Department of Civil and Environmental Engineering Course Description and Outline

Fall 2016 CE 643 – Advanced Foundation Engineering

Course Description:
This course will describe methods of analysis, design and monitoring of earth retaining structures, including gravity and cantilever walls, as well as braced excavations. Initially, the course will give an overview of site investigation methods and emphasize the importance of soil parameter selection in geotechnical problems. The lectures will also cover soil-structure interaction, slope stability, techniques for ground improvement and mechanically-supported earth walls and slopes. Throughout the course the students will also be exposed to the modeling and analysis of geotechnical problems using the Finite Element code Plaxis.

Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Assignments</th>
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</thead>
</table>
| 1    | Introduction  
Soil classification  
Site investigation:  
- Drilling and soil sampling methods |                                            |
| 2    | Soil properties based on in-situ testing  
Geotechnical design:  
- Emphasis on the selection of soil parameters for ultimate and serviceability limit state calculations |                                            |
| 3    | Earth retaining structures - Introduction  
Earth pressures - Review |                                            |
| 4    | Gravity and cantilever retaining walls  
Propped walls  
Sheet-pile walls | Assignment 1 - Gravity and cantilever retaining walls |
| 5    | Design of anchors and tiebacks  
Braced excavations | Assignment 2 - Braced excavations          |
| 6    | Braced excavations | Due Assignment 1                          |
| 7    | Introduction to Finite Element modeling  
Modeling of an excavation problem in Plaxis  
Guest speaker - Deep-excavation project | Due Assignment 2                          |
<p>| 8    | Midterm |                                            |</p>
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<tr>
<th></th>
<th>Topic</th>
<th>Due Assignment 3</th>
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<tr>
<td>9</td>
<td>Soil-structure interaction</td>
<td>Assignment 3 - Plaxis: Braced excavation</td>
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<tr>
<td>10</td>
<td>Slope stability</td>
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<td>11</td>
<td>Guest speaker - Slope stability project</td>
<td>Assignment 4 - Slope stability</td>
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<td>Modeling of a slope stability problem in Plaxis</td>
<td>Due Assignment 3</td>
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<td>12</td>
<td>Mechanically stabilized earth walls and slopes:</td>
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<td></td>
<td>- Reinforced soil</td>
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<td></td>
<td>- Nailed soil</td>
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<tr>
<td>13</td>
<td>Ground improvement</td>
<td>Due Assignment 4</td>
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<tr>
<td>14</td>
<td>Open topic (To be defined by the class)</td>
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<tr>
<td>15</td>
<td>Final</td>
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**Basis of Grading:**

- 40% - Assignments
- 20% - Midterm exam
- 30% - Final exam
- 10% - Class participation

Final grades are determined as follows:

- A – Above 90%
- B – 80 – 89%
- C – 70 – 89%
- D – 65 – 69%
- F – Below 65%

**Policies:**

- The class notes can be used in the mid-term and final exams. No other textbooks, notes, or internet can be used.
- The NJIT Honor Code will be upheld and any violations will be brought to the immediate attention of the Dean of Students.
- Students will be notified by the instructor of any deviations from the syllabus.
- Students should bring the class notes posted on Moodle, calculator and writing paper to the class.
- Work should be submitted in a professional manner.
- Students should always keep a copy of their assignments.
- Home assignments must be done on 8 ½”x11” engineering calculation paper.
- No electronic versions of the home assignments will be accepted.
Home assignments are due at the beginning of the class indicated in the schedule above. Late submittals will incur a 50% grade deduction.

Laptops and cell phones should be switched off during quizzes and exams.

No recording devices shall be used during class or exams.