Civil Engineering
CIVENG 3C03
Engineering Systems
Fall 2025

McMaster University

ENGINEERING

Instructor Information

Moustafa Naiem Abdel-Mooty
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Office Hours:
By Appointment

TA Information

Name: Ahmed Abdenabi
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Class Times

Lectures: Thursday 8:30 AM - 10:20 AM

Tutorials: T01Tu 2:30 PM - 4:20 PM

       T02 Th 4:30 PM - 6:20 PM

Class Format

In Person

Course Dates: 09/02/2025 - 12/04/2025
Units: 3.00
Course Delivery Mode: In Person
Course Description: Mathematical models and systems; economic comparison of projects; optimization; linear, nonlinear and dynamic programming; simulation modelling. With an emphasis on transportation and other civil engineering applications. Two lectures, one tutorial (two hours); first term Prerequisite(s): Registration in Level III or above of any Engineering program

Instructor-Specific Course Information

- All formal communications regarding this course will be conducted through McMaster email accounts and/or Avenue to Learn. Please, make sure that you check your McMaster email account and the course page on Avenue to Learn regularly.

- Students' emails to the instructor or the TAs should include the course number and a relevant description in the subject line of the email (e.g., CIVENG3C03: Assignment 3 question). The instructor and the TAs will respond to emails within three weekdays.

- If you believe that you have received incorrect grades (for any assignment or test), you must contact the instructor within one week of the day that the assignment/test was returned to you. You should also reach out to the TA Assigned to that Assignment to ensure you understand the grade and the reason before contacting the instructor.

- Any additional policies/rules that will be discussed in the first lecture and documented in the first lecture notes are considered complementary to the course-specific policies mentioned herein.

Important Links

- Mosaic

- [Avenue to Learn](#)
- [Student Accessibility Services - Accommodations](#)
- [McMaster University Library](#)
- [eReserves](#)

Course Learning Outcomes

- Select an appropriate technique to solve an optimization problem based on thenature of the problem (CEAB attribute 3.1: Selects appropriately from relevantknowledge base to plan appropriate data collection methods and analysisstrategies)

- Apply proper computer tools (e.g., Microsoft Excel and MATLAB) to solve thedifferent optimization problems and understand the limitations associated withsuch tools (CEAB attribute 5.1: Evaluates engineering tools, identifies theirlimitations, and selects, adapts, or extends them appropriately

- Identify the relevant data needed to solve an optimization problem based on theobjective of the problem (CEAB attribute 3.1: Selects appropriately from relevantknowledge base to plan appropriate data collection methods and analysisstrategies)

- Apply Microsoft Excel to conduct Monte Carlo simulation and evaluate standardstatistical distributions (CEAB attribute 5.1: Evaluates engineering tools, identifiestheir limitations, and selects, adapts, or extends them appropriately)

- Apply optimization principles to determine the optimal production policy thatmaximizes system profit given the available resources and minimizes the differentcosts of a project (CEAB attribute 11.1: Applies economic principles in decisionmaking)

- Apply various statistical and decision-making tools to make decisions underuncertainty (CEAB attribute 11.3: Identifies, characterizes, assesses,

andmanages risks to project success)

- Analyze the sensitivity of the optimal policy of engineering projects to a variety offactors, and understand the implications of such analysis on the projectimplementation and operation (CEAB attribute 11.3: Identifies, characterizes,assesses, and manages risks to project success)

Graduate Attributes

The Canadian Engineering Accreditation Board (CEAB) is a division of Engineers Canada and is responsible for accrediting undergraduate engineering programs across Canada. Accreditation by the CEAB ensures that the engineering programs meet a national standard of quality and cover essential educational requirements. Graduate Attributes are a set of qualities and skills that the CEAB expects engineering graduates to possess. These attributes are a benchmark for the learning outcomes of accredited engineering programs. This section lists the Graduate Attribute Indicators associated with the Learning Outcomes in this course.

Course Schedule

A weekly breakdown of the course schedule. Note: This schedule is subject to change. Students will be notified at least one week in advance of any change.

Week	Topic
Week 1 (Sep 4)	Course outline and Introduction to Linear Programming
Week 2 (Sep 11)	Linear Programming
Week 3 (Sep 18)	Linear Programming 2 & Introduction to Non-Linear
Week 4 (Sep 25)	Integer Programming & Sensitivity Analysis
Week 5 (Oct 2)	Sensitivity Analysis & Midterm Review
Week 6 (Oct 9)	Midterm Exam

Final Examination	Scheduled during regular university final examination period, established by the registrar's office

Week	Topic
Week 7 (Oct 16)	Midterm Recess (No Class)
Week 8 (Oct 23)	Special LP Problems 1
Week 9 (Oct 30)	Special LP Problems 2
Week 10 (Nov 6)	Dynamic Programming
Week 11 (Nov 13)	Modelling and Simulation 1
Week 12 (Nov 20)	Modelling and Simulation 2
Week 13 (Nov 27)	Decision Analysis
Week 14 (Dec 4)	Review/Questions
Final Examination	Scheduled during regular university final examination period, established by the registrar's office

Required Materials and Texts

Please sign in with your MacID here to view your booklist

There are no mandatory materials for this course

Course Evaluation

This Evaluation scheme is subject to change, students will be notified in advance of any changes.

