## Course Name Number (CIVE 385) – Geotechnical Engineering

### Term – SPRING 2016 (201601)

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Office Hours</th>
</tr>
</thead>
</table>
| Dr. Yasser Abdelghany Ph.D.; P.Eng. | Days: Fridays  
E-mail: abdelgha@uvic.ca  
Time: 11:30 am – 12:30pm or by appointment  
Location: to be announced |

**List all prerequisites and co-requisites:** 285, MECH 220

### LECTURE DATE(S)

| Section: A /CIVE 385 | Days: Thursdays and Fridays | Time:  
Th 11:30 am - 12:50 pm  
F 10:00 am - 11:20 am | Location:  
Th: ECS Bldg 104  
F: CORB 135 |

Lecture times and locations are also available from the timetable through Sign in to UVic, My Page.

### TUTORIAL SECTIONS

<table>
<thead>
<tr>
<th>Section:</th>
<th>Days:</th>
<th>Time:</th>
<th>Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fridays</td>
<td>F 11:30 am - 12:20 pm</td>
<td>F: CORB 135</td>
</tr>
</tbody>
</table>

Tutorial times and locations are also available from the timetable through Sign in to UVic, My Page.

### LAB SECTIONS

<table>
<thead>
<tr>
<th>Section: B (Multiple)</th>
<th>Days:</th>
<th>Time:</th>
<th>Location:</th>
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</thead>
<tbody>
<tr>
<td>(or leave blank and state how/when labs will be scheduled)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lab #1:</td>
<td>Fridays (Alternate Biweekly)</td>
<td>2:30 pm - 5:20 pm</td>
<td>ISC 370</td>
</tr>
<tr>
<td>Lab #2:</td>
<td>Fridays (Alternate Biweekly)</td>
<td>2:30 pm – 5:20 pm</td>
<td>ISC 370</td>
</tr>
<tr>
<td>Lab #3:</td>
<td>Thursdays (Alternate Biweekly)</td>
<td>5:00 pm - 7:50 pm</td>
<td>ISC 370</td>
</tr>
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Lab times and locations are also available from the timetable through Sign in to UVic, My Page.

<table>
<thead>
<tr>
<th>TA Name</th>
<th>E-mail</th>
<th>Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peiman Azarsa</td>
<td><a href="mailto:azarsap@uvic.ca">azarsap@uvic.ca</a></td>
<td>To Be Announced</td>
</tr>
</tbody>
</table>
Required Text:
Title: Principles of Geotechnical Engineering 8th Ed.
Author: B. Das & K. Sobhan
Publisher/Year: Nelson 2014

Title: Principles of Foundation Engineering 8th Ed.
Author: B. Das
Publisher/Year: Nelson 2014

Optional Text

Reference Materials:
Laboratory Manual will be circulated by email

COURSE OBJECTIVES: Soil is one of the oldest construction and foundation materials known to humankind. In spite of the fact that dealing with soil is ageless, the science of geotechnical engineering has only been developed in the twentieth century. In many cases a knowledge of how a soil behaves is sufficient to solve a given geotechnical problem, however, an understanding of why a soil behaves in a certain manner, serves the geotechnical engineer in optimizing the solution for the problem.

- The main objectives of this course is to develop an understanding of the factors determining and controlling the engineering properties of soils, with emphasis on the “why” aspect of soil behavior. Other Objectives of this course include the knowledge of soil behavior as a three physical states medium under various types of loading and unloading, shear strength theories for both cohesionless and cohesive soils. This is very important for the soil investigation program.
- To develop understanding of the concepts, theories and procedures of design for different types of foundations. The student will learn to calculate the capacity of shallow and deep foundations.

LEARNING OUTCOMES: At the end of this course, students will be able to:

- Learn how to implement a Soil Investigation Program and perform Soil Classification Analyses
- Judge when shallow foundations should be considered and Recognize the failure modes of shallow foundations and Determine the bearing capacity of shallow foundations on soils and learn to calculate vertical stress distribution below a shallow foundation and Find the primary consolidation settlement of shallow foundations on cohesive and non-cohesive soils
- Learn about the when you can effectively use piles foundations and what shall be considered during the design phase and Grasp the principles and the detailed design process of piles foundations under vertical and lateral loads together with settlement analyses.
- Develop confidence in piles foundations design under vertical and lateral loads gained from detailed design examples and achieve knowledge principles in the pile foundations design.
- Use analytical techniques for shallow and deep foundation systems design, as well for slope stability and retaining walls design.

