Carleton University
Department of Civil and Environmental Engineering

CIVE 4403/5200 –Masonry Design

Instructor: **Ted Sherwood** ted.sherwood@carleton.ca
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Office Hours: open door
I am also easily reached by email.
Please use “CIVE 4403” or “CIVE 5200” in the subject header when emailing.

TAs: 1) tbd
2) tbd
3) tbd

Lectures: Tuesdays 11:35 – 2:25 [redacted]
PA/Lab: Alternate Tuesdays 8:35 – 11:25 [redacted]
(Sept 22, Oct 6, Oct 20, Nov 10, Nov 24, Dec 8)
No lectures or PA/Labs during the week of Oct 26

Topics Covered:

1.	Introduction	-History of masonry and reinforced masonry -Structural design requirements, building loads, building layout
2.	Material Properties	-Concrete and clay masonry units, mortar, grout, reinforcement -Properties of masonry assemblages
3.	Beams and Lintels	-Singly and doubly-reinforced beams, deflections, shear, splices and development
4.	Columns	-Design of masonry columns, pilasters -Slenderness effects, biaxial bending.
5.	Loadbearing Walls	-Design of unreinforced walls and reinforced walls under axial load, combined axial load and bending. Slenderness effects
6.	Shear Walls	-Failure modes, distribution of lateral loads to walls, wall rigidity, flexural and shear design
7.	Brick Veneer and Cavity Walls	-Masonry components of the building envelope, rain screen walls, wall detailing, shelf angles, building science (time permitting)
8.	Advanced Topics in Seismic Behaviour	-Design of shear walls for enhanced seismic ductility

Note: topics may be added, modified or removed as the term progresses

Required Texts:

1) Masonry Structures: Behaviour and Design (2nd Canadian Edition), R.G. Drysdale, B.R. Banting, Canada Masonry Design Centre, 769pp. This text ($225 retail value) has been generously donated by the Canada Masonry Design Centre (CMDC). Hard copies will be available soon for pickup.
2) CSA S304-19: Design of Masonry Structures, Canadian Standards Association, 126pp. This text is bundled with the textbook

Course Description: https://calendar.carleton.ca/search/?search=cive+4403
https://calendar.carleton.ca/search/?search=cive+5200

Mark Breakdown:

Assignments	30% (About 7 to 9 in total through the term)
Midterm Exam	20% (November 3, 2 hours long)
Final Exam	50% (Formally scheduled, 3 hours long)
Field trip	Attendance at, and participation in, the field trip is mandatory. The date(s) for the field trip is/are still to be confirmed.

It is hoped that the class will visit the masonry training centre in Ottawa for a field trip (https://carleton.ca/cee/2017/masonry-design-students-learn-hands/) where students will learn masonry techniques and how to build a masonry wall. The trip, if it goes ahead, will be held on a Tuesday when we have both a PA and lecture scheduled. This opportunity is kindly supported by the masonry industry hence attendance is mandatory (failure to attend will result in a failing grade). To accommodate inclusion of the field trip into the course, one or more lectures will be held during the PA sessions in addition to the regular lecture times. **Students are required to wear CSA-approved safety footwear. Scheduling for this trip is still in progress, and it is not yet confirmed that it will go ahead. Tentative dates are one or more of Nov 10, Nov 24 or Dec 8.**

Assignments must be completed in pencil on engineering computation paper. Assignments must be neat, clear and of professional quality. Assignments are due at the start of lectures in class (which rigorously start on time). Assignments that are not handed in when due will immediately receive a 50% penalty. Thereafter a penalty of 10% per day will be assessed. The only reasons that will excuse a late assignment are illness documented by a doctor's note or prior permission from the instructor. Calculators (regular and programmable) are the only electronic aids permitted during exams. A minimum grade of 40 out of 100 must be obtained on the final exam in order to receive credit for the course.

General:

Attendance at lectures and PA sessions is mandatory. Handouts that supplement the lecture material will be given out from time-to-time during the term. Experience has shown that there is a direct relationship between regular attendance and the student's final grade (and can be the difference between a passing or failing mark). Students are required to check Brightspace and their Carleton email regularly for messages, updates and course content. All electronic devices other than calculators are to be turned off prior to lectures.

Students are strongly encouraged to work together in groups (the course is designed with this intention), but all submitted work must be entirely a student's own. It is very easy to tell when an assignment has been copied. Academic integrity is born out of personal character. Academic dishonesty is lazy, immoral and destructive both personally and professionally. It is discouraging and deeply unfair to the overwhelming majority of students who pursue their studies honestly and honourably. Assignments exhibiting copying of all or part of someone else's solution will be forwarded to the Associate Dean for sanction, along with the assignment that was copied. This is an emotionally traumatizing process for everyone, so please do not cheat. Read Carleton's Policy on Academic Integrity: https://carleton.ca/registrar/academic-integrity/

Please no food in class, no colognes, no perfumes. I ask that everyone work together to create an environment that is inclusive of diversity. While I maintain the same very high expectations of all students, if you require accommodation I am happy to problem-solve with you in a way that makes you feel supported and understood. Students requiring special arrangements to meet academic obligations should write to me during the first two weeks of class (or as soon as the need is known to exist). Students requiring academic accommodation must register with the Paul Menton Centre for Students with Disabilities for a formal evaluation of needs. Registered PMC students are required to contact the PMC every term to ensure that your instructor receives your Letter of Accommodation on time. See https://students.carleton.ca/course-outline for complete details.