Western University - Faculty of Engineering
Department of Civil and Environmental Engineering

CEE 3322b – Introduction to Geotechnical Engineering - Course Outline 2020/21

This is the second course in soil mechanics and geotechnical engineering for students enrolled in the Department of Civil and Environmental Engineering. The students are required to attend lectures, participate in laboratory sessions to measure the engineering properties of soil, interpret experimental data, attend tutorial sessions, prepare complete and concise laboratory reports. The general objectives are for the student to become able to:

- Calculate total and effective stress in soil
- Analysis of simple stress distribution in soil medium.
- Understand the concepts of soil consolidation including primary consolidation, secondary compression and time-rate of consolidation.
- Analyse one-dimensional settlement
- Understand soil shear strength and its measurement using laboratory experiments
- Introduction to stability of slopes

Calendar Copy:
A continuation of CEE 3322B. One dimensional settlement and consolidation theories for clayey soils, shear strength models, and assessment of slope stability.

Prerequisites:
CEE 3321A, CEE220A/B

Antirequisites:
None

Note: It is the student's responsibility to ensure that all Prerequisite and Corequisite conditions are met or that special permission to waive these requirements has been granted by the Faculty. It is also the student's responsibility to ensure that they have not taken a course listed as an Antirequisite. The student may be dropped from the course or not given credit for the course towards their degree if they violate the Prerequisite, Corequisite or Antirequisite conditions.

Contact Hours:
3 lecture hours/week;
Lectures will be delivered asynchronously through pre-recorded videos posted to the course OWL site. Lectures will be organized into learning modules which students should review on a weekly basis. Review of lecture material and self-study should take approximately 6 hours per week.

A 2-hour laboratory session will be delivered synchronously through Zoom every two weeks during the scheduled laboratory hour. Attending laboratory sessions and submitting laboratory reports are mandatory. The link to the Zoom meeting will be posted to OWL.
A 2-hour tutorial session will be delivered synchronously through Zoom every two weeks during the scheduled tutorial hours. Tutorials are not mandatory but students seeking assistance with weekly assignments or clarification on lecture material are strongly encouraged to attend. The link to the Zoom meeting will be posted to OWL.

All of the remote learning sessions for this course may be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals participating in the course for their private or group study purposes. Please contact the instructor if you have any concerns related to session recordings.

Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

**Instructor:**
Professor Abouzar Sadrekarimi, SEB 3010D
asadrek@uwo.ca
Office hours: Wednesdays 10:30 am - 12:30 pm via Zoom

Administrative Assistant: Sandra McKay (smckay@uwo.ca)

**Textbook:**

Course notes are available on OWL and can be downloaded from the course website ([http://owl.uwo.ca](http://owl.uwo.ca)).

**Lab manual:**

**Laboratory:**
All laboratory training will be through online videos and live sessions will be conducted to answer any questions. Three mandatory laboratory reports should be submitted for:
A) Consolidation Oedometer Test
B) Direct Shear Test
C) Triaxial Compression Shear Test

Laboratory reports should be prepared in groups and submitted online to the course website by the specific due dates which will be announced by the instructor. Late reports will be deducted 0.5 (out of 4 marks) per day and will not be accepted 7 days after the due date. All reports should be typewritten and graphs prepared using a professional drawing software (e.g., MS Excel), and converted to a PDF file for submission. Every report should include a mandatory cover page showing the experiments title, submission date, student name and number.

Computing:

Assignments may require the use of Microsoft Excel for calculation and developing engineering plots.

Units:
Both SI and FPS unit systems may be used in lectures, tutorials and examinations.

Specific Learning Objectives:
The lectures and tutorial assignments will prepare students to do the following [GA Indicator]:
1. Effective Stress
   a) Calculate the total stress, pore pressure and effective stress in soil [PA2]
   b) Define the distribution of stress in the ground using simple methods
2. Soil Compressibility and Settlement Analysis
   a) Describe the components of soil settlement
   b) Calculate immediate settlement of soil
   c) Perform consolidation tests
   d) Calculate the preconsolidation pressure, compressibility, coefficient of consolidation and stiffness of soils from consolidation test data [PA2]
3. Time Rate of Consolidation
   a) Calculate the degree of consolidation and degree of settlement of clay soils using analytical and finite difference solutions [PA2]
   b) Describe the concept of secondary consolidation
4. Shear Strength of Soils
   a) Define the soil shear strength for short- and long-term conditions
   b) Use Mohr-Coulomb failure criterion to define failure in soil [PA2]
   c) Describe the shear strengths of sand and clay [PA2]
   d) Measure the shear strength of sands and clays in lab and in-situ
5. Introduction to Stability of Slopes
   a) Understanding the fundamentals of limit equilibrium analysis
   b) LEA methods and their differences

The instructor may expand or revise material presented in the course as appropriate.
General Learning Objectives:

E=Evaluate, T=Teach, I=Introduce; (I) = Introduction, (D) = Developing, (A) = Advanced level

<table>
<thead>
<tr>
<th>Knowledge Base</th>
<th>E</th>
<th>Problem Analysis</th>
<th>T</th>
<th>Engineering Tools</th>
<th>T</th>
<th>Impact on Society</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigation</td>
<td>T</td>
<td>Team Work</td>
<td>I</td>
<td>Ethics and Equity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>I</td>
<td>Communication</td>
<td></td>
<td>Economics and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Project Management</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Evaluation:
The final mark will be determined as follows:

Quiz Exam (1)               20 %
Quiz Exam (2)               20 %
Lab Reports                30 %
Written Final Examination   30 %
Total                      100 %

Note: Students who have failed this course previously must repeat all components of the course. No special permissions will be granted enabling a student to retain laboratory, assignment or test marks from previous years. Previously completed assignments and laboratories cannot be resubmitted.

