California State University, Fullerton
College of Engineering and Computer Science
Department of Civil and Environmental Engineering

EGCE 544-01 ADVANCED FOUNDATION ENGINEERING
SCH 18055
Spring Semester 2011

Instructor: Binod Tiwari, Ph.D.
Office: E-419
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Fax: (657) 278-3916
Email: btiwari@fullerton.edu

Class Meeting: M W 17:30 – 18:45
Class Room: UH-335
Units: 3

Pre requisite EGCE 418 or equivalent
Students registered for this course should have completed the prerequisite course. During the
semester, the department will verify the prerequisite requirements. If any student has
completed the prerequisite course at another school, please submit appropriate documents to
the department secretary. Otherwise, their name will be deleted from the class list at any time
during the semester.

Textbook

Reference Materials
• Handouts, website URLs, visuals, and other materials will be provided during class or
  posted on Blackboard.
• Soil Mechanics by Lambe and Whitman, John Wiley (1980).

Office Hours
Tuesday and Wednesday 13:00 – 15:00
As long as the office door is open, please feel free to walk in and consult. However, phone and
e-mail appointments are encouraged.

Course Description
Design of foundation for earthquake loading; design of foundation for problematic soils; design
of piles and caissons, ground surface subsidence, slope stability and stabilization; design of
anchored bulkheads and dam sections.

Course Learning Objectives
This course will provide the students with theory and experience-based knowledge necessary to analyze and design civil engineering structures such as retaining walls, excavation bracing systems, and shallow and deep foundations. Upon completion of this course the students will be able to:

- Investigate and evaluate subsurface soil conditions using techniques of geotechnical engineering, structural engineering, and construction engineering.
- Estimate soil properties from sources of information such as boring logs, visual descriptions, and index test results, in combination with textbooks and engineering manuals.
- Evaluate bearing capacity and settlement failure condition for shallow and deep foundations.
- Select the most suitable type of foundation for given site condition and design.
- Estimate total and effective horizontal earth pressures.
- Design retaining walls, sheet piles, and braced excavation supports.

**Topics Covered**

- Review of Geotechnical Properties of Foundation Materials
- Review of Shear Strength of Soil and Rock
- Sub-soil Exploration
- Design of Shallow Foundation for Static and Seismic Loadings
- Design of Shallow Foundation for Difficult Soil
- Design of Mat Foundation
- Analysis and Design of Pile Foundations
- Design of Drilled Shafts

**Program Educational Objectives**

The educational objectives of the program are as follows:

A) Technical Growth: Graduates will be successful in modern engineering practice, integrate into the local and global work force, and contribute to the economy of California and nation.

**Assessment of Student’s Learning**

The effect of this course on student’s learning ability will be assessed according to the following criteria:

- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to identify, formulate and solve engineering problems.

**Homework and Quizzes**

There will be several take home assignments during the course of the semester. Those assignments will be posted on the blackboard every week. Students should check the blackboard at least once a day. There will also be a number of quizzes of 5 minutes duration each. These quizzes will be based on the contents covered in the class. all assignments should be submitted neatly in a clean paper, one side of which should be left blank. New problem should be started on the fresh page. Assignment submission format and guidelines should be strictly followed.
Class Project
Students will be provided with a compilation of field geotechnical investigation reports. Each student is responsible to use those reports to make a complete geotechnical report and design foundation system for the assigned loading condition.

Scheduled Exams
There will be two mid-term exams. No make up exams will be conducted. However, if one misses a midterm exam for any university approved reasons, weight of the other midterm exam will be increased. However, students should inform the instructor in written well on time to get approval for such reasons. Missing of exams for non-approved reasons counts as zero score. The final exam will be comprehensive and will cover the contents covered in the entire class.

Grading Policy
The final letter grade will be computed using the following criteria:

- Homework/Quizzes: 10%
- Midterm Exam I: (March 14, 2011) 20%
- Midterm Exam II: (April 20, 2011) 20%
- Final Exam: (May 16, 2011, 17:00 -18:50) 30%
- Project: 20%

Letter Grades

- A’ (> 97%)  A (93 – 96.9%)  A’ (90 – 92.9 %)
- B’ (87 – 89.9%)  B (83 – 86.9%)  B’ (80 – 82.9 %)
- C’ (77 – 79.9%)  C (73 – 76.9%)  C’ (70 – 72.9 %)
- D’ (67 – 69.9%)  D (63 – 66.9%)  D’ (60 – 62.9%)
- F (< 60%)

Honor Code
- “California State University, Fullerton's Honor Code” explained in UPS 300.021 applies to all works performed in this class including homework, quizzes, and examinations. Students should strictly follow those codes.
- This is a professional course. A learning environment will be created in each class for motivated students; therefore professional conduct is expected of all participants. Professional conduct extends to use of cell phones, personal computers, iPods and PDAs during lecture. Students violating such professional conducts are subject to expulsion from the class.

