COURSE SYLLABUS (2 Page)

Course Number: CEGR 3278
Course Name: Geotechnical Engineering

Credits and Contact Hours: 3

Instructor: Kimberly Warren

Textbook: *Title:* Geotechnical Engineering: Principles and Practices, 2nd Edition
Authors: Coduto, Yeung, and Kitch
Year: 2011

Other Supplemental Materials: Course Notes on Moodle 2 and Handouts

Catalog Description: Soil origin, formation, composition, and classification; permeability; seepage; soil mechanics principles, including stresses, shear strength, and consolidation; foundations, retaining structures, and slope stability. Integration of design and technical reporting.
Most Recently Offered (Day): Spring 2016, Fall 2015, Summer 2015
Most Recently Offered (Evening): Course has not been offered in 3 years

Pre-Requisites/Co-Requisites: MATH 2171 and MEGR 2144 with grades of C or above

Course is: Required (R)

Goals: Civil engineering students will be introduced to the fundamental concepts of soil mechanics. This is an introductory geotechnical engineering course. Upon completion of this course, students will be expected to (at a minimum):

1. Describe the Significance and applications associated with Geotechnical Engineering
2. Describe Basic Sampling and Subsurface Exploration Techniques
3. Develop a Soil Profile from a Set of Boring Logs
4. Solve Phase Diagram Problems While Manipulating Weight-Volume Relationships
5. Describe the Soil Structure and Index Properties of Fine and Coarse Grained Materials
6. Develop and Evaluate a Particle Size Distribution Curve
7. Gain Basic Knowledge of Clay Minerals
8. Properly Classify Soils using USCS and AASHTO Procedures
9. Evaluate a Compaction Curve and Determine the Range of Acceptable Field Conditions
10. Analyze One Dimensional and Two Dimensional Flow Systems
11. Calculate Pore Pressure, Total Stress, and Effective Stress in Soil
12. Calculate the Vertical Stress Distribution as a Result of Overburden Stresses and Surface Loads
13. Use Mohr's Circle to Analyze Soil Stress

14. Describe the Fundamentals of Consolidation
15. Calculate Consolidation Settlement
16. Analyze the Time Rate of Consolidation
17. Evaluate Data from Direct Shear, Triaxial, and Unconfined Compression Tests
18. Calculate the Shear Strength of Soil (Effective Stress and Total Stress Analysis)
19. Analyze a Single Failure Surface by Hand for Simple Slope Stability Problems
20. Analyze Lateral Earth Pressures for Simple Earth Retaining Structures
21. Calculate the Ultimate and Allowable Bearing Capacity of Foundation Soils

Student Outcomes Addressed:
In this course, students will develop the following Student Outcomes:

A. an ability to apply knowledge of mathematics, science, and engineering
E. an ability to identify, formulate, and solve engineering problems
F. an understanding of professional and ethical responsibility
I. a recognition of the need for, and an ability to engage in life-long learning
J. a knowledge of contemporary issues
K. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Course Topics:
Sampling and site exploration; soil structure, phase diagrams, soil classification, compaction, 1D and 2D Seepage; soil stress and Mohr's circle; total stress and effective stress; stress distribution; settlement and consolidation; shear strength; lateral earth pressures; bearing capacity; slope stability.