Department of Civil and Environmental Engineering

ECOR 1033 F: Statics

Course Outline – Winter 2026

COURSE INSTRUCTOR	COURSE SCHEDULE
Christian Viau, Ph.D., P.Eng. Assistant Professor Department of Civil and Env. Engineering Email: christian.viau@carleton.ca Office: 4535 Mackenzie (EDC) Office Hours: Mon. and Wed., 4:00 pm – 5:00 pm	Weekly Lectures: Mon. and Wed., 2:35 pm – 3:55 pm Weekly Problem Analysis (PA) Sessions: • **F1**: Thurs. 8:35 am – 11:25 am • **F2**: Thurs. 8:35 am – 11:25 am • **F3**: Mon. 11:35 am – 2:25 pm • **F4**: Thurs. 2:35 pm – 5:25 pm

COURSE WEBSITE AND COMMUNICATION

All course information, assignments, and lecture files 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 Carleton University email address. Students are responsible for checking the Brightspace course management site and their official email account frequently. The announcement function in Brightspace will be used to send out any updates with important information related to the course.

COURSE DESCRIPTION AND LEARNING OUTCOMES

This course introduces principles of statics for engineering structures. Learning statics will provide you with important problem-solving concepts and skills that are transferable to many subjects in your program of study. In this course, you will learn the basic applications of the science of physics to the profession of engineering. Mathematics also plays an important role in this course and here you will use basic concepts and skills in algebra, trigonometry, vectors, and calculus to solve engineering statics problems. To develop the skills required for this course you must practice and participate in lectures, problem analysis (PA) sessions, and other course elements.

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

- Apply the correct units, notation, and significant figures when solving engineering problems;
- Apply a vector formulation when solving static problems;
- Correctly draw free body diagrams;
- Calculate the coord. of the centroid or center of gravity of 2D and 3D objects using integration and composite bodies;
- Calculate the effect of forces and moments on 2D and 3D rigid bodies;
- Analyze the equilibrium conditions of particles and rigid bodies in 2D and 3D space;
- Analyze the equilibrium conditions of 2D particles and rigid bodies when solving 2D truss problems;
- Determine axial force, shear force, and moment (A, V, M) at a point for beams and frame elements;
- Determine shear and moment diagrams for beam elements;
- Understand and apply the basic structural engineering design process; and,
- Understand how to approach solving engineering problems.

GRADUATE ATTRIBUTES

The Canadian Engineering Accreditation Board (CEAB) requires graduates of undergraduate engineering programs to possess 12 attributes. Courses in all four years of our programs evaluate students' progress towards acquiring these attributes. Aggregate data (typically, the data collected in all sections of a course during an academic year) is used for accreditation purposes and to guide improvements to our programs. Some of the assessments used to measure GAs may also contribute to final grades; however, the GA measurements for individual students are not used to determine the student's year-to-year progression through the program or eligibility to graduate. This following list provides the GAs that will be measured in this course, along with the Learning Outcomes that are intended to develop abilities related to these attributes. For information on GAs and continual curriculum improvement, visit the Accreditation section of Engineers Canada website.

GA - Indicator	Assessment Tool
1.3 Fundamental Engineering Concepts	Final course grade

TEXTBOOK(S)/LEARNING MATERIALS AND THEIR COSTS

Engineering Mechanics – Statics and Dynamics, 15th edition, R. C. Hibbeler

An online platform called “Mastering Engineering” will be used for the weekly assignments and is a **requirement** for this course. Obtaining the accompanying eText is **very strongly recommended** as it has many aspects that can assist student learning. If you would like to learn more about Mastering before making your purchase decision, please watch this short YouTube video. Please select only one of the two Mastering Engineering purchase options below. Both options provide 24-month access to Mastering Engineering. If you’re not sure which version is right for you, I recommend registering using the 14-day temporary access option which includes access to the version with the eText:

(a) Mastering Engineering **with** eText for Hibbeler, Engineering Mechanics: Statics & Dynamics 15e $99.99 CDN. Link.