Drop Policy
The Spring 2011 Schedule contains the University Regulations and Deadlines for dropping this course. Students should note that the department stamp and/or department chair’s signature is also required in addition to instructor’s signature to drop the course.

Students With Special Needs
Students who need adaptations or accommodations because of a disability (e.g. learning, attention deficit disorder, psychological, physical, etc.), or have emergency medical information to share with the instructor, or need special arrangements in case the building must be evacuated, are requested to make an appointment to discuss their needs with the instructor during the first week of classes.
<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Topic/s</th>
<th>Due Date</th>
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<td>1</td>
<td>January 24</td>
<td>Course Introduction</td>
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<td>Review of Geotechnical Properties of Foundation Materials</td>
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<td>Review of Subsoil Exploration</td>
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<td>February 2</td>
<td>Guest Lecture</td>
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<td>Review of Correlation in Geotechnical Engineering</td>
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<td>Review: Design of Shallow Foundation with UBC</td>
<td>Home Work # 1</td>
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<td>Review: Elastic Settlement</td>
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<td>16</td>
<td>Review: Consolidation Settlement</td>
<td>Home Work # 2</td>
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<td>5</td>
<td>21 President’s Day Campus Closed</td>
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<td>23</td>
<td>Design of Foundation for Seismic Loading</td>
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<td>Design of Eccentrically Loaded Foundation</td>
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<td>March 2</td>
<td>Review: Design of Combined Footing</td>
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<td>Review: Design of Mat Foundation System</td>
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<td>Review for Mid-term Exam 1</td>
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<td>14 Mid-term Exam 1</td>
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<td>Review: Design of Pile Foundation</td>
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<td>Pile Load Test</td>
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<td>Settlement of Pile</td>
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<td>Mar. 28 - Apr. 3 Spring Recess</td>
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<td>April 4</td>
<td>Design for Pile in Group</td>
<td>Home Work # 6</td>
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<td>Laterally Loaded Piles</td>
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<td>12</td>
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<td>Pile Driving Formula</td>
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<td>13</td>
<td>Difference Between a Pile and a Drilled Shaft</td>
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<td>18 Review for Mid-term Exam 2</td>
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<td>Design of Pile for Special Situation</td>
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<td>Design of Drilled Shaft</td>
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<td>May 2</td>
<td>Design of Laterally Loaded Drilled Shaft</td>
<td>Home Work # 9</td>
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<td>Foundation on Expansive and Collapsible Soil</td>
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<td>16</td>
<td>9</td>
<td>Soil Improvement and Ground Modification</td>
<td>Home Work # 10</td>
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<td>11</td>
<td>Review for Final Exam</td>
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**May 16, 2011 17:00-18:50** Final Exam
Emergency Procedures Notice to Students

The safety of all students attending California State University Fullerton is of paramount importance. During an emergency it is necessary for students to have a basic understanding of their personnel responsibilities and the University’s emergency response procedures. In the event of an emergency please adhere to the following guidelines

Before an emergency occurs-

1. Know the safe evacuation routes for your specific building and floor.
2. Know the evacuation assembly areas for your building.

When an emergency occurs-

1. Keep calm and do not run or panic. Your best chance of emerging from an emergency is with a clear head.
2. Evacuation is not always the safest course of action. If directed to evacuate, take all of your belongings and proceed safely to the nearest evacuation route.
3. Do not leave the area, remember that faculty and other staff members need to be able to account for your whereabouts.
4. Do not re-enter building until informed it is safe by a building marshal or other campus authority.
5. If directed to evacuate the campus please follow the evacuation routes established by either parking or police officers.

After an emergency occurs-

1. If an emergency disrupts normal campus operations or causes the University to close for a prolonged period of time (more than three days), students are expected to complete the course assignments listed on the syllabus as soon as it is reasonably possible to do so.
2. Students can determine the University's operational status by checking the University's web site at http://www.fullerton.edu, calling the University's hotline number at 657-278-0911, or tuning into area radio and television stations. Students should assume that classes will be held unless they hear or read an official closure announcement.

EMERGENCY CALLS

DIAL 9-1-1
All campus phones and cell phones on campus reach the University Police Department

Non-emergency line: (657) 278-2515

24-hour recorded emergency information line: (657) 278-0911
(657) 278-4444