# CIVE 3206 –Design of Reinforced Concrete Components

**Instructor:** Ted Sherwood  
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Office: ME 3366  
Office Hours: tbd. I am also easily reached by email. Please use “CIVE 3206” in subject header.

**TA:**  
1) tbd  
2) tbd  
3) tbd  
4) tbd  
TA contact info will be posted on CuLearn.

**Lectures:**  
Mondays and Wednesdays, 11:35am – 12:55pm EST  
No lectures during the week of Feb 15

**PA/Lab:**  
Alternate Mondays, 2:35 – 5:25pm  
(Jan 18, Feb 1, Feb 22, Mar 8, Mar 22, Apr 5)

**Topics Covered:**

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| 1. | Introduction | -history of concrete  
|-constituents of reinforced concrete, portland cement, hydration |
| 2. | Material Properties | -steel, concrete tensile and compressive response  
|-time-dependant properties: shrinkage, thermal and creep effects |
| 3. | Behaviour of Axially-Loaded Elements | -axial load-axial deformation response  
|-short-term and long-term properties |
| 4. | Members in Flexure | -moment-curvature response, uncracked and cracked response  
|-rectangular stress blocks, linear-elastic simplifications |
| 5. | Flexural Design of Beams | -limit-states design  
|-nominal flexural capacity, factored flexural resistance  
|-tension, compression and balanced failures  
|-doubly-reinforced sections, T-sections, one-way slabs  
|-cracking, durability considerations |
| 6. | Deflections | -effective moment of inertia  
|-instantaneous and long-term deflections, deflection limits |
| 7. | Shear Design of Beams | -shear stresses in uncracked and cracked beams  
|-variable-angle truss model  
|-CSA A23.3 methods of shear design |
| 8. | Bond and Development of Reinforcement | -development length, bond stresses, radial stresses, splitting  
|-hooked anchorages  
|-development of reinforcement in continuous members and design of bar cutoffs |
| 9. | Short Columns | -types of columns  
|-strength of axially-loaded columns and columns subjected to combined axial load and bending  
|-design of columns, interaction diagrams |
| 10. | Footings | -types of footings  
|-structural actions, soils pressures and distribution, kern distance  
|-isolated footings, strip footing |

**Note:** topics may be added, modified or removed as the term progresses
Students near Ottawa can use curbside pickup for bookstore purchases. For those further afield, the bookstore can ship to anywhere in the world in 4-6 days. Older editions of the handbook are out of date and should be avoided.

Useful Textbook: (can be purchased online)

Referenced Textbooks:

Mark Breakdown:
Assignments 25% - Approximately 10 in total, approximately 1 per week, lowest assignment grade to be dropped
Midterm Exam 20% - Will be held live on March 8 during PA/Lab timeslot
Final Exam 55% - Date to be scheduled

To receive credit for the course (1) a minimum grade of 40 out of 100 must be obtained on the final exam and (2) the average assignment grade must be 45 out of 100 or greater.

Lectures:
The first lecture will consist of a live Zoom meeting starting at 11:35am on Monday January 11. Thereafter lectures will be asynchronous. That is, I will record and place them online in advance of their scheduled times. They will not be done live and you may watch them whenever it suits you. I do recommend, however, that if you are in or near the Eastern Time Zone that you watch during the regularly scheduled times. I will place notes and handouts online to accompany the lectures.

If we have a guest lecture in the course, it will be done live. I will schedule it well in advance.

PA/Labs:
These will be asynchronous. I will prerecord about 2 hours or so of material and place it online. For the remainder of the PA session I will be available online for questions.

Office Hours:
I will regularly be available for online office hours for this course. In normal times I have an “open-door” policy meaning that students are very welcome to come by my on-campus office at any time to ask questions about the course or anything else. Coming by my office has been a great way for me to get to know students and for them to get to know me and to understand the course better. In Covid times the open-door policy is obviously not possible. As such, I will hold office hours online as often as possible. Please complete the survey on CuLearn to indicate times during the week when office hours are convenient for you (it is vital that you complete the survey).
**Assignments:**
Assignments must be completed entirely in pencil on engineering computation paper. They must be neat, clear and of professional quality. All drawings are to be done by hand, are to follow standard engineering technique and drawn to scale using appropriate drafting instruments. Each assignment is marked out of 100, and 10 of these marks will assess the assignment’s professionalism. It is strongly recommended that students work on assignments together in groups (difficult to do when learning online but give it a try). While working in groups is encouraged, your submitted assignment must be your own work (see “Academic Integrity”).

To submit assignments please scan them, convert to a pdf and then submit through CuLearn as a single file.

Students are responsible for meeting assignment submission deadlines. Assignments that are not handed in before they are due will receive a penalty of 50%. Concerns about a grade on an assignment or midterm will be addressed only if brought to the attention of the grader within seven working days of handing back the graded work as per Section 2.7 of the undergraduate calendar.

**General:**
The method of teaching in this course in normal times is exclusively through blackboard-based lectures. This will continue for Covid times.

There is no textbook for the course (the Concrete Design Handbook is not a textbook). Handouts that supplement the lectures will be given out from time-to-time during the term. Experience has shown that there is a direct relationship between regular lecture attendance and the student’s final grade.

Students are required to check CuLearn and their Carleton email regularly for messages, updates and supplemental course content.

**Academic Integrity**

“…no legacy is so rich as honesty.”
-William Shakespeare, *All’s Well That Ends Well* (3.5.1618-19)

Academic integrity is essential to both the pursuit of scholarship in a university setting and to ensuring that a degree from Carleton University is a strong signal of a student's individual achievement. Academic dishonesty is profoundly destructive to the values of the university. Furthermore, it is discouraging and deeply unfair to the overwhelmingly vast majority of students who pursue their studies honestly and honourably.

Both Carleton University and your Professor treat cases of cheating and plagiarism very seriously. Carleton University’s Policy on Academic Integrity (https://carleton.ca/registrar/academic-integrity/) describes actions that constitute academic dishonesty and procedures for dealing with it. Students are responsible for reading and understanding these policies. Sanctions for students found to have violated Carleton’s policies on academic integrity can range from failure in the course, to suspension from the degree program and expulsion from the university.

Assignments, or parts thereof, found to have been copied directly from a previous year’s solution set or from another student’s assignment will be forwarded to the Associate Dean for possible academic sanction. Midterm and final exams must be completed solely by the individual student with no communication or collaboration with anyone else. Only permitted aids may be accessed during an exam.
**Academic Accommodations**

Students with diverse learning needs are very welcome to take this course. I ask that all students in the class work with me to create a welcoming environment that is respectful of all forms of diversity, including diversity of learning needs, background and parenting status. While I maintain the same very high expectations of all students in my class regardless of personal situations, I am happy to problem-solve with you in a way that makes you feel supported and understood as you work to complete your engineering degree in unprecedented times.

Students requiring accommodations to meet their learning needs should contact the Paul Menton Centre for Students with Disabilities (UC 500; 613-520-6608) and advise the instructor in person of any accommodations that may be required at a minimum of two weeks prior to requiring the accommodation. No accommodation can be arranged for until the instructor is advised of accommodation requirements.