Carleton University Department of Civil and Environmental Engineering

CIVE 4302A: REINFORCED AND PRESTRESSED CONCRETE DESIGN

Course Syllabus – Fall 2021

COURSE INSTRUCTOR

Ahmed Hassan
Department of Civil and Env. Engineering
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Office: ME (Mackenzie) 3440
Office Hours: Wednesday 10 to 11 AM EST
(During Lecture session time) or by appointment

COURSE SCHEDULE

Lectures: Wednesday 8:30 to 11:30 AM EST
Tutorials: ODD WEEKS ONLY (not used)
Friday 2:30 to 5:30 PM EST

COURSE WEBSITE AND COMMUNICATION

All course information and online quizzes will be available through Brightspace. All students are responsible for ensuring that they are correctly registered through Brightspace and that they are receiving messages properly through their official university email address. Students are responsible for checking the Brightspace course management site and their official email account frequently.

COURSE DESCRIPTION AND OBJECTIVES

Calendar Description: Reinforced concrete shear and torsion design. Two-way slab design by Direct Design and Equivalent Frame Method. Behaviour and design of slender reinforced concrete columns. Prestressed concrete concepts; flexural analysis and design; shear design; anchorage zone design; deflection and prestress loss determination.

By the end of the course, successful students will be able to:

- Differentiate between the direct design and elastic frame methods for analyzing two-way slabs, and justify using one over the other in various applications
- Design a two-way slab based on a set of loads determined using the student’s chosen analysis method
- Assess the loads on a slender column and design the slender column based on the applied loading
- Assess the flexural, shear and torsional loads on prestressed beams, and design the beam accordingly based on prestressed concrete design principles
- Examine the long-term loading effects on prestressed beam members and explain how these effects result in prestressing losses in the member behaviour

COURSE DELIVERY

This course will have a blended synchronous/asynchronous delivery method. Lecture videos will be posted weekly every Wednesday morning. The videos will be segmented for ease of viewing, to make it easy to refer to them and take notes. Posting videos allows the students to view the lecture at their own pace, at whichever time is most convenient to them, which is especially important in online modes of delivery where students are not guaranteed access to internet during a specific allotted time. It also allows for a clear uninterrupted content delivery with no disruptions due to bad internet connection or faulty hardware. To supplement the video lecture content, the allotted lecture time (10 to 11 am EST on Wednesday) will be used as open office
hours, I will be online for 1 hour regardless of attendance and will be willing to stay for longer if there is higher demand on a given day. This will be the synchronous component in which I get to interact with you directly online using big blue button (on Brightspace). The attendance for these office hours is not mandatory but is highly recommended. The lecture time is assigned in the calendar but will not be used.

I will be using the announcement function in Brightspace to send out weekly update with important information related to the course. Using the announcement function is helpful because it keeps all communication from me about this course in one place instead of searching through your email every time you need to find a previous communication.

I will also have an “ask the instructor” forum in Brightspace in which you can post your questions about weekly course content and wording of assignment questions. I will be checking this forum daily (except weekends) to answer all questions. There are two reasons why I like to do this (i) Out of fairness so that all students can have access to the answers I provide other students and (ii) efficiency, I often get the same questions over and over again, also, I am not always available to answer emails right away. Having the forum allows me to put the answer to questions there and reduce the wait time on your end and reduce the response time on my end.

TEXTBOOK

It is necessary that all students own a copy of the Concrete design handbook 4th edition. All assessment will be open book using this design manual only. It is not available at the university bookstore. You must get a copy on your own from the Cement Association of Canada. To purchase the book please visit https://www.cement.ca/technical-publications/. Make sure you use your Carleton student email in your correspondence to be able to access student pricing.

COURSE OUTLINE (SUBJECT TO CHANGE)

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>TOPIC</th>
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<tbody>
<tr>
<td>1</td>
<td>Lect. #1</td>
<td>Sep. 8 General review of Reinforced Concrete Design</td>
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<tr>
<td>2</td>
<td>Lect. #2</td>
<td>Sep. 15 Shear and Torsion design Part 1</td>
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<td>3</td>
<td>Lect. #3</td>
<td>Sep. 22 Shear and Torsion design Part 2</td>
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<tr>
<td>4</td>
<td>Lect. #4</td>
<td>Sep. 29 Design of two-way slabs Part 1</td>
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<td>5</td>
<td>Lect. #5</td>
<td>Oct. 6 Design of two-way slabs Part 2</td>
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<td>6</td>
<td>Lect. #6</td>
<td>Oct. 13 Design of two-way slabs Part 3</td>
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<td>7</td>
<td>Lect. #7</td>
<td>Oct. 20 Design of Slender Columns</td>
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<td>FALL BREAK OCTOBER 23 TO 31</td>
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<tr>
<td>8</td>
<td>Lect. #8</td>
<td>Nov. 3 Prestressed Concrete Concepts and materials</td>
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<td>9</td>
<td>Lect. #9</td>
<td>Nov. 10 Determination of prestress losses</td>
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<td>10</td>
<td>Lect. #10</td>
<td>Nov. 17 Flexural analysis and design</td>
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<td>11</td>
<td>Lect. #11</td>
<td>Nov. 24 Shear and torsion design</td>
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<tr>
<td>12</td>
<td>Lect. #12</td>
<td>Dec. 1 Anchorage zone design</td>
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COURSE WORK AND ASSESSMENT

- Lecture Quizzes ......................................... 10%
- Assignments .................................................. 30% (6% each)
- Final Exam ..................................................... 60%
Lecture Quizzes

Each week, a collection of lecture videos will be posted online. A lecture quiz will be used to assess the level of understanding attained from watching the lecture videos. The quizzes have two main purposes: a) ensure an adequate level of understanding is attained from watching the videos, and b) they act as a form of formative assessment that allows me to address common mistakes and questions. Therefore, it is imperative for students to attempt the quizzes on their own in order for me to be able to adequately prepare and address issues of concern during the lecture time. Lecture quizzes will be available for 1 week after posting the lecture videos. Lecture videos will be posted every Wednesday morning, with the quiz closing on the following **Tuesday at 11:59pm** (typically). The quizzes will be a combination of multiple choice and short answer questions. With a question asking for feedback regarding the video content. The feedback question will directly affect the way I respond to how I can better address your needs during lecture times and in subsequent lecture videos.

