

# CIVE 4208: Geotechnical Engineering

## Course Syllabus - Fall 2020

Faculty of Engineering and Design, Carleton University  
Department of Civil and Environmental Engineering

Sections: A

Instructor: [Dr. Mehdi Pouragha](#)

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Office Hours: Wednesdays 8:30 – 11:30 am (subject to change)

### 1 Course Overview:

This course focuses on the application of soil mechanics concepts (obtained in CIVE 3208) to analysis and design of geotechnical systems such as foundations, slopes, embankments, and retaining walls.

### 2 Student Learning Outcomes:

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

- Analyze water flow in geotechnical structures and its effect on stability.
- Calculate shear strength of different types of soils under various loading conditions.
- Calculate lateral pressure of soil.
- Analyze stresses applied to rigid and flexible earth retaining walls
- Understand and apply common criteria in design of earth retaining walls.
- Analyze stability of slopes using common methods.
- Calculate bearing capacity of different soils.
- Analyze and design of shallow foundations.

### 3 Textbook:

The course textbook is the following:

- **Soil Mechanics and Foundations (3rd Edition)**, by M. Budhu

Other useful sources:

- **Craig's Soil Mechanics, (7<sup>th</sup> Edition)**, by R.F. Craig

### 4 Tentative Lecture Schedule:

**Table 1. Lectures Content**

Lec #	Topic	Book Chapter*
1	Review of Preliminary Concepts	5, 6, 7, 8, 9, 10
2 & 3	2D Flow of Water through soils	14
4 & 5	Shear Strength of Soils	10
6	Lateral Earth Pressure	15
7 & 8	Design of Soil Retaining Structures	15
9 & 10	Slope Stability	16
11 & 12	Shallow Foundations	12
13	Review & Problem Solving	-

\* Capters from: Soil Mechanics and Foundations (3rd Edition), by M. Budhu

## 5 Mode of Delivery (\*\*Important\*\*)

Lectures are delivered via **asynchronous** videos posted regularly on cuLearn page. Students are required to watch the videos as the course progresses. Designated lecture times are used for **synchronous** quizzes, further clarification of the materials, and consultation time with the instructor. Clean and annotated slides will be available on cuLearn webpage.

## 6 Assessment:

Breakdown of the final grade is given in **Table.2**. A minimum of **35%** in each component is required to obtain a passing grade.

**Table 2. Assessment Breakdown**

#	sections	Description	Weights
1	Assignments	Bi-Weekly assignments (5 Assignments)	10%
2	Quizzes	Weekly short quizzes during lecture sessions*	15%
3	Midterm Exam	2 hours, closed book exam. Nov 4, 8:35 -10:35 am (Tentative)	25%
4	Final Exam	3 hours, closed book exam. Date and time TBD.	50%

\* Quiz taken during the first lecture is only for familiarizing the students with the format and will not count towards the final grade.

## 7 Course Policies:

### 7.1 Online Classroom Behaviour:

Students are required to maintain a professional, quiet, attentive and engaging classroom environment during synchronous sessions.

### 7.2 Communications:

Course materials will be distributed through the course's cuLearn page. Students are responsible for ensuring they are correctly registered through cuLearn, and for checking the cuLearn course management site regularly. Lecture slides will be made available before class; however, the presented material (e.g. solutions and calculations) in the lectures will not be accessible through the slides alone.

**Note:** All electronic communications with the instructor must be through official Carleton email accounts. In your email, include your full name, student number, course, and section number. Professionalism is expected in all course communications; messages with informal language or improper grammar and spelling will not receive a response. Electronic correspondence should be limited to the scheduling of meetings or providing information (e.g. absence from an exam). General questions on the course content will not be answered by e-mail.

### 7.3 Attendance and Absences:

Attendance is not mandatory during synchronous sessions. However, quizzes are taken during the designated lecture time. Please note that the attendance in quizzes and examinations is mandatory and you will lose the designated mark to the quiz or the exam that you have missed. In case of emergency (e.g. serious illness), proper communications with your instructor is mandatory. Acceptable documentation is required to justify your absence within three days of the date of the quiz or midterm. In case of illness, a doctor note or a completed self-declaration form will be required (<https://carleton.ca/registrar/special-requests/deferral/>). You must obtain approval prior to the test/quiz/exam if you cannot write at the scheduled time (except in cases of unexpected emergencies). If you miss a quiz and present acceptable documentation, the weight of the missed component

will be reweighted among the other quizzes. If you miss the midterm and present acceptable documentation, there will be a deferred midterm. Exact place and time to be confirmed.

#### 7.4 Appeals:

All grade appeals in this course must be made within seven days of the posting or return of the graded component (quiz, project deliverable, etc). Appeals are to be addressed to the marking TA first. The final exam is for evaluation purposes only, and the paper will not be returned or made available to students by the instructors after it is marked. You will be able to make arrangements with the instructor or with the department office to see your marked final examination after the grades have been made available.

### 8 Graduate Attributes:

The Canadian Engineering Accreditation Board (CEAB) requires the faculty to collect data on graduate attributes and use that data to improve our program. The aggregate data is used for accreditation purposes and to guide program improvements **only**, and have no impact on individual student progression or evaluation. Data is collected in many courses across the faculty. The attributes being measured in this course relate to (i) Knowledgebase of geotechnical engineering concepts, (ii) Problem definition, (iii) Approach to the problem, (iv) Use of assumptions, and (v) Interpreting the solution and validity of results.

### 9 Academic Integrity:

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensure that a degree from Carleton University is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. Carleton University's Policy on Academic Integrity (<http://www.carleton.ca/registrar/academic-integrity>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. It is your responsibility to be familiar with these policies. Any students who do not act with academic integrity will face severe consequences including immediate referral to the Associate Dean of Student Affairs.

### 10 Academic Accommodation:

Students with diverse learning styles and needs are welcome in this course. You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows. For more information, please consult: <http://students.carleton.ca/course-outline>

#### 10.1 Pregnancy Obligation

Please contact the instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please consult: <http://students.carleton.ca/course-outline>

#### 10.2 Religious Obligation

Please contact the instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please consult: <http://students.carleton.ca/course-outline>

### 11 Accommodations for Students with Disabilities

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism

Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your **Letter of Accommodation** at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). **Requests made within two weeks will be reviewed on a case-by-case basis.** After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website (<http://www.carleton.ca/pmc>) for the deadline to request accommodations for the formally-scheduled exam (if applicable).

## 12 Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working, and living environment where sexual violence will not be tolerated, and survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, please visit: <http://www.carleton.ca/sexual-violence-support>

## 13 Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact the instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more information, please consult: <http://students.carleton.ca/course-outline>

## 14 Copyright on Materials (\*\*Important\*\*)

The materials created for this course (including the course outline and any slides, posted notes, labs, project, assignments, quizzes, exams and solutions) are intended for personal use and may not be reproduced, redistributed, or posted on any website without prior written permission from the author(s).