Carleton University Department of Civil and Environmental Engineering

CIVE 4308A: BEHAVIOUR AND DESIGN OF STEEL STRUCTURES

Course Syllabus – Winter 2025

COURSE INSTRUCTOR

Ahmed Hassan
Department of Civil and Env. Engineering
Email: ahmed.hassan@carleton.ca
Office: ME (Mackenzie) 3440
Office Hours: Monday 5 to 6 PM EST

COURSE SCHEDULE

Lectures: Thursday 6 to 9 PM

Tutorials: ODD WEEKS ONLY
Wednesday 2:30 to 5:30 PM

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

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.

LEARNING OUTCOMES

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 12th 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, 2025. Having a copy of the Design of Steel structures Handbook is mandatory (Cost $409 + tax CAD).

COURSE OUTLINE (SUBJECT TO CHANGE)

WEEK		DATE	TOPIC
1	Lect. #1	Jan. 6	Review of Structural Steel Design
2	Lect. #2	Jan. 13	Design of Steel Deck and Joists
3	Lect. #3	Jan. 20	Design of Composite Beams (Strength)
4	Lect. #4	Jan. 27	Design of Composite Beams (Shear connectors)
5	Lect. #5	Feb. 3	Design of Composite Columns
6	Lect. #6	Feb. 10	Design of Plate Girder (Design for bending)
			WINTER BREAK FEBRUARY 19 TO 23
7	Lect. #7	Feb. 24	Design of Plate Girders (Design for shear)
8	Lect. #8	Mar. 3	Design of Stiffeners
9	Lect. #9	Mar. 10	Design for Structural Stability
10	Lect. #10	Mar. 17	Design for Member Stability
11	Lect. #11	Mar. 24	Design of Moment connections
12	Lect. #12	Mar. 31	Design of base plates and anchor bolts
13	Lect. #13	Apr. 7	Potential industry guest lecture

COURSE WORK AND ASSESSMENT

Lecture Quizzes (Best 10/11) ..... 5% (0.5% each)
Assignments ..... 25% (5% each)
Midterm Exam..... 20% (February 26th during the PA session)
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 at 11:59 PM.

Assignment	Posted	Due
Assignment #1	January 13th	January 20th
Assignment #2	January 27th	February 3rd
Assignment #3	March 3rd	March 10th
Assignment #4	March 17th	March 24th
Assignment #5	March 31st	April 7th

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 PA session on February 27th. It will cover all topics upto the end of lecture 5. Please note that there will be **no deferred or makeup midterms for this course**.

The final exam has not yet been scheduled. You will be notified of the date, time and location through the university once SES makes the exam schedule available. Final exam will be cumulative covering all topics in the course. Students who are unable to write the final examination because of a serious illness/emergency or other circumstance beyond their control may apply for accommodation by contacting the Registrar's office. Consult the Section 4.3 of the University Calendar.

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.

Both midterm and final exams are open book where students are allowed to use the handbook, lecture notes, and their own notes. Electronic devices are not allowed, if you need lecture notes you can print the relevant ones.

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.

Academic dates

Students should be aware of the academic dates (eg. last day for academic withdrawal and examination period) posted on the Registrar's office web site
https://carleton.ca/registrar/registration/dates/academic-dates/

COURSE POLICIES

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 the deadlines.

Missed term work and midterm

Students who claim extenuating circumstances defined in the Academic Consideration Policy, as a reason for missed term work are held responsible for immediately informing the instructor concerned and for making alternate arrangements with the instructor. In all cases, this must occur no later than three (3) days after the term work was due. The alternate arrangement must be made before the last day of classes in the term as published in the academic schedule. Consult Section 4.4 of the University Calendar. There are **no makeup or deferred midterms and/or assignments for this course**. In cases where a student misses the midterm examination, approved absences will be accommodated by moving the weight of the midterm to the final exam.

ACADEMIC INTEGRITY AND PLAGIARISM

a) Please consult the Faculty of Engineering and Design information page about the Academic Integrity policy and our procedures: https://carleton.ca/engineering-design/current-students/fed-academic-integrity Violations of the Academic Integrity Policy will result in the assignment of a penalty such as reduced grades, the assignment of an F in a course, a suspension or, expulsion.

b) One of the main objectives of the Academic Integrity Policy is to ensure that **the work you submit is your own.** As a result, it is important to write your own solutions when studying and preparing with other students and to avoid plagiarism in your submissions. The University Academic Integrity Policy defines plagiarism as "presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own." This includes reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source.

Examples of violations of the policy include, but are not limited to:

- any submission prepared in whole or in part, by someone else;
- using another's data or research findings without appropriate acknowledgement;
- submitting a computer program developed in whole or in part by someone else, with or without modifications, as one's own; and
- failing to acknowledge sources of information through the use of proper citations when using another's work and/or failing to use quotations marks.

