CIVE 550 – FOUNDATION ENGINEERING

Credits: 3

Term(s) to be offered: Fall 2013

Lecture Time: MWF 8:00 - 8:50 AM. The actual class schedule will be determined during the first class based on input from enrolled students.

Prerequisite(s): CIVE 355 (Introduction to Geotechnical Engineering)

Instructor: Geoff Chao – Vice President / Senior Geotechnical Engineer, Engineering Analytics, Inc.

Email: gchao@enganalytics.com

Office Hours: Fridays from 9:00 to Noon at Room No. 234 of the Lory Student Center


Additional Class Material: Handouts, PowerPoint slides, and worksheets provided by the instructor.

Course Description: This course will include the application of fundamental concepts of foundation analysis and design. Primary topics include overview of foundations, soil mechanics review, subsurface exploration, and selection and design of shallow and deep foundations in various site/soil conditions.

Course Objectives: This course is intended to provide students with the knowledge to design shallow and deep foundations. At the completion of this class, students should be able to:
- Interpret field and laboratory data to obtain design parameters,
- Identify major types of shallow and deep foundations,
- Determine the bearing capacity and settlement of shallow and deep foundations, and
- Select and design appropriate deep and shallow foundations in various site/soil conditions.

Instructional Method: Lecture, Reading, and Homework

Mode of Delivery: Classroom Instruction

Method of Evaluation: Homework (30%), Midterm Exam (25%), Final Exam (25%), and Project (details later) (20%).

Grading: Term grades for this course will use the following grading system: A ≥ 90; 90 > B ≥ 80; 80 > C ≥ 70; 70 > D ≥ 60; F < 60
## TENTATIVE COURSE OUTLINE

<table>
<thead>
<tr>
<th>Topics</th>
<th>Periods</th>
<th>Reading Assignments</th>
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<tbody>
<tr>
<td><strong>Overview:</strong> course objectives, foundation types, foundation design concepts, examples of foundation failure, and tolerable movement of buildings.</td>
<td>1</td>
<td>Handouts</td>
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<tr>
<td><strong>Subsurface Exploration:</strong> subsurface exploration program, drilling exploratory, sampling techniques, and in-situ soil tests.</td>
<td>1</td>
<td>Chapter 2</td>
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<tr>
<td><strong>Geotechnical Properties of Soils:</strong> basic geotechnical properties of soils, steady-state and transient seepage flow, effective stress, consolidation, and shear strength.</td>
<td>2</td>
<td>Chapter 1</td>
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<tr>
<td><strong>Shallow Foundations:</strong> design considerations, bearing capacity theories, ultimate and allowable bearing capacity, and elastic and consolidation settlements.</td>
<td>5</td>
<td>Chapters 3, 5, and 6</td>
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<tr>
<td><strong>Deep Foundations:</strong> design considerations of piles and piers, bearing capacity and settlement calculations, laterally loaded conditions, and group effect.</td>
<td>5</td>
<td>Chapters 11 and 12</td>
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<td><strong>Foundations on Problematic Soils:</strong> introduction of collapsible and expansive soils, laboratory testing of the soils, and foundation design considerations.</td>
<td>1</td>
<td>Chapter 13</td>
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