Carleton University
Department of Civil and Environmental Engineering

CIVE 3204 A/B Introduction to Structural Design
2022 Fall

Hours per Week	
Lecture	Lab/P.A.
3	3/2

Course Description: Building systems and structural form. Design Philosophy and design process. Limit states design. National Building Code of Canada. Understanding the load effects and actions on structures. Determination of dead, live, snow, wind, and earthquake loads.

Learning Outcomes: Upon completion of this course, students will

- Know about basic structural forms and how structural framing systems work;
- Have the knowledge of the overall concept of structural design and the design process, the significance of uncertainties in design of safe structures, and how uncertainties are considered in the limit states design approach;
- Have the knowledge of the physical phenomena of various load actions on building structures;
- Be able to determine dead, live, snow, wind and earthquake loads;
- Have the knowledge of the principles, assumptions and limitations behind the building code load calculation procedures, and with this knowledge be able to design buildings safely and effectively.

Week	Topic
0-1	Building Systems and Structural Form • Structural form, linear members, planar systems, shell structures, tension structures. • Types of buildings • Structural framing for buildings, industrial buildings, multistorey buildings
1-3	Design Philosophy and Design Process • limit states design • codes and standards • design process • loads, load combinations and load factors
3-5	Dead and Live Loads • use and occupancy • tributary area • live load reduction factor
5-7	Snow, Ice and Rain Loads • basic snow load, accumulation, drift • load distribution and combinations • ponding

7-9 Wind Loads
- reference velocity pressure
- load distribution and statically equivalent forces

10-12 Earthquake Loads
- objectives of earthquake-resistant design
- seismic regionalization
- evaluation and distribution of lateral seismic forces.

Required Texts

1. *National Building Code of Canada, 2020*, National Research Council of Canada, 2020.
2. (Supplement to the National Building Code of Canada, 2015) *User's Guide - NBC 2015 Structural Commentaries (Part 4 of Division B)*, National Research Council of Canada, 2015.

Reference Texts

1. Handbook of Steel Construction, 2017. Canadian Institute of Steel Construction, 11th Edition.
2. Kulak and Grondin, 2018. Limit States Design in Structural Steel, 10th Ed., CISC.
3. CSA Standard S16-19. Design of Steel Structures.
4. CSA Standard CAN-A23.3-19. Design of Concrete Structures.

Marking Scheme

Assignments	25%
Mid-Term examination**, Friday, 11 November 2022**	25%
Final Examination (TBA)	50%
Total	**100%**

In addition to obtaining a minimum of 50% overall mark, it is required that a minimum of 40% out of 100 must be achieved in the final exam to pass the course.

Mid-term: 2 hr. **Friday, 11 November 2022**
Final exam: 3 hr. (TBA)

Instructors:

Professor D.T. Lau, 3436ME (Virtual Office Hours)

Office hours: D. Lau Tuesday 10:15 – 11:15 hr
Thursday 14:45 – 15:15 hr
or see instructor after lecture to arrange other alternative time

Teaching Assistants:

(TA office hour to be announced on Brightspace website)

Special Information for Pandemic Measures

It is important to remember that COVID is still present in Ottawa. The situation can change at any time and the risks of new variants and outbreaks are very real. There are a number of actions you can take to lower your risk and the risk you pose to those around you including being vaccinated, wearing a mask, staying home when you're sick, washing your hands and maintaining proper respiratory and cough etiquette.

Feeling sick? Remaining vigilant and not attending work or school when sick or with symptoms is critically important. If you feel ill or exhibit COVID-19 symptoms do not come to class or campus. If you feel ill or exhibit symptoms while on campus or in class, please leave campus immediately. In all situations, you must follow Carleton's symptom reporting protocols.

Masks: Carleton has paused the COVID-19 Mask Policy, but continues to strongly recommend masking when indoors, particularly if physical distancing cannot be maintained. It may become necessary to quickly reinstate the mask requirement if pandemic circumstances were to change.

Vaccines: Further, while proof of vaccination is no longer required as of May 1 to attend campus or in-person activity, it may become necessary for the University to bring back proof of vaccination requirements on short notice if the situation and public health advice changes. Students are strongly encouraged to get a full course of vaccination, including booster doses as soon as they are eligible, and submit their booster dose information in cuScreen as soon as possible. Please note that Carleton cannot guarantee that it will be able to offer virtual or hybrid learning options for those who are unable to attend the campus.

All members of the Carleton community are required to follow requirements and guidelines regarding health and safety which may change from time to time. For the most recent information about Carleton's COVID-19 response and health and safety requirements please see the University's COVID-19 website and review the Frequently Asked Questions (FAQs). Should you have additional questions after reviewing, please contact covidinfo@carleton.ca.

Academic Accommodation:

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

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, visit the Equity Services website: students.carleton.ca/course-outline

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, visit the Equity Services website: students.carleton.ca/course-outline

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. carleton.ca/pmc

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 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: students.carleton.ca/course-outline

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. students.carleton.ca/course-outline

For more information on academic accommodation, please contact the departmental administrator or visit: students.carleton.ca/course-outline