Quizzes and Examinations:
Two 60-minute quiz exams will be scheduled during a Monday lecture period (8:30 to 9:30 am). The first quiz will be tentatively on Monday, February 22nd and the second quiz will be tentatively on Wednesday, March 17th. Both quizzes will be conducted using the OWL platform.

A three-hour written final examination will be held during the regular examination period. The exam will be conducted through the OWL platform. In addition to the material covered in the class lectures, the exams may include questions from the laboratory portion of the class. Students will need to bring their own calculator, straight edge, compass, and protractor to the exams.

Use of English:
In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for improper use of English. Additionally poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

Cheating:
University policy states that cheating is a scholastic offence. The commission of a scholastic offence is attended by academic penalties that might include expulsion from the program. If you are caught cheating, there will be no second warning. For more information on scholastic offenses, please see:
http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_undergrad.pdf

**Attendance:**
Any student who, in the opinion of the instructor, has not engaged sufficiently in class, laboratory, or tutorial periods will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be debarred from taking the regular final examination in the course.

**Accessibility:**
Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

**Accommodation:**
Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The accommodation policy can be found here: Academic Accommodation for Students with Disabilities.

**Academic Consideration for Student Absence**
Students will have up to two (2) opportunities during the regular academic year to use an on-line portal to self-report an absence during the term, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student’s final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence, unless noted on the syllabus. Students are not able to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar (e.g., December and April exams)
- absence of a duration greater than 48 hours,
- assessments worth more than 30% of the student’s final grade,
- if a student has already used the self-reporting portal twice during the academic year

If the conditions for a Self-Reported Absence are *not* met, students will need to provide a Student Medical Certificate if the absence is medical, or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office to obtain more information about the relevant documentation.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For Western University policy on Consideration for Student Absence, see
Policy on Academic Consideration for Student Absences - Undergraduate Students in First Entry Programs

and for the Student Medical Certificate (SMC), see:

Religious Accommodation
Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar.

Use of Recordings:
All of the remote learning sessions for this course will be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals under special circumstances. Please contact the instructor if you have any concerns related to session recordings. Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

Sickness and Other Problems:
Students should immediately consult with the Instructor or Department Chair if they have any problems that could affect their performance in the course. Where appropriate, the problems should be documented (see attached). The student should seek advice from the Instructor or Department Chair regarding how best to deal with the problem. Failure to notify the Instructor or Department Chair immediately (or as soon as possible thereafter) will have a negative effect on any appeal.

Students that are in emotional/mental distress should refer to Mental Health@Western http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.

For more information concerning medical accommodations, please see:
http://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf

Conduct:
Some components of this course will involve online interactions. To ensure the best experience for both you and your classmates, please honour the following rules of etiquette:

- please “arrive” to class on time
- please use your computer and/or laptop if possible (as opposed to a cell phone or tablet)
- ensure that you are in a private location to protect the confidentiality of discussions in the event that a class discussion deals with sensitive or personal material
- to minimize background noise, kindly mute your microphone for the entire class until you are invited to speak, unless directed otherwise
- In order to give us optimum bandwidth and web quality, please turn off your video camera for the entire class unless you are invited to speak
• please be prepared to turn your video camera off at the instructor’s request if the internet connection becomes unstable
• unless invited by your instructor, do not share your screen in the meeting

The course instructor will act as moderator for the class and will deal with any questions from participants. To participate please consider the following:

• if you wish to speak, use the “raise hand” function and wait for the instructor to acknowledge you before beginning your comment or question
• remember to unmute your microphone and turn on your video camera before speaking
• self-identify when speaking.
• remember to mute your mic and turn off your video camera after speaking (unless directed otherwise)

General considerations of “netiquette”:

• Keep in mind the different cultural and linguistic backgrounds of the students in the course.
• Be courteous toward the instructor, your colleagues, and authors whose work you are discussing.
• Be respectful of the diversity of viewpoints that you will encounter in the class and in your readings. The exchange of diverse ideas and opinions is part of the scholarly environment. “Flaming” is never appropriate.
• Be professional and scholarly in all online postings. Cite the ideas of others appropriately.

Note that disruptive behaviour of any type during online classes, including inappropriate use of the chat function, is unacceptable. Students found guilty of Zoom-bombing a class or of other serious online offenses may be subject to disciplinary measures under the Code of Student Conduct.

**Online Proctoring Notice:**
Tests and examinations in this course will be conducted using Zoom. You will be required to keep your camera on for the entire session, hold up your student card for identification purposes, and share your screen with the invigilator if asked to do so at any time during the exam. The exam session will not be recorded.*

More information about the use of Zoom for exam invigilation is available in the Online Proctoring Guidelines at the following link:


Completion of this course will require you to have a reliable internet connection and a device that meets the system requirements for Zoom. Information about the system requirements are available at the following link:

https://support.zoom.us/hc/en-us.

* Please note that Zoom servers are located outside Canada. If you would prefer to use only your first name or a nickname to login to Zoom, please discuss this with your instructor in advance of the test or examination.
Notice:
Students are responsible for regularly checking their email, course website (https://owl.uwo.ca) and notices posted outside the Civil and Environmental Engineering Department Office

Consultation:
Students are encouraged to discuss problems with their teaching assistant and/or the Instructor in tutorial sessions. Office hours will be arranged for the students to meet with the Instructor and teaching assistants. Other individual consultation can be arranged by appointment with the instructor.

Course Breakdown: (Values given in accreditation units)
Engineering Science = 60%; Engineering design = 40%

The attached document “INSTRUCTIONS FOR STUDENTS UNABLE TO WRITE TESTS OR EXAMINATIONS OR SUBMIT ASSIGNMENTS AS SCHEDULED” is part of this course outline.