(b) Mastering Engineering **without** eText for Hibbeler, Engineering Mechanics: Statics & Dynamics 15e $60 CDN. Link.

COURSE DELIVERY AND PEDAGOGY

Lectures

Lectures will take place during the official lecture times. Incomplete lecture slides (in PDF) will be posted the day before each lecture. Annotated “full” lecture notes will be posted following the end of the lecture, however, attendance to the lectures is recommended as not everything will be written down on the posted notes. This course follows the topics required by the curriculum at a very fast pace. Every lecture presents a new topic which is based on the previous lectures. Students should closely follow the course progress. Students should follow the course progress closely by reviewing the Notes in advance of the lectures, reading the textbook, and participating in the lectures.

Problem Analysis (PA) Sessions:

The PA sessions for this course are problem-solving sessions and are a great way to reinforce what is learnt in the classroom. These will be run by the teaching assistants (TA). You will work through problems on the material currently being covered in class. Attendance is required. PA Sessions are

weekly, beginning on Monday, January 12, 2025. Please refer to the Public Class Schedule for the most recent information. PA sessions will typically include a quiz during the last hour of the PA Session. Students must attend the full three-hour PA Session to receive credit for the quiz.

Office Hours

Office hours are specifically allocated by the instructor and the TAs to make themselves available for you to ask questions and receive clarifications regarding course content. To get the most out of them, you are asked to prepare your questions and works-in-progress prior to attending.

COURSE OUTLINE (SUBJECT TO CHANGE)

It is expected that that class topics will follow the schedule below. Students are strongly urged to read the relevant sections of the textbook prior to each lecture.

Lecture	Topic	Chapter (Hibbeler)
1	Course Introduction and General Principles	1 – General Principles (1)
2	Force Vectors, Resultants, and Components	2 – Force Vectors (2.1-2.4)
3	Cartesian Coordinates, Position and Unit Vectors	2 – Force Vectors (2.5-2.7)
4	Force Vectors Components and Dot Product	2 – Force Vectors (2.8-2.9
5	Equilibrium of a Particle and Free Body Diagrams (FBDs)	3 – Equilibrium of a Particle (3.1-3.2)
6	Coplanar and 3D Force Systems	3 – Equilibrium of a Particle (3.1-3.3)
7	Scalar Formulation and Cross Product	4 – Force System Resultants (4.1-4.3)
8	Vector Formulation and Moment about an Axis	4 – Force System Resultants (4.4-4.5)
9	Moments of a Couple and Force/Couple Systems	4 – Force System Resultants (4.6-4.7)
10	Further Simplification of Force/Couple Systems	4 – Force System Resultants (4.8)
11	Reduction of Simple Distributed Loading	4 – Force System Resultants (4.9)
12	Review	
13	Basics of Integration	
14	Centroids by Integration	9 – Center of Gravity and Centroid (9.1)
15	Centroids of Composite Bodies	9 – Center of Gravity and Centroid (9.2)
16	Equilibrium FBD and 2D Support Reactions	5 – Equilibrium of a Rigid Body (5.1-5.3)
17	2 and 3 Force Members and 3D Support Reactions	5 – Equilibrium of a Rigid Body (5.4-5.5)
18	3D Rigid Body Equilibrium, Constraints and Determinacy	5 – Equilibrium of a Rigid Body (5.6-5.7)
19	Trusses and the Method of Joints	6 – Structural Analysis (6.1-6.2)
20	Trusses and the Method of Sections	6 – Structural Analysis (6.3-6.4)
21	2D Frames	6 – Structural Analysis (6.6)
22	2D Machines	6 – Structural Analysis (6.6)
23	Internal Loadings	7 – Internal Forces (7.1)
24	Shear and Moment Equations and Diagrams	7 – Internal Forces (7.2)
25	Review	

COURSE WORK AND ASSESSMENTS

The final grade for the course will comprise of assignments, quizzes, a midterm exam, and a final exam. Details on Mastering Engineering will be provided by Pearson Education. Weightings are as follows:

