CIVE 2700: Civil Engineering Materials

Faculty of Engineering and Design, Carleton University
Course Syllabus - Fall 2024

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- Professor office hours: Wednesdays & Fridays and: 1:00 to 2:00 PM
- TA office hours: TBD

When emailing the instructor/teaching assistants type "***CIVE2700- query***" as your subject header and use your Carleton university account only.

Highlights:

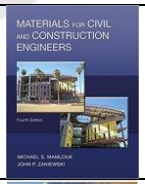
1. This course has a number of lab components that would require students to attend laboratory sessions and participate in the fabrication or testing procedure of materials (see section 5).
2. Most of the assessment items (e.g., assignments and quizzes, the project) will be accessible on Brightspace, and students will submit their work in Brightspace. The assignments and quizzes will have multiple-choice, short-answer, True/False, and arithmetic questions that will be automatically graded; this requires students to be careful in choosing the right answer and be concise in entering the short answers in the provided field. The timetable of assessment items will be posted on Brightspace.
3. Please use the link https://calendar.carleton.ca/academicyear/ for important dates regarding registration.

1 Course Overview:

The basic engineering properties, micro/macrostructure, behaviour and applications of various civil engineering materials will be studied including materials used in structural engineering, geotechnical engineering, and environmental engineering. This will include steel, concrete, timber, polymers, composites, and soil. Interaction between materials will be examined. Laboratory experiments are included in the course to demonstrate material behaviour.

2 Textbook:

The teaching materials in this course are derived from the three textbooks. The books are listed below according to their importance in this course:

1	Materials for Civil and Construction Engineers, 4th Edition, Pearson.	
2	Design and Control of Concrete Mixtures (Canadian version); 8th Edition	
3	Materials Science and Engineering: An Introduction, Callister and Rethwisch, 10th Edition	

3 Tentative Lecture Schedule:

It is expected that class topics will follow the schedule below, but adjustments will be made during the term as needed. In Table 1, the topics that will be covered in each session are summarized. The chapters of the selected books that are used in the respective lecture are shown in the last columns of the tables.

Table 1. Lectures

Session #	Notes #	Topics	Reading sources *	PA sessions	
1	1	Intro: Course Introduction		PA1	PA 4 and PA 5
2	2	Intro: Mechanical properties of Materials	Ref. 1: Section 1.2		
3	3	Concrete: Aggregates	Ref. 1: Chapter 5	PA2	
4	4	Concrete: Portland Cement	Ref. 1: Sections 6.1 to 6.9		
5	5	Concrete: Admixtures for concrete	Ref. 1: Section 6.11	PA3	
6	6	Concrete: Concrete mix design	Ref. 2: Chapter 12		
7	7	Concrete: Concrete mix in the laboratory	Ref. 2: Chapter 12		
	8	Concrete: Properties of Hardened Concrete	Ref. 1: Sections 7.3 to 7.5		
8	9	Metals: Steel Microstructure & Alloys	Ref. 1: Sections 2.2 and 3.2 to 3.4	PA6	PA7
9	10	Metals: Steel production	Ref. 1: Section 3.1		
	11	Metals: Grades of structural steel	Ref. 1: Sections 3.5 to 3.7 and 3.9		
10	12	Metals: Mechanical testing of steel	Ref. 1: Section 3.8		
11	13	Metals: Stainless Steel & Aluminum	Ref. 1: Sections 3.5 and 3.10		
	14	Metals: Welding of metals	Ref. 1: Section 3.10		
12	15	Wood- Structure	Ref. 1: Sections 10.1 to 10.6	PA8	
13	16	Wood- Properties	Ref. 1: Sections 10.7 to 10.13		
14	17	Masonry	Ref. 1: Chapter 8	PA9	
15	18	Bituminous Materials	Ref. 1: Chapter 9		
16	19	Soil- Introduction	Only course notes	PA10	
17	20	Soil: Physical properties	Only course notes		
18	21	Polymers- Composite FRP and strengthening	Ref. 1: Sections 11.1 to 11.3	PA11	
19	22	Polymers- Properties	Ref. 1: Sec. 2.4 & Ref. 3: Chapter 14	PA12	
	23	Polymers- Applications in Civil engineering	Ref. 3: Chapters 15&16		

* (1) Materials for Civil and Construction Engineers, 4th Edition, Pearson
(2) Design and Control of Concrete Mixtures (Canadian version); 8th Edition
(3) Materials Science and Engineering: An Introduction, Callister and Rethwisch, 10th Edition

4 Assessment:

The final grade for the course will comprise assignments, quizzes, a report, and a final exam as summarized in Table 2. The quizzes within the semester will be online and take place in person and on campus. A **laptop or proper tablet** is necessary to take the quizzes.

