

We recognize and acknowledge that McMaster University meets and learns on the traditional territories of the Mississauga and Haudenosaunee nations, and within the lands protected by the "[Dish With One Spoon](#)" wampum, an agreement amongst all allied Nations to peaceably share and care for the resources around the Great Lakes.

MATH 1ZC3 – Engineering Mathematics II-B 2023 Fall Term

Instructor and Course Information

	Section C01	Section C02	Section C03
Instructor	Gagandeep Virk	Aaron Childs	Jiasheng Teh
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Office	TBA	HH/213	HH/414
Office Hours	TBA	TBA	TBA

Class times and Location: Check [Mosaic](#)

Course Home Page: The course home page is NOT on Avenue to Learn. It is on [childsmath](#).

Course Description

Vector spaces given by solutions to linear systems. Linear independence, dimension. Determinants. Eigenvalues, eigenvectors and diagonalisation. Complex numbers.

- Three lectures, one tutorial, one lab; one term

Prerequisite(s): One of Grade 12 Calculus and Vectors U, MATH 1F03, or credit or registration in MATH 1ZA3

Antirequisite(s): MATH 1B03, 1ZZ5

Course and Learning Objectives

Learning Objectives

Upon completion of this course, the student will be able to:

1. Obtain a basic working familiarity with Matlab.
2. Find general solutions to linear systems using Gaussian elimination.
3. Develop proficiency with basic matrix operations and learn their properties.
4. Define and use the matrix inverse and its properties, and be able to derive an inverse matrix



5. Be able to work with determinants and their properties.
6. Develop a working knowledge of eigenvalues and eigenvectors, including their meaning and applications.
7. Obtain a basic familiarity with complex numbers and complex roots in rectangular and polar form
8. Able to calculate and apply ideas of vector multiplication and projections
9. Understand the concepts of abstract vector spaces and subspaces.
10. Be able to determine and work with independence, basis, spanning sets, and dimension.

Course Format

- The course delivery will be in-person lectures. The in-person lectures will also be recorded.

Required Materials/ Resources

- **Required:** *Elementary Linear Algebra - Applications Version*, 12th Edition or 11th Edition, Anton and Rorres, Wiley
- **Optional:** Student Solutions Manual for *Elementary Linear Algebra - Applications Version* Matlab (Version 7 or later) Software
- A copy of the textbook and solutions manual are available on reserve in Thode Library.
- Course materials can be accessed through the [Bookstore](#).

Virtual Course Delivery

Aside from the required pre-lecture videos, this course will run fully in-person in accordance with university directives and strict health and safety guidelines. It is the expectation that students be prepared to attend all lectures, labs/tutorials, tests, exams, and other evaluations in-person. However, students must be prepared to move to virtual learning should there be a change to health regulations and restrictions as issued by the Province or University.

To follow and participate in virtual classes it is expected that you have reliable access to the following:

- A computer that meets performance requirements [found here](#).
- An internet connection that is fast enough to stream video.
- Computer accessories that enable class participation, such as a microphone, speakers and webcam when needed.

If you think that you will not be able to meet these requirements, please contact uts@mcmaster.ca as soon as you can. Please visit the [Technology Resources for Students page](#) for detailed requirements. If

you use assistive technology or believe that our platforms might be a barrier to participating, please contact [Student Accessibility Services](#), sas@mcmaster.ca, for support.

Course Overview and Assessment

Material Covered

- All sections covered in the suggested problems.
- **Major Topics:** Systems of linear equations and matrices, determinants, Euclidean vector spaces, eigenvalues and eigenvectors, complex numbers, general vector spaces, applications. Here are the learning objectives.
- **Approximate Schedule:** Systems of linear equations (2 lectures), matrices (7 lectures), determinants (3 lectures), Euclidean vector spaces (6 Lectures), eigenvalues and eigenvectors (4 lectures), complex numbers (2 lectures), general vector spaces (8 lectures), applications (4 lectures).

Assignment Information

- There will be 6 online assignments. See the Important Dates for the due dates.

Lab Information

- There will be 5 labs which will require the use of Matlab (Version 7 or later) or Octave. See the Important Dates for the due dates.
- You do not have to attend any scheduled lab times. But TAs will be available if you need help at the times given on the Lab Information Page.
- All information about labs is available on the Lab Information Page.

Test Information

- Calculators are NOT allowed on any of the tests or exams.
- Some sample tests are available under 'Content Groups' to the left.
- Tentative Dates (subject to change):
 - o **Test #1:** Evening of Thursday October 19th
 - o **Test #2:** Evening of Thursday November 23rd
- Check the Announcements for room and time information, and for instructions on what to do if you have a conflict with the test time.



Evaluation

Assessment	Weight
6 Assignments	- 2% each
5 Labs	- 2% each
2 Tests	- 19% each
Final Exam	- 40%

- At the end of the course the grades may be adjusted, but this can only increase your grade and will be done uniformly. We will use the grade equivalence chart published in the Undergraduate Calendar to convert between percentages and letter grades.
- The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

Requests for Relief for Missed Academic Term Work

[McMaster Student Absence Form \(MSAF\)](#): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

Course Specific Missed Work Policy

- If you are absent from the university for a minor medical reason, lasting fewer than 3 days, you may report your absence, once per term, without documentation, using the McMaster Student Absence Form. Absences for a longer duration or for other reasons must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, report your absence to childs@mcmaster.ca. Please note that the MSAF may not be used for term work worth 25% or more, nor can it be used for the final examination. For more information please review the [Academic Calendar’s - Request for Relief for Academic term Work](#).



- If your MSAF form was received then the word "note" will appear in place of your mark on the marks page. This will show up within one week after you filled out the MSAF form. If you don't see the word "note" in place of your mark for the missed work one week after filling out the MSAF form, then send an email to [Dr. Childs](#). If you do see the word "note" in place of your mark, then no follow-up is required.
- The percentage for a missed test will be added to your final exam.
- The percentage for a missed assignment or lab will be distributed among your remaining assignments or labs.

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 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.

Courses with An On-Line Element

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), 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.

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](https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/), located at <https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/>

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.

Inclusivity

McMaster is committed to an inclusive and respectful community. These principles and expectations extend to online activities including electronic chat groups, video calls and other learning platforms. If you are concerned about your virtual classroom experiences, the [Equity and Inclusion Office](#) (EIO) is available to advise and assist students who may be experiencing any equity, accessibility, inclusion, harassment, discrimination or sexual violence concerns. You can reach the EIO at equity@mcmaster.ca. Thank you for joining us in ensuring that our McMaster online communities are spaces where no one feels excluded and everyone is able to enjoy learning together.

Authenticity / Plagiarism Detection

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to the [McMaster Office of Academic Integrity's](#) webpage.

Conduct Expectations

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all 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.

Additional information about the [Code and netiquette](#) can be found on the **Student Support & Case Management** website.



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.

Research Ethics -NA

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, A2L and/or McMaster email.