

Carleton University Department of Civil and Environmental Engineering
ECOR 3800: ENGINEERING ECONOMICS
Course Syllabus – Winter 2024

COURSE INSTRUCTOR	COURSE SCHEDULE
Section C and E Prof. Ahmed Hassan Department of Civil and Env. Engineering Email: ahmed.hassan@carleton.ca Office hours: Tuesdays and Thursdays: 3:00 pm – 4:00 pm ME 3440	Lectures: Section C: Tuesday and Thursday: 1:05 pm – 2:25 pm AT 102 Section E: Monday and Wednesday: 6:05 pm – 7:25 pm SC 103

COURSE WEBSITE AND COMMUNICATION

All course information, assignments, and problem sets 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: Introduction to engineering economics; cash flow calculations; methods of comparison of alternatives; structural analysis; replacement analysis; public projects; depreciation and income tax; effects of inflation; sensitivity analysis; break-even analysis; decision-making under risk and uncertainty.

LEARNING OUTCOMES

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

- Develop cash flow engineering-economic models of costs and benefits of projects
- Compare the costs and benefits of alternative and mutually exclusive projects using time value of money approaches, including present worth, annual worth, payback period, and Internal Rate of Return (IRR)
- Assess the effect of inflation and taxation on costs and benefits of projects, as well as developing numerical methods to account for their impact
- Assess the elements which may affect the decision-making process for public sector projects
- Develop a strategy to account for uncertainty and risk through the use of sensitivity analysis and probability distribution

COURSE DELIVERY

This course will be delivered fully in-person, this class is not catered towards online students or students who cannot access campus. Lectures will take place during the times stated above. Lecture slides from the lecture will be posted the day of the lecture. I will also be holding office hours in which you would have the opportunity to ask any further questions. All assessments will be in-person (except for assignments).

COURSE COMMUNICATION

I will be using the announcement function in Brightspace to send out any updates 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.

TEXTBOOK

It is highly recommended, although not mandatory, that students own a copy of the course textbook titled: “Engineering Economics: Financial Decision Making for Engineers” 7th edition by Fraser, Jewkes, Pirnia, and Schmitt. The material for this course is heavily adopted from that textbook including the course’s lecture slides.

COURSE OUTLINE (SUBJECT TO CHANGE)

PROJECTED START	LECTURE	TOPIC	TEXTBOOK SECTION	ASSIGNMENT
Jan 8/9	Lect. #1	Time Value of Money	Ch 2.1-2.7	Assign. 1
Jan 15/16	Lect. #2	Cashflow Analysis	Ch 3.1-3.6	
Jan 24/25	Lect. #3	Comparison Methods I	Ch 4.1-4.5	Assign 2
Feb 5/6	Lect. #4	Comparison Methods II	Ch 5.1-5.8	
Feb 12/13	Lect. #5	Replacement Decisions	Ch 7.1-7.8	Assign 3
Feb 26/27	Lect. #6	Taxes	Ch 8.1-8.10	
Mar 4/5	Lect. #7	Inflation	Ch 9.1-9.4	Assign 4
Mar 11/12	Lect. #8	Project Management	Ch 11.1-11.4	
Mar 18/19	Lect. #9	Dealing with Risk	Ch 12.1-12.3	Assign 5
Mar 25/26	Lect. #10	Public Projects	Ch 10.1-10.4	
Apr 1/2	Lect. #11	Financial Accounting	Ch 6.1-6.2	--

COURSE WORK AND ASSESSMENT

Assignments (Best 4 out of 5) 20% (5% each)

Midterm 30% (weekend of March 1st - March 3rd)

Final Exam..... 50%

Assignments

There will be a total of 5 assignments posted and due on the following dates. Best 4 out of 5 assignments will count towards your final grade. All Assignments will be due at 12:00 PM (noon) of each of the following dates.

Assignment	Posted	Due
Assignment #1	January 19 th	January 26 th
Assignment #2	February 9 th	February 16 th
Assignment #3	March 1 st	March 8 th
Assignment #4	March 15 th	March 22 nd
Assignment #5	March 29 th	April 5 th

Example questions will be solved during the lecture. Assignments will be similar to the examples solved in the lecture. Submission of the assignment will be done through an “assignment” 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 the 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 Exam

Midterm exam will be scheduled on the weekend of March 1st to March 3rd (TBD by SES). The midterm will cover all the material from lectures 1 through 5 (Chapters 2 through 5), inclusive. Midterm exam is a closed book exam, you are not allowed to bring any notes. An equation sheet provided by the instructor will be attached to the exam paper. A copy of this will be available on Brightspace. There will be **no deferred midterm for this course.**

Final Exam

The final exam has not yet been scheduled. You will be notified through the university once SES makes the exam schedule available. Final exam is a closed book exam, you are not allowed to bring any notes. An equation sheet provided by the instructor will be attached to the exam paper.

A minimum mark of 40% 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 office hours.** Effort will be made to reply to emails as soon as possible during working hours, but please expect a possible delay of up to 24 hours. Emails must come

from official Carleton University email addresses or through Brightspace, other emails will simply not reach my inbox. The instructor will not respond to emails from external addresses.

Missed term work

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 48 hours after assignment deadlines. Notification of absence from a midterm cannot be accommodated more than 24 hours after the midterm end time. As stated earlier, there is **no deferred or makeup midterm or assignment for this course**, missed midterms with approved excused absences will be accommodated by moving the weight to the final exam.

GRADUATE ATTRIBUTES AND ACCREDITATION UNITS

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
11.2 – Engineering Economics	Assignments and Exams
11.4 – Risk and change management	Assignments and Exams
11.5 – Project definition and management techniques	Assignments and Exams

Math	Natural Science	Complementary Studies	Engineering Science	Engineering Design
		100%		

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.
- c)

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.

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

1. **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/>
2. [Emergencies and Crisis](#) and [Emergency Numbers](#)
3. **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/>
4. **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/>

5. **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/>
6. **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/>
7. **Distress and Crisis Ontario,** Available for chat 2 pm – 2 am EST. <https://www.dcontario.org/>
8. **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/>.