

Carleton University
Faculty of Engineering and Design
Department of Civil and Environmental Engineering

STATICS (ECOR 1033)

2026 - Fall

Course Outline

Teaching Team

Instructor:

Name: Professor Ehab Zalok, Ph.D., P.Eng.

email address: ehab.zalok@carleton.ca

(use Brightspace discussion section for course related questions)

email ONLY for non-course material's related questions and where you NEED to include your student ID

Office location: ME 2486

Office hours: By appointment

TA(s): Information will be posted to Brightspace when it becomes available.

Course Description and requirements

1) Course schedule Please refer to the [Public Class Schedule](#) for the most recent information

2) Course description

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.

3) Learning Outcomes

At the end of this 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.

4) 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

For information on GAs and continual curriculum improvement, visit the [Accreditation section of Engineers Canada website](#).

5) Text book(s)/Learning Materials and their costs

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

Price \$ varies based on the chosen form of the book

For Section D, “Mastering Engineering” will NOT be used as an assessment tool. However, students are encouraged to use it as a learning tool.

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 eText:

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

6) Topics and tentative plan

It is expected that that class topics will follow the schedule below, but adjustments will be made during the term as needed.

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)
	Force Vectors Components and Dot Product	2 – Force Vectors (2.8-2.9)
4	Equilibrium of a Particle and Free Body Diagrams (FBDs)	3 – Equilibrium of a Particle (3.1-3.2)
	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 of Composite Bodies	9 – Center of Gravity and Centroid (9.2)
15	Centroids by Integration	9 – Center of Gravity and Centroid (9.1)
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	

This course follows the topics required by the curriculum at a fast pace. Every lecture presents a new topic which is based on the previous lectures. Students should closely follow the course progress.

Lecture Notes will be posted on Brightspace and, students should follow the course progress closely by reviewing the Notes in advance of the lectures, reading the textbook, and participating in the lectures.

PA sessions: To complement the lectures, PA sessions will typically include a problem analysis discussion.

Attendance: PA sessions attendance is mandatory. Students must attend the full three-hour PA Session. Absence from 1 PA session = 1% deduction (example: at the end of the term, a student scored 80%, however, did not attend 3 PA sessions, student final mark is going to be 80% - 3% = 77%)

7) Evaluation and marking scheme

a) Assessment Breakdown

The final grade for the course will comprise midterm exam(s), and a final exam. Weightings are as follows:

Item	Description	Weight
PA sessions	Absence from 1 PA session = 1% deduction (details above)	varies
Midterm Exam I	Closed book. (Tentatively – Weekend of Oct 17 / 18)	20%
Midterm Exam II	Closed book. (Tentatively – Weekend of Nov 14 / 15)	30%
Final Exam	Closed book. (scheduled by the University) A minimum of 50% is required to pass the final exam and the course.	50%

b) Final Examination

- i) Final exams are for evaluation purpose and will not be returned to students.
- ii) This is a closed book exam. No extra papers or crib sheets will be provided or accepted. Only a programmable calculator without storage capacity is allowed. The calculator must **not** have an integral function or storage capacity or Wi-Fi connectivity.
- iii) Deferred Final Examinations: 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](#).

c) Deferred term work and self declaration

In all cases, if a student misses a component and present acceptable documentation, the weight of the missed component will be reweighted to the final exam. No makeups
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. This must occur no later than three (3) days after the term work was due.

8) Academic dates

Students should be aware of the academic dates (e.g. last day for academic withdrawal) posted on the Registrar's office web site <https://carleton.ca/registrar/registration/dates/academic-dates/> or [Calendar website](#).

9) Appeals

All grade appeals in this course must be made within seven days of the posting or return of the graded component. Appeals are to be addressed to the marking TA first, if no resolution, bring it to the attention of the instructor.

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.

Unauthorized Dissemination

As per Carleton’s [Academic Integrity Policy](#), Unauthorized Dissemination is a violation of the standards of academic integrity to publish, disseminate, or otherwise make available to a third-party instructional material where the instructor has explicitly prohibited their dissemination.

The materials (including the course outline, slides, posted notes, videos, labs, projects, assignments, quizzes, exams, and solutions) created for this course are intended for personal use only. They may not be reproduced, redistributed, or disseminated 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.

Generative Artificial Intelligence (GenAI)

As our understanding of the uses of GenAI and its relationship to student work and academic integrity continue to evolve, students are required to discuss their use of GenAI in any circumstance not described here with the course instructor to ensure it supports the learning goals for the course.

Safer Learning and Working Environment

Carleton 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, [Ombuds Services - Carleton University](#) or submit an anonymous human rights concern through [this form](#).

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 (students.carleton.ca/course-outline)

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.

Department: CEEUGChair@cunet.carleton.ca

Prof. Shoeleh Shams

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

ACSE: Prof. Cara Lozinsky

Email: caralozinsky@cunet.carleton.ca, Office: 2374 Mackenzie

CIVE: Prof. Christian Viau

Email: Christian.Viau@carleton.ca, Office: 4535 Mackenzie

ENVE: Prof. Cole Van De Ven

Email: cole.vandeven@carleton.ca, Office: 6210 Canal Building

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

1. [Emergencies and Crisis](#)
2. **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/>
3. **Carleton's Care and Support Team:** The role of a Care and Support Team is to support students with any questions or concerns they may have relating to their academics, well-being, finances or any other challenges they may be experiencing. <https://wellness.carleton.ca/mental-health/student-care-and-support-team/>
4. **Carleton's Health and Counselling Services:** To book an appointment visit the [CHR Connect App](#) or contact the main clinic by calling 613-520-6674 ext. 2. 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://wellness.carleton.ca/counselling/>
5. **Carleton's Single Session Counselling:** To book an appointment visit the CHR Connect App. <https://thconnect.telushealth.com/mobile-app-information/xz6lzGrv>
6. **Residence Counselling and Wellness Service:** Counselling services specifically for students in residence. To book an appointment call 613-520-2600 ext. 8061. <https://carleton.ca/health/residence-counselling/>
7. **Carleton's 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://wellness.carleton.ca/mental-health/therapy-dogs/>
8. **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/>
9. **The Walk-In Counselling Clinic (off-campus community resource):** The Walk-in Counselling Clinic has 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/>

10. **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/>

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

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