

Winter 2024

ECOR 1045: Statics (Sections D, E and F)

**Department of Civil and Environmental Engineering, Faculty of Engineering,
Carleton University**

Teaching Team

Instructor- sections D and F:

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office hours: TBD

Instructor- section E:

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office hours: TBD

TA(s): Information will be posted on Brightspace

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

Course Description and requirements

1. Course description and content:

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 have to practice and participate in lectures, problem analysis (PA) sessions, and other course elements.

2. 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 statics problems;
- Correctly draw free body diagrams (FBDs);
- Calculate the coordinates of the centroid or center of gravity of 2D and 3D objects using integration and composite bodies; and,
- Analyze the equilibrium conditions of particles and rigid bodies in 2D and 3D space.

3. Graduate Attributes:

The Canadian Engineering Accreditation Board (CEAB) requires the faculty to collect data on graduate attributes and use that data to improve our program. The aggregate data is used for accreditation purposes and to guide program improvements **only**, and have no impact on individual student progression or evaluation. Data is collected in many courses across the Faculty. The attribute being measured in this course relates to knowledge base of fundamental engineering concepts.

4. Textbook:

- Engineering Mechanics: Statics and Dynamics, 15th Edition, R.C. Hibbeler, Pearson.

5. Topics and tentative plan:

It is expected that class topics will follow the schedule below, but adjustments will be made during the term as needed. Students are strongly urged to read the relevant sections of the textbook prior to each lecture.

Table 1. Tentative lecture schedule

Lecture	Topic	Chapter
1	Course Introduction and General Principles	1 - General Principles
2	Force Vectors, Resultants, Components	2 - Force Vectors
3	Cartesian Coordinates, Position and Unit Vectors	2 - Force Vectors
4	Dot Product and Components of Vectors	2 - Force Vectors
5	Particle Equilibrium and Free Body Diagrams (FBDs)	3 - Equilibrium of a Particle
6	Moments and the Cross Product	4 - Force System Resultants
7	Moment about an Axis, Couples, Triple Scalar Product	4 - Force System Resultants
8	Reduction of Force Systems and Distributed Loads	4 - Force System Resultants
9	Centre of Gravity by Integration	9 - Center of Gravity and Centroid
10	Centre of Gravity by Composite Bodies	9 - Center of Gravity and Centroid
11	2-D Rigid Body Equilibrium	5 - Equilibrium of a Rigid Body
12	3-D Rigid Body Equilibrium	5 - Equilibrium of a Rigid Body

6. Evaluation and marking scheme

6.1. Requirements:

In order to use this course as prerequisite for other engineering courses students are required to achieve a grade of C- or better.

6.2. Assessment breakdown:

The final grade for the course will comprise homework assignments, quizzes, a midterm exam, and a final exam. Details on Mastering Engineering (the online system used to administer assignments) will be provided by Pearson Education. Please do not purchase the textbook nor Mastering Engineering until you receive instructions from Pearson Education (Pearson provides a significant discount when purchased through their instructions.).

Please note:

- The final exam will not be returned to the students.
- The students must resolve any issues related to their marks within one week of the grades being posted.

#	Item	Description	Weight
1	Assignments	Weekly homework assignment administered through Mastering Engineering	5 %
2	Quizzes	Weekly quizzes administered in the last hour of the PA sessions. Attendance is required to participate in the quizzes.	20 %
3	Midterm Exam	Closed book (date: TBD)	25 %
4	Final Exam	Closed book (2- hour exam, date: TBD by the university)- The final exam will not be returned to the students.	50 %

7. Academic dates

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

Academic Integrity and Plagiarism

- 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.
- 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.

Copyright

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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](mailto:equity@carleton.ca) 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.

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 orCEEUGChair@cunet.carleton.ca.

ACSE: Prof. Scott Bucking

Email: scott.bucking@carleton.ca, Office: 5209 Canal Building

CIVE: Prof. Heng Khoo

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

ENVE: Prof. Shoeleh Shams

Email: shoeleh.shams@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. [Emergencies and Crisis](#) and [Emergency Numbers](#)
4. **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/>
5. **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/>
6. **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/>
7. **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/>
8. **Distress and Crisis Ontario,** Available for chat 2 pm – 2 am EST. <https://www.dcontario.org/>

9. **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/>.