Settlements and Distortions of Structures

V. MAT FOUNDATIONS
   A. B.C. of Mats
   B. Compensated Foundations
   C. Structural Design of Mats

VI. PILE FOUNDATIONS
   A. Types of Pile Foundations
   B. Load Transfer and Estimating Pile Ultimate Resistance
   C. Ultimate Resistance in Sand and Clay
   D. Effective Stress Method
   E. Negative Shaft Resistance and Downdrag
   F. Pile Group Loading and Settlement
   G. Lateral Loading of Single Piles and Groups
H. Pile Load Testing and Dynamic Monitoring

VII. DRILLED SHAFTS
   A. Shaft Uses and Construction Methods
   B. Load Transfer and Estimating Shaft Ultimate Resistance
   C. Ultimate Resistance in Sand, Clay, and Rock
   D. Drilled Shaft Settlement
   E. Shaft Load Testing and Quality Control

VIII. SPECIALTY FOUNDATIONS
   A. Augercast/Continuous Flight Auger Piles
   B. Micropiles
   C. Deep Soil Mixing

REQUIRED COURSE TEXTBOOK
None

RECOMMENDED REFERENCES
NAVFAC DM-7.1 Soil Mechanics; NAVFAC DM-7.2 Foundations and Earth Structures.

COURSE GRADING
Class Participation 10%
Homework 20%
Project or Midterm Exam 30%
Final Exam 40%