<table>
<thead>
<tr>
<th>Weight &amp; Date(s) of Assessments</th>
<th>Weight</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Assignments and Quizzes:</td>
<td>15%</td>
<td>TBD</td>
</tr>
<tr>
<td>Labs and Lab Reports</td>
<td>15%</td>
<td>Biweekly</td>
</tr>
<tr>
<td>Mid-term</td>
<td>20%</td>
<td>Date: Friday, February 26th, 2016</td>
</tr>
<tr>
<td>Final Exam</td>
<td>50%</td>
<td>Date: TBA</td>
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Course Outline - Spring 2016

Updated November 2015
ASSIGNMENTS and QUIZZES

Minimum Five problem sets will be distributed over the course of the term. The assignment problems will be predominantly hand calculations. Assignments are to be completed individually. Assignment hardcopy submissions are to be made to the CIVE 385 in the Class in its due date. Hardcopy submissions must be completed. Also few Quizzes for assigned problems will be used to evaluate students understanding and performance and to be solved individually in the class.

LABORATORIES

CIVE 385 – GEOTECHNICAL ENGINEERING LABORATORY
Laboratories: Yasser Abdelghany, Ph.D., P.Eng.
Email: abdelgha@uvic.ca
Laboratory rooms: B01/B02/B03 ISC370
Weight of laboratory and lab reports: 15 %.
Reference: Laboratory Manual;

Lab Session Organization:
• Students will work into groups of four. Each group member shall continue working with the same group in all experiments unless the lab instructor advises with other group distribution.
• Each group will perform the experiments on an assigned soil sample
• Student attendance and participation with his/her group is a must. No Lab reports will be accepted for any of the students who did not attend the lab experiment in it is due time with his/her group except in case of sickness or major problems as clarified below.
• For logistics, organization and time efficiency, each student shall attend with his/her section and group permanently. Changing sections and alternating between the lab sections will not be allowed.
• Students are expected to arrive at the lab session on time, and to conduct themselves during class in a professional and respectful manner that is not disruptive to others.
• A student who misses a lab session may not attend another session to make up the lab unless authorized by the lab instructor. Only in case of absence due to sickness or other major problems, the absent student may be given an opportunity to attend the same experiment he/she missed with the other section the following week after consulting and seeking the approval from the lab instructor providing he or she provides a formal medical notice in case of a medical reason or by an in advance email notification to the lab instructor, in case of any other major problems or excuses and the instructor will decide based on the case facts submitted.
• All apparatus, benches and floors shall be left clean. Failure in doing so will result in mark reduction for all members of the group.
• Students shall pay attention not to misuse, break or loss of equipment part or parts. Each group member shall be very careful with machine or equipment usage.

Reports
• Each student shall submit a separate individual report for each experiment in the following lab session of his or her section. Late report submission will be subject to an automatic penalty of 10% reduction per day after the deadline.
• The original data neat sheets for each experiment should be stapled to the report appendix. One Group report will not be accepted.
• Each report must include an introduction and shall cover the following sections: objectives, reference of standard procedure followed, deviations of actual performed laboratory experiment from the standard procedure, reported data, calculations, test results, analyses and observations, discussions and conclusions and appendix, references. Missing any of these sections will result in report mark reduction.
• The report shall be clear and graphical and tabular methods should be used. Minimum font of 12 Times
New Romans, and line Spacing of 1.5 shall be considered for Report Body paragraphs. Report Section titles shall be font Times New Romans 14 bold.

- The report will be graded on its neatness, clarity and content. Particular emphasis will be placed on the analysis of data. The student should compare the measured results with published values whenever possible for a specific soil.

**Plagiarism:**

Each Student must write his or her own individual report or Assignment in his or her own words. It is understood that the group members works together in the experiment and share the experiment data only, discussion between group members is allowed. But each individual report shall reflect the student ideas. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence. Copy and paste exact paragraphs from each other reports and submitting similar reports may be considered an action of Plagiarism and no mark for such lab report.

*Based on Schedule, There is also a chance for other Demonstration Lab Experiment and/or Field Test.

