CE 482 Foundation Design 3 Units

USC | SONNY ASTANI DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

ABET Course Syllabus

Course Information, Textbook and Supplementary Materials

Capstone | Kernel

Course Description:

Analysis and design principles of building foundations, including spread footings, piles, drilled shafts, sheet-pile walls and retaining structures.

Capstone for: BSCE Structural **Design Kernel for:** BSCE and BSCE Environmental

Prerequisite: CE 467 Geotechnical Engineering

Co-Requisite: None

Required Textbooks:

1. *Soil Mechanics in Engineering Practice*, 3rd Edition, by Terzaghi and Peck, John Wiley & Sons, Inc., NY, NY, 1996.
2. *Naval Facilities Engineering Command Design Manual 7.02, Foundations & Earth Structures,* US Navy, 1986.

Reference: None

Topics Covered	Learning Outcomes
Review of soil mechanics and engineering properties of soils	1. Review Index properties and soil classification methods. 2. Review soil shear strength and mechanical properties
Soil Exploration and In situ Testing	3. Learn the basic steps in a Subsurface Exploration Program 4. Become familiar with methods for drilling and soil sampling 5. Understand the various in situ test methods and how to use in situ test results to determine soil properties
Theory and application of soil mechanics to foundation design	6. Understand "limit state" methods for determination of bearing capacity of shallow foundations 7. Learn standard design methods for sizing and analyzing settlements of spread footings 8. Learn design methods to size and estimate settlement of mat foundations 9. Learn standard design methods for evaluating capacity and deformations of deep foundations: piles and drilled shafts
Lateral earth pressure theory and applications for retaining wall design	10. Understand active and passive earth pressure theories 11. Learn and implement design considerations for gravity retaining structures 12. Learn basic design procedures for cantilever and anchored sheet pile walls 13. Learn basic design procedures for Mechanically Stabilized Earth (MSE) walls
Ground Improvement Methods	14. Learn various approaches to improving soil properties to enhance soil strength and decrease compressibility
Comprehensive Design Project	15. Learn to recommend and design the appropriate foundation type given soil exploration data and design constraints at a given site

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Lecture and Lab Schedule			
Lecture		**Lab**	
Sessions per Week	Duration per Session	Sessions per Week	Duration per Session
2	1.5 hours	n/a	

Relation of Course Objectives to Program Outcomes

The Civil Engineering program is designed to teach beyond the technical content of the curriculum and prepare the students to utilize what they learn in a professional setting.

This course contributes to the program outcomes as outlined in the adjacent table.

Course Contribution to Program Outcomes (a-k)	✓ Key
c. An ability to design a system component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	
e. An ability to identify, formulate and solve engineering problems.	
i. Recognition of the need for, and an ability to engage in life-long learning.	✓

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Date: Fall 2014