CARLETON UNIVERSITY
SCHOOL OF MATHEMATICS AND STATISTICS

BIT 1201A / MATH 1107A Linear Algebra I Winter 2022

Preliminary COURSE OUTLINE

Objectives of the course: this is an introductory course in linear algebra, with the focus on calculations and applications. It includes basic topics in linear algebra. This course will help the students develop their mathematical skills. The students will also have an opportunity to develop their communication skills.

Lectures will be asynchronous. **Lecture recordings** will be posted on **Brightspace** every Monday, beginning on Monday *January 10*.

Tutorials will be held on-line every ***Monday at 2:35 - 3:25 pm***, *beginning on January 24*.

Instructor: Dr. Inna Bumagin

- **Email:** inna.bumagin AT carleton.ca
- **Office hours:** online, Mondays 11:30 am - 1 pm, or by appointment.
- **Website:** `https://carleton.ca/brightspace/`

Teaching Assistants: TBA

Main Reference: Course notes *Linear Algebra I* by Inna Bumagin, will be **posted on Brightspace**.

Reference Text: *Linear Algebra with Applications*, by Keith W. Nicholson, Lyryx Learning Inc., open edition 2021 A, available at
`https://lyryx.com/linear-algebra-applications`

Prerequisites: Ontario Grade 12 Mathematics: Advanced Functions, or MATH 0005, or equivalent, or permission of the School.

Additional resources

- TA Office hours will be mostly dedicated to informal discussion group meetings. Your participation is not mandatory but is highly recommended.
- The **Math Tutorial Centre** will be available via a link in Brightspace called *"(MTC) Online Math Tutorial Centre (Winter 2022)"*. More details can be found here:
  `https://carleton.ca/math/math-tutorial-centre/`

Preliminary list of topics

"Sections" are sections from the course notes

Week	Dates	Topics	Sections
1	Jan 10–14	Vectors and Lines in 2D and 3D. Dot product	1.1-1.3
2	Jan 17–21	Planes in 3D. Complex numbers	1.4, 1.5
3	Jan 24– 28	Systems of linear equations	2.1-2.5
4	Jan 31 – Feb 4	Matrix operations	3.1-3.4
5	Feb 7 – 11	Matrix inverses. Elementary matrices	3.5, 3.6
6	Feb 14 – 18	Determinants	4.1-4.5
	Feb 21 – 25	Winter break	
7	Feb 28 – Mar 4	Vector space $\mathbb{R}^n$	5.1-5.5
8	Mar 7 – 11	Linear transformations	6.1-6.5
9	Mar 14 – 18	Subspaces of $\mathbb{R}^n$	7.1-7.3
10	Mar 21 – 25	The Invertible Matrix Theorem. Eigenvalues	7.4, 8.1, 8.2
11	Mar 28 – Apr 1	Eigenspace. Diagonalization	8.3, 8.4
12	Apr 4 – 8	Applications	9.1-9.3
	April 11 – 12	Review	

Winter term ends on April 12 (Tuesday).

EVALUATION. Your final grade for the course will consist of

(1) **Quizzes 10%**
(2) **Weekly homework assignments 30%**
(3) **Tests 25%**
(4) **Final Examination 35%**.

Note: you must obtain **at least 50%** of the mark **in each category** (homework assignments and quizzes; tests; and the final exam) to pass the course.

Weekly homework assignments and **quizzes** will be administered via **Webwork**: `https://webwork.math.carleton.ca/webwork2/2022-WINTER-MATH1107/`

There will be **three** one-hour open-book **Tests**, also administered via Webwork. Tests are tentatively scheduled for February 1-2, March 1-2, and March 29-30. Each test will be available Tuesday 1 pm - Wednesday 2:30 pm. Once you open the test you will have 60 minutes to solve it. Answers submitted after 2:30 pm on Wednesday will not count toward your mark for the test. *Only the best two of the three marks for the tests will count toward your final grade.* There are no make-up tests.

Final Examination is a **3-hour open-book exam** scheduled by the University. Unlike the tests, the final examination must be completed within the 3-hour allotted time period. The exam is taking place during the period of April 14-28, 2022.

Academic Integrity.

The tests and the final exam are to be completed individually. You must approach the Instructor or a Teaching Assistant when in need for assistance when solving a test or the final exam. **Contacting anyone else is *strongly prohibited*.**

You are welcome to *collaborate with other students from class on the homework,* but you should **solve your assignments on your own**. Getting help from anyone who is not a participant in this class is *strongly discouraged*.
Never submit answers based on solutions that you do not understand.

Course notes, presentation videos, assignments, tests, final exam created for this course remain intellectual property of either Instructors or TAs who created them. These materials are intended for the personal and non-transferable use of the students registered in the current offering of the course. **Reposting, reproducing, or redistributing** any of these materials, in part or in whole, without the written consent of the Instructor is **strictly prohibited**.

Students are required to be familiar with the complete **Academic Integrity Policy** at Carleton University available at:
`https://carleton.ca/registrar/academic-integrity/`

The University states unequivocally that it demands academic integrity from all its members. Academic dishonesty, in whatever form is ultimately destructive to the values of the University. Students who violate the principles of academic integrity through dishonest practices undermine the value of the Carleton degree. Dishonesty in scholarly activity cannot be tolerated. Any student who violates the standards of academic integrity will be subject to appropriate sanctions.

Plagiarism. Plagiarism is a specific matter of Academic Integrity. Plagiarism includes reproducing or paraphrasing portions of someone else's material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source. In mathematics, an answer can not be plagiarized, but the presentation of its solution can! Thus, copying answers from fellow students, online posts, or online calculators (such as Wolfram, Symbolab, etc.) is strictly prohibited.

Academic Accommodation
Carleton University has suspended the need for a doctor's note or medical certificate until further notice when requesting academic accommodation related to COVID-19. Students should complete the self-declaration form available on the Registrar's Office website to request academic accommodation for missed course work including exams and assignments:
`https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf`

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy obligation: write to the Instructor with any requests for academic accommodation during the first two weeks of classes, or as soon as possible after the need for accommodation is known to exist.

Religious obligation: write to the Instructor with any requests for academic accommodation during the first two weeks of classes, or as soon as possible after the need for accommodation is known to exist.

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 for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send the Instructor your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, contact the Instructor to ensure accommodation arrangements are made. Please consult the PMC website for more information:
`https://carleton.ca/pmc/`

You can find more detailed information on academic accommodation here:
`https://students.carleton.ca/course-outline/#accommodation-for-student-activiti`