If you miss a quiz and present acceptable documentation, the weight of the missed component will be reweighted among the other quizzes. Please note that there will be no deferred quizzes. For assignments, however, no reasons will be accepted for missing them. If you miss an assignment for any reason, the mark for the missed assignment will be zero.

Table 2. Assessment breakdown

#	sections	Description	Weights
1	Assignments	Four homework assignments administered via Brightspace	10 %
2	Quizzes	Three quizzes are administered via Brightspace but in-person and on campus. The dates will be marked in the Brightspace calendar. A laptop or tablet is necessary to have to take the quizzes in the classroom.	30 %
3	Concrete lab report	Normally, you will join one group out of three groups available in each laboratory section (e.g., L01, L02)	10 %
	In-class activity	Participation in class activities and questions	Up to +5%-Bonus
4	Final Exam	Three-hour long, closed books and calculators are allowed	50 %

Figure 1 Quiz schedule

SEPTEMBER						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5
6	7	8	9	10	11	12

OCTOBER						
Su	Mo	Tu	We	Th	Fr	Sa
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	Fall Break			25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

NOVEMBER						
Su	Mo	Tu	We	Th	Fr	Sa
27	28	29	30	31	1	2
3	4	Quiz 1			8	9
10	11	12	13	14	15	16
17	18	Quiz 2			22	23
24	25	26	27	28	29	30
1	2	3	4	5	6	7

DECEMBER						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	Quiz 3			6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4
5	6	7	8	9	10	11

4.1 Deferral Exam:

In addition to university policies on granting a deferral final exam, a satisfactory performance in the course assessment items (excluding the final exam) throughout the semester is necessary to grant a deferral final exam. To be eligible e for a deferred exam, students must have earned at least 25% in quizzes and assignments. Participation in the concrete mix design report is mandatory.

5 Laboratory sessions:

Laboratory sessions are marked as L## in your weekly schedule. Please use the following calendar to attend the in-person laboratory sessions at MC2060. There will be 6 laboratory sessions in total during the fall semester. For L## sessions in your weekly timetable, you do not need to attend any session other than what is marked in the following calendar.

Figure 2 Laboratory schedule

SEPTEMBER						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	Lab 1-Steel Coupon					21
22	23	24	25	26	27	28
29	30	Lab 2- Rebars			4	5
6	7	8	9	10	11	12

OCTOBER						
Su	Mo	Tu	We	Th	Fr	Sa
		Go to classrooms assigned to you L## sections to complete the concrete mix design with the TA				5
	Lab 3- Concrete cylinders cast					
13	14	15	16	17	18	19
20	21	Fall Break			25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

NOVEMBER						
Su	Mo	Tu	We	Th	Fr	Sa
27	28	29	30	31	1	2
	Lab 4- compressive test-28 days					
10		Lab 5- splitting test			15	16
17	18	19	20	21	22	23
24		Concrete Lab Report			29	30
1	2	3	4	5	6	7

DECEMBER						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4
5	6	7	8	9	10	11

6 Course Policies:

6.1 Classroom Behaviour:

Students are required to observe standards of behaviour expected in a university environment. Excessive talking among students, texting, watching movies, etc. during lectures is disruptive of the learning atmosphere, and is a distraction for the instructor and the other students. Please maintain a quiet, attentive and engaging classroom environment.

6.2 Communications:

Course materials will be distributed through the course's Brightspace page. Students are responsible for ensuring they are correctly registered through Brightspace, and for checking the Brightspace course management site regularly. Lecture slides will be made available before class. Professionalism is expected in all course communications; messages with informal language or improper grammar and spelling will not be replied to.

6.3 Attendance and Absences:

Please note that 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 communication with your instructor is mandatory. Acceptable documentation is required to justify your absence within three days of the date of the quiz or midterm. You must obtain approval before the test/quiz/exam if you cannot write at the scheduled time (except in cases of unexpected emergencies).

6.4 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.

7 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 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.

8 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

8.1 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

8.2 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

8.3 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 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).

8.4 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

8.5 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

9 Copyright on Materials

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).