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LEARNING AND WORKING ENVIRONMENT

The University and all members of the University community share responsibility for ensuring that the University's educational, work and living environments are free from discrimination and harassment. Should you have concerns about harassment or discrimination relating to your age, ancestry, citizenship, colour, creed (religion), disability, ethnic origin, family status, gender expression, gender identity, marital

status, place of origin, race, sex (including pregnancy), or sexual orientation, please contact the Department of Equity and Inclusive Communities at equity@carleton.ca

Academic Accommodations

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

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.

You should request your academic accommodations in the Ventus Student Portal, for each course at the beginning of every term. For in-term tests or midterms, please request accommodations at least two (2) weeks before the first test or midterm. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable).

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).

Pregnancy Obligation: 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, please review the Student Guide to Academic Accommodation (PDF).

Religious Obligation: 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, please review the Student Guide to Academic Accommodation (PDF).

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 Sexual Violence Prevention & Survivor Support.

Engineering Academic Advising

The Engineering Academic Support Service assists undergraduate engineering students with course selection, registration, and learning support from first-year through to graduation.

Academic Advisors Contact can be found here: https://carleton.ca/engineering-design/current-students/undergrad-academic-support/undergraduate-advisors/.

STUDENT MENTAL HEALTH AND WELLNESS

As a university student you may experience a range of mental health challenges that can significantly impact your academic success and overall well-being. Carleton's Wellness Services Navigator is designed to help students connect with mental health and wellness resources.

If you need to talk to someone from the department for more information and support with connecting to resources, you can contact the following faculty members, depending on your program. Or contact the department at or CEEUGChair@cunet.carleton.ca.

ACSE: Prof. Elie Azar

Email: Elie.Azar@carleton.ca, Office: 3432 Mackenzie

CIVE: Prof. Heng Khoo

Email: heng.khoo@carleton.ca, Office: 3364 Mackenzie

ENVE: Prof. Shoeleh Shams

Email: shoelehshams@cunet.Carleton.ca, Office: 4242 Mackenzie

Here is a list of on-campus and off-campus recourses:

1. **Carleton's Wellness Desk**: Located at 204A MacOdrum Library, is a space for students to learn about resources, connect with our Wellness Coordinator, and decompress during stressful times of the year. You can pop into the Wellness Desk any time during its hours of operation – no appointments necessary! https://wellness.carleton.ca/mental-health/wellness-desk/

2. **Carleton's Health and Counselling Services:** To book an appointment contact the main clinic by calling (613) 520-6674. If urgent, let the Patient Care Coordinator know or go in person to the main clinic (2500 Carleton Technology and Training Centre Building) and indicate that they are in crisis and need to speak to someone right away. For more information, please see https://carleton.ca/health/

3. **Residence Counselling and Wellness Service:** Counselling services specifically for students in residence. https://carleton.ca/health/residence-counselling/

4. **Therapy Dogs:** Carleton's therapy dogs are around campus with their owners (who are Carleton University staff and faculty) to comfort and provide support to help you thrive as a university student. https://carleton.ca/wellness/dogs/

5. Emergencies and Crisis and Emergency Numbers

6. **Good2Talk (1-866-925-5454):** Good2Talk is a free, confidential helpline providing professional counselling and information and referrals for mental health, addictions and well-being to post-secondary students in Ontario, 24/7/36 https://good2talk.ca/

7. **Empower Me:** Undergraduate students have access to free counselling services in the community through Empower Me, either in person, by telephone, video-counselling or e-counselling. **This free service is accessible 24/7, 365 days per year.** Call **1-844-741-6389 (toll free)** to make an appointment with a counsellor in the community. More information is available https://students.carleton.ca/services/empower-me-counselling-services/

8. **The Walk-In Counselling Clinic (off-campus community resource):** The walk-in Counselling Clinic have offices in various locations across Ottawa and the greater Champlain region that are open 7 days a week. Individuals will be assisted, with no appointment, on a first-come, first-serve basis during the Walk-in Counselling Clinic hours. The Walk-in Counselling Clinic **offers services in many languages** and is free and confidential. More information can be found at: https://walkincounselling.com/

9. **Distress Centre of Ottawa and Region**: Available 10am-11pm, 7 days/week, 365 days/year. **Distress Line:** 613-238-3311, **Crisis Line:** 613-722-6914 or 1-866-996-0991, **Text:** 343-306-5550. https://www.dcottawa.on.ca/

10. **Distress and Crisis Ontario**, Available for chat 2 pm – 2 am EST. https://www.dcontario.org/

11. **BounceBack Ontario** **(Toll-Free: 1-866-345-0224)** is a free skill-building program managed by the Canadian Mental Health Association (CMHA). It is designed to help adults and youth 15+ manage low mood, mild to moderate depression and anxiety, stress or worry. Delivered over the phone with a coach and through online videos, you will get access to tools that will support you on your path to mental wellness. https://bouncebackontario.ca/.