CIVE 4403/5200 – Masonry Design

Instructor: Ted Sherwood  
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Office: ME 3366
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: Meghan Potts
Possibly a 2nd TA

Lectures: Fridays 11:35 – 2:25  TB 240
Even Week Fridays  8:35 – 11:25  TB 240
(Sept 22, Oct 6, Oct 20, Nov 10, Nov 20)
No lectures or PA/Labs during the week of Oct 23

Topics Covered:

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| 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, design of rain screen walls, wall detailing, shelf angles |
| 8. | Building Science  
- Control of moisture flow, energy transfer and air leakage |
- Bringing it all together: design of a low-rise industrial building |

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

Required Texts:

2) CSA S304.1-04: Design of Masonry Structures, Canadian Standards Association, 126pp.

The above two texts are commonly bundled together in a combined textbook offered for sale by the Canada Masonry Design Centre (CMDC). This combined textbook has been generously donated to each student enrolled in this course by CMDC.
Mark Breakdown:

- Assignments 25% (About 7-9 in total through the term)
- Midterm Exam 15% (October 20)
- Term Project 10%
- Final Exam 50%
- Field trip Attendance at, and participation in, the field trip is mandatory.

The class will visit the masonry training centre at La Cité Collégiale in Orleans for a field trip (http://www.collegelacite.ca/programmes/51633.htm) where students will learn masonry techniques and how to build a masonry wall. The trip will be held on a Friday when we have both a PA and lecture planned. A bus will be available to take students to and from campus, and more details will be presented in class. This excellent opportunity is being kindly supported by the masonry industry, hence attendance is mandatory (failure to attend will result in a grade of FND).

Assignments must be completed in pencil either on engineering computation paper. Assignments must be neat, clear and of professional quality. Drawings are to be done by hand and in pencil. 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.

The term project will be conducted in teams of three. Students will conduct a literature review on a topic related to some aspect of masonry construction, masonry buildings or masonry research, write a short report and present their report in class at the end of term. Students are free to pick their own topic or choose from a sample list provided. CIVE 4403 reports should be a minimum of 4 pages long, CIVE 5200 reports should be a minimum of 8 pages long (pages are 11pt font, single spaced, and the minimum number of pages does not include figures, references or title/preliminary pages).

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 CuLearn and their Carleton email regularly for messages, updates and course content. All electronic devices other than calculators (such as cell-phones, music devices and laptops) are to be turned off prior to lectures.

Students with disabilities should contact the Paul Menton Centre for Students with Disabilities (500 University Centre) and advise the instructor by email of any accommodations that may be required. Students requiring religious accommodations should contact the instructor by email to arrange for prior individual accommodation.