<table>
<thead>
<tr>
<th>Lab #</th>
<th>Modules</th>
<th>Start</th>
<th>Due Dates</th>
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</table>
| 1     | EXPERIMENT 1 - Classification of Soils - Particle Size Distribution of Soil – Sieve Analysis and Water Content | B3 21st Jan.  
B1 22nd Jan.  
B2 29th Jan. | TBD |
| 2     | EXPERIMENT 2 - Consistency Limits - Atterberg Limits (Liquid Limit; Plastic Limit) and Pocket Penetrometer (Undrained Shear Strength of Cohesive Soils) | B3 4th Feb.  
B1 5th Feb.  
B2 19th Feb. | TBD |
| 3     | EXPERIMENT 3 – Soil Compaction | B3 18th Feb.  
B1 26th Feb.  
B2 4th March | TBD |
| 4     | EXPERIMENT 4 – Specific Gravity | B3 3rd March  
B1 11th March  
B2 18th March | TBD |
| 5     | EXPERIMENT 5 – Vane Shear Test | B3 17th March  
B1 1st April*  
B2 1st April* | TBD |

*8th - 12th February reading Break; 8th February Family Day “Statutory Holidays”; 25th March Good Friday “Statutory Holiday”*;

**NOTE:**

Failure to complete all laboratory requirements will result in a grade of N being awarded for the course. Failure to pass the final exam will result in a failing grade for the course.

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

**COURSE LECTURE NOTES**

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.
There will be no supplemental examination for this course.

GENERAL INFORMATION

Note to Students:
Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair’s Secretary to set up an appointment.

“Attendance
Students are expected to attend all classes in which they are enrolled. An academic unit may require a student to withdraw from a course if the student is registered in another course that occurs at the same time.

An instructor may refuse a student admission to a lecture, laboratory, online course discussion or learning activity, tutorial or other learning activity set out in the course outline because of lateness, misconduct, inattention or failure to meet the responsibilities of the course set out in the course outline. Students who neglect their academic work may be assigned a final grade of N or debarred from final examinations.

Students who do not attend classes must not assume that they have been dropped from a course by an academic unit or an instructor. Courses that are not formally dropped will be given a failing grade, students may be required to withdraw and will be required to pay the tuition fee for the course.” UVic Calendar, (2015) http://web.uvic.ca/calendar2015-09/FACS/UnIn/UArE/Atte.html

Accommodation of Religious Observance (AC1210) http://web.uvic.ca/calendar2015-09/GI/GUpo.html

Discrimination and Harassment Policy (GV0205) http://web.uvic.ca/calendar2015-09/GI/GUpo.html

Faculty of Engineering, University of Victoria Standards for Professional Behaviour
“It is the responsibility of all members of the Faculty of Engineering, students, staff and faculty, to adhere to and promote standards of professional behaviour that support an effective learning environment that prepares graduates for careers as professionals....”

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour which contains important information regarding conduct in courses, labs, and in the general use of facilities.
http://www.uvic.ca/engineering/current/undergrad/index.php #section0-23

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the Undergraduate Calendar for the UVic policy on academic integrity.

Policy on Academic Integrity http://web.uvic.ca/calendar2015-09/FACS/UnIn/UArE/PoAcI.html

Course Schedule

<table>
<thead>
<tr>
<th>Module</th>
<th>Topics</th>
<th>Date/Week</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Introduction, Scope of Course and Origin of Soil and Grain Size</td>
<td>Start January 7th, 2 lectures</td>
</tr>
<tr>
<td>2</td>
<td>Geotechnical Properties of Soil, Weight-Volume Relationships / Plasticity and Structure of Soil</td>
<td>2 lectures</td>
</tr>
<tr>
<td>3</td>
<td>Index and Classification of Soil and Evaluation of Soil Properties</td>
<td>2 lectures</td>
</tr>
<tr>
<td>4</td>
<td>Soil Compaction</td>
<td>1 to 2 lectures</td>
</tr>
<tr>
<td>5</td>
<td>Natural Soil Deposits and Subsoil Exploration</td>
<td>1 to 2 lectures</td>
</tr>
<tr>
<td>6</td>
<td>Permeability and Seepage and Ground Water flow</td>
<td>2 lectures</td>
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<tr>
<td>7</td>
<td>Compressibility of Soil and Consolidation of Soils</td>
<td>2 lectures</td>
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<tr>
<td>8</td>
<td>Stress and Strains in Soil Mass and Shear Strength of Soils</td>
<td>2 lectures</td>
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<tr>
<td>9</td>
<td>Shallow Foundations</td>
<td>2 lectures</td>
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<tr>
<td>10</td>
<td>Deep Foundations</td>
<td>2 to 3 lectures</td>
</tr>
<tr>
<td>11</td>
<td>Slope Stability and Retaining Structures</td>
<td>2 lectures</td>
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