Item	Description	Weight
Assignments	Weekly assignments administered through Mastering Engineering	5%
Quizzes	Weekly quizzes administered in the last hour of the PA sessions. Attendance is required in order to participate in the quizzes.	20%
Midterm Exam	Closed book. (2-hour exam, date TBA)	25%
Final Exam	Closed book. (3-hour exam scheduled by the University)	50%

For the final grade calculation, the lowest Assignment and lowest Quiz will be dropped. **A final course grade of C- or better must be obtained to pass the course.** All components of the course must be fulfilled; otherwise, students may receive an F as a final mark. This is also valid for students who are taking the course for the second or third time. Quizzes will take place weekly during PA sessions. All exams will take place in-person. Assignment submissions will be made online via Pearson Mastering Engineering.

Weekly Assignments

Weekly assignments will be similar to the examples solved in the lecture. Submission of the assignment will be done through Mastering Engineering. It is 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 the final exam. Late assignment submissions will not be accepted. Make sure to note down assignment deadlines in your calendar and double check to make sure the assignment has been submitted correctly. It is your responsibility to ensure submissions are made properly and punctually

Grade Appeals

All appeals of grades assigned in this course must be made within 7 calendar days of the grade being made available. Note that an appeal may result in a reduction or an increase in grade.

COURSE POLICIES

Email Policy

Please use ***ECOR 1033F*** in the subject header. Efforts 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. Emails will not be answered during weekends or holidays. **For course content questions, use the office hours**.

For enquiries regarding assignments, quizzes, and PA sessions, contact the respective TA.

Missed Term Work

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 and in all cases. Students must also fill out and submit an Academic Consideration for Coursework Form. 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. Unjustified late submissions will not be accepted.

For justified absences or missed deadlines, the following policies apply:

a) Assignment: the weight will be transferred onto the remaining assignments.

b) Midterm exam: the weight will be transferred onto the final exam. No make-up midterms will be administered.

c) Final exam: Students who are unable to write the final examination because of extenuating circumstances, as defined in the Academic Consideration Policy, may apply for accommodation

by contacting the Registrar's office. Consult the Section 4.3 of the University Calendar. Final exams are for evaluation purpose and will not be returned to students.

Academic Integrity and Plagiarism:

a) 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) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. It is your responsibility to be familiar with these policies. 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;
- any submission prepared in whole or in part, **using artificial intelligence (AI)**;
- 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.

Copyright

The materials (including the course outline, slides, posted notes, videos, labs, PA sessions, projects, assignments, quizzes, exams, and solutions) created for this course are intended for personal use only. They may not be reproduced, redistributed, or transmitted in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without written permission from the author(s), both during and after the semester. Students are not permitted to upload these copyrighted course materials to any online repositories.

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, parenting duties, or sexual

orientation, please contact the Department of Equity and Inclusive Communities at equity@carleton.ca.

We will strive to create an environment of mutual respect for all through equity, diversity, and inclusion within this course. The space which we work in will be safe for everyone. Please be considerate of everyone's personal beliefs, choices, and opinions.

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/

Academic Accommodations

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes, including information about the Academic Consideration Policy for Students in Medical and Other Extenuating Circumstances, are outlined on the Academic Accommodations website (https://students.carleton.ca/course-outline/).

PUBLIC HEALTH MEASURES

If you feel sick, please stay home. If you require assistance due to missing a lecture while recovering from an illness, please contact a colleague or the course instructor. **You will not be penalized for staying home if you are feeling unwell**. Remaining vigilant and not attending work or school when sick or with symptoms is critically important for the wellbeing of your peers and Carleton University staff.

If the course instructor falls ill prior to a scheduled lecture, an announcement will be made on Brightspace, and the in-person lecture will be canceled. A recorded lecture will be posted on Brightspace afterwards.

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 a student needs to talk to someone from the department for more information and support with connecting to resources, please consult **First Year Academic Advising**. For students who are not in first year, please contact your respective department's academic advisor.

The following is a non-exhaustive list of available on- and off-campus resources:

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. 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/.**