To avoid the need for extensive accommodations for sickness or other obligations, the lecture quiz with the lowest marks will be dropped from the final mark. Any additional accommodations require exceptional circumstances and supporting documentation.

Assignments

There will be a total of 5 assignments posted and due on the following dates.

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<thead>
<tr>
<th>Assignment</th>
<th>Posted</th>
<th>Due</th>
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<tr>
<td>Assignment #1</td>
<td>September 22&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>September 29&lt;sup&gt;th&lt;/sup&gt;</td>
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<td>Assignment #2</td>
<td>October 13&lt;sup&gt;th&lt;/sup&gt;</td>
<td>October 20&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>Assignment #3</td>
<td>October 20&lt;sup&gt;th&lt;/sup&gt;</td>
<td>November 3&lt;sup&gt;rd&lt;/sup&gt;</td>
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<td>Assignment #4</td>
<td>November 10&lt;sup&gt;th&lt;/sup&gt;</td>
<td>November 17&lt;sup&gt;th&lt;/sup&gt;</td>
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<td>Assignment #5</td>
<td>November 24&lt;sup&gt;th&lt;/sup&gt;</td>
<td>December 1&lt;sup&gt;st&lt;/sup&gt;</td>
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Example questions will be solved in the lecture videos. Assignments will be similar to the examples solved in the lecture videos. Submission of the assignment will be done through a submission form on Brightspace. **It is absolutely crucial that assignments are completed individually.** It is okay to discuss the assignment with colleagues to enhance understanding, but attempting assignments individually is the only way to have an opportunity to test your understanding and practice for the final exam.

| Any late assignments will be deducted 25% (even if late by one minute) and will receive a grade of zero if late by 24 hours or more. |
| Forgetting or making a mistake in submission is not an acceptable excuse for late assignments. Make sure to note down assignment deadlines in your calendar and double checking to make sure the assignment has been submitted correctly. It is your responsibility to ensure submissions are made properly and punctually. |
**Final Exam**

The final exam has not yet been scheduled. Keep in mind that the Final Exam is the only timed assessment, make sure that you time yourself throughout the semester while doing the assignments to ensure that you are not taking longer than you should.

A minimum mark of 50% on the final exam is required to pass the course.

**Appeals**

All appeals of marks assigned in this course must be made within 7 calendar days of the grade being made available. Appeals of grade can result in either a reduction or an increase in grade.

**COURSE POLICIES**

*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/studentaffairs/academic-integrity](http://www.carleton.ca/studentaffairs/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 Associate Dean of Student Affairs.

*Email Policy*

The instructor is more than happy to answer questions related to administration via email. For course content questions please use the “ask the instructor” forum. Effort will be made to reply to emails as soon as possible, but please expect a possible delay of up to 48 hours for a response (especially during weekends). In addition, complex technical questions should be addressed during office hours, or by appointment. Emails must come from official Carleton University email addresses or through Brightspace. The instructor will not respond to emails from external addresses.

*Extensions*

In the interest of fairness for all students, requests for extensions will only be granted for situations that are truly out of a student's control. Extensions cannot be granted more than 24 hours after deadlines.

*Course Material Copyright*

Classroom teaching and learning activities, including lectures, discussions, presentations, etc., are copy protected and remain the intellectual property of the instructor. All course materials, including PowerPoint presentations, outlines, and other materials, are also protected by copyright and remain the intellectual property of the instructor.

Students registered in the course may take notes and make copies of course materials for their own educational use only. Students are not permitted to reproduce or distribute lecture notes and course
materials publicly for commercial or non-commercial purposes without express written consent from
the copyright holder(s). Students are not permitted to upload these copyrighted course materials to any
online repositories.

**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:

**Pregnancy obligation:** write to me 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
visit the Equity Services website: [http://www2.carleton.ca/equity/](http://www2.carleton.ca/equity/)

**Religious obligation:** write to me 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
visit the Equity Services website: [http://www2.carleton.ca/equity/](http://www2.carleton.ca/equity/)

**Academic 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 (www.carleton.ca/pmc) for the deadline to request accommodations for the
formally-scheduled exam (if applicable).

You can visit the Equity Services website to view the policies and to obtain more detailed information
on academic accommodation at [http://www2.carleton.ca/equity/](http://www2.carleton.ca/equity/)

**STUDENT MENTAL HEALTH AND WELLNESS**

Social isolation, online learning, career uncertainty, health concerns and stresses of being in the final year
of your studies can combine to create adverse mental health effects to students. These mental health
effects and any feelings of anxiety and uncertainty are valid, and I strongly advise you to reach out and
seek help and guidance when you feel it is necessary. There are many resources available to provide you
with support and guidance through turbulent times, yet if you feel like you need to speak about it with
me to guide you towards one of these resources, then please reach out! As an instructor, my job is not
only to teach and evaluate learning, but my job is also to provide the best environment possible to
facilitate the learning process, and that includes helping you get the support you need for success.