Method of Evaluation	Weight
Assignments (4 Assignments)	25%
Quizz	10%
Midterm	20%
Final Exam	45%

1. Assignment 1 should be posted September 26th, with deadline of October 5th at 11:59 PM.

2. Assignment 2 should be posted October 20th, with deadline October 27th at 11:59 PM.

3. Assignment 3 should be posted Friday November 7th, with deadline of November 16th at 11:59 PM

4. Assignment 4 should be posted November 25th with deadline on last day of classes, December 5th at 11:59 PM.

Quiz Date: November 27th In Lecture.

Undergraduate Grading Scale

The McMaster 12 Point Grading Scale

Grade	Equivalent Grade Point	Equivalent Percentages
A+	12	90-100
A	11	85-89
A-	10	80-84
B+	9	77-79
B	8	73-76
B-	7	70-72
C+	6	67-69
C	5	63-66
C-	4	60-62
D+	3	57-59
D	2	53-56
D-	1	50-52
F	0	0-49

Graduate Grading Scale

Graduate Student Grading Scale (Except for MBA and Master of Finance)

Grade	Points	Equivalent Percentage	Pass/Fail
A+	12	90-100	P+

Grade	Points	Equivalent Percentage	Pass/Fail
A	11	85-89	
A-	10	80-84	
B+	9	77-79	P
B	8	73-76	
B-	7	70-72	
F	0	69 and under	F

MBA and Master of Finance Grading Scale

Grade	Points	Equivalent Percentage	Pass/Fail
A+	12	90-100	P+
A	11	85-89	
A-	10	80-84	
B+	9	75-79	P
B	8	70-74	
B-	7	60-69	
F	0	59 and under	F

Late Assignments

Late assignments up to 3 days will be graded out of 80%. Later than 3 days will not be accepted. Unless with explicit permission from course instructor via email.

Absences, Missed Work, Illness

If you submit an MSAF, you are granted the following reliefs, based on the missed work:

- Assignments: If you submit an MSAF for a missed assignment, the weight of the assignment will be the average of the remaining assignments.
- Quiz: If you submit an MSAF for a missed quiz, the quiz weight will be automatically assigned to the final exam
- Midterm: If you submit an MSAF for the midterm, you will be given a chance to write the exam on another date

Generative AI: Use Prohibited

Students are not permitted to use generative AI in this course. In alignment with [McMaster academic integrity policy](), it "shall be an offence knowingly to … submit academic work for assessment that was purchased or acquired from another source". This includes work created by generative AI tools. Also state in the policy is the following, "Contract Cheating is the act of "outsourcing of student work to third parties" (Lancaster & Clarke, 2016, p. 639) with or without payment." Using Generative AI tools is a form of contract cheating. Charges of academic dishonesty will be brought forward to the Office of Academic Integrity.

APPROVED ADVISORY STATEMENTS

Academic Integrity

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. **It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the [Academic Integrity Policy](), located at https://secretariat.mcmaster.ca/university-policies-proceduresguidelines/

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

Courses with an On-line Element

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn, LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

Online Proctoring

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

Conduct Expectations

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the [Code of Student Rights & Responsibilities](#) (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online.**

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

Equity, Diversity, and Inclusion

The Faculty of Engineering is committed to creating an environment in which students of all genders, cultures, ethnicities, races, sexual orientations, abilities, and socioeconomic backgrounds have equal access to education and are welcomed and treated fairly. If you have any concerns regarding inclusion in our Faculty, in particular if you or one of your peers is experiencing harassment or discrimination, you are encouraged to contact the Chair, Associate Undergraduate Chair, Academic Advisor or to contact the Equity and Inclusion Office.

Academic Accommodation of Students with Disabilities

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's Academic Accommodation of Students with Disabilities policy.

Academic Advising

For any academic inquires please reach out to the Office of the Associate Dean (Academic) in Engineering located in JHE-Hatch 301.

Details on academic supports and contact information are available from:

https://www.eng.mcmaster.ca/programs/academic-advising

Requests for Relief for Missed Academic Term Work

In the event of an absence for medical or other reasons, students should review and follow the Policy on Requests for Relief for Missed Academic Term Work.

Academic Accommodation for Religious, Indigenous, or Spiritual

Observances (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](#) policy. Students should submit their request to their Faculty Office **normally within 10 working days** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

Copyright and Recording

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

Extreme Circumstances

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn and/or McMaster email.