Carleton University Department of Civil and Environmental Engineering

CIVE 4308A: BEHAVIOUR AND DESIGN OF STEEL STRUCTURES

Course Syllabus – Winter 2023

COURSE INSTRUCTOR
Ahmed Hassan
Department of Civil and Env. Engineering
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Office: ME (Mackenzie) 3440
Office Hours: Monday 6 to 7 PM EST

COURSE SCHEDULE
Lectures: Monday 2:30 to 5:30 PM EST
NI 3030
Tutorials: ODD WEEKS ONLY
Friday 8:30 to 11:30 AM EST
ME 3269

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: Behaviour and design of open web steel joists, steel and composite decks, composite beams and columns, stud girders, and plate girders. Design of moment connections, base plates and anchor bolts, and bracing connections. Stability of rigid and braced frames. Design for lateral load effects.

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

- Design composite steel decks and open-web steel joists based on a manufacturer’s catalogue
- Design of composite floor system with structural steel beams
- Design of deep plate girders which can be used for large span applications such as bridges
- Design for the structural and member stability of steel structures after second order P-Δ effects
- Design of Moment connections which can be part of a moment resisting seismic force resisting system
- Design of base plate and anchor bolt connections which can be used at the foundation of the structure

COURSE DELIVERY

This course will be taught in-person during the lecture times. Lecture slides for each week will be posted one week in advance. Students are advised to review the slides, read the corresponding code clauses, and attempt the lecture examples before attending the lecture. Doing this allows the lecture time to have more discussion about different aspects of the lecture content. Once the lecture concludes, students are advised to complete the online lecture quiz to ensure that they clearly understood the conceptual and theoretical components of the lecture. And finally, assignments are designed to be a good practice of the practical components of the lecture.
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. You are welcome to use this forum before or after lecture time.

TEXTBOOK

It is necessary that all students own a copy of the 11th edition of the “Design of Steel Structures” handbook (CSA S16). All assessment will be open book using this design manual and students own course notes. It is not available at the university bookstore. You should already have a copy considering CIVE 3205 is a prerequisite to this course. If you lost it or need another copy, you must get a copy on your own from Amazon. If you need more information about student discounts please contact me no later than the January 15th, 2023.

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>Jan. 9</td>
<td>Review of Structural Steel Design</td>
</tr>
<tr>
<td>2</td>
<td>Jan. 16</td>
<td>Design of Steel Deck and Joists</td>
</tr>
<tr>
<td>3</td>
<td>Jan. 23</td>
<td>Design of Composite Beams (Strengthen)</td>
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<tr>
<td>4</td>
<td>Jan. 30</td>
<td>Design of Composite Beams (Shear connectors)</td>
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<tr>
<td>5</td>
<td>Feb. 6</td>
<td>Design of Composite Columns</td>
</tr>
<tr>
<td>6</td>
<td>Feb. 13</td>
<td>Design of Plate Girder (Design for bending)</td>
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Winter Break February 21 to 25

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>TOPIC</th>
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<tbody>
<tr>
<td>7</td>
<td>Feb. 27</td>
<td>Midterm Examination</td>
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<tr>
<td>8</td>
<td>Mar. 6</td>
<td>Design of Plate Girders (Design for shear)</td>
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<tr>
<td>9</td>
<td>Mar. 13</td>
<td>Design of Stiffeners</td>
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<tr>
<td>10</td>
<td>Mar. 20</td>
<td>Design for Structural Stability</td>
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<tr>
<td>11</td>
<td>Mar. 27</td>
<td>Design for Member Stability</td>
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<tr>
<td>12</td>
<td>Apr. 3</td>
<td>Design of Moment connections</td>
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<tr>
<td>13</td>
<td>Apr. 10</td>
<td>Design of base plates and anchor bolts</td>
</tr>
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COURSE WORK AND ASSESSMENT

Lecture Quizzes ......................... 5%
Assignments ................................ 25% (5% each)
Midterm Exam .......................... 20%
Final Exam ............................. 50%

Lecture Quizzes

Each week, a lecture quiz will be used to assess the level of understanding attained from attending lectures. The quizzes have two main purposes: a) ensure an adequate level of understanding is attained
from the lectures, and b) a 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 and will be made available at the same time the lectures are released. The quiz will always close on **Sunday at 11:59pm** (typically). The quizzes will be a combination of multiple choice and short answer questions.

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.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Posted</th>
<th>Due</th>
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<tbody>
<tr>
<td>Assignment #1</td>
<td>January 23rd</td>
<td>January 30th</td>
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<tr>
<td>Assignment #2</td>
<td>February 13th</td>
<td>February 27th</td>
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<tr>
<td>Assignment #3</td>
<td>March 6th</td>
<td>March 13th</td>
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<tr>
<td>Assignment #4</td>
<td>March 20th</td>
<td>March 27th</td>
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<tr>
<td>Assignment #5</td>
<td>April 3rd</td>
<td>April 10th</td>
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Example questions will be solved during the lectures. Assignments will be similar to the examples solved during the lecture. 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 midterm and 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.

*Midterm and Final Exam*

The midterm exam will take place during the lecture time on February 27th. It will cover all topics up to the end of the slender columns lecture. The final exam has not yet been scheduled. Make sure that you time yourself throughout the semester while doing the assignments to ensure that you are not taking longer than you should during the midterm and exam.
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 outside addresses.

Extensions and absences

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. In cases where a student misses the midterm examination, there will be no deferred midterm for this course, approved absences will be accommodated by moving the weight of the midterm to the final exam.

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 please review the Student Guide to Academic Accommodation.

**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 please review the Student Guide to Academic Accommodation.

**Academic Accommodations for Students with Disabilities:** If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the Paul Menton Centre website.

**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 where 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, visit the Equity and Inclusive Communities website.

**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 your 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, see the Senate Policy on Accommodation for Student Activities (PDF, 25KB).

**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.