

MATH 204
Vectors and Matrices
Winter 2023

Instructor*: _____

Office/Tel No.: _____

Office Hours: _____

*Students should get the above information from their instructor during class time. The instructor is the person to contact should there be any questions about the course.

Textbook: *Elementary Linear Algebra*, Custom Version, 12th Edition, by H. Anton, C. Rorres & A. Kaul (JohnWiley & Sons).

Prerequisite: Math 201 or equivalent.

Office Hours: Your professor will announce her/his office hours during which she/he will be also available to give a reasonable amount of help. Note, however, that if you missed a class it is not reasonable to expect your professor to cover the missed material for you.

Tutorials: The material in this course requires a lot of practice. The Department has therefore organized special tutorial sessions conducted every week to provide additional support to students outside the online lecture environment. These sessions are conducted by tutors who will help with solving problems on the topics learned in class that week, with particular emphasis on the material that students may have difficulties with in this course. Students are strongly encouraged to participate and be active at these problem-solving sessions. Tutorials are an important resource to help students succeed in this course.

Math Help Centre: A Math Help Centre staffed by graduate students is available. The schedule of its operation will be posted in the Department and on the Department webpage <https://www.concordia.ca/artsci/math-stats/services/math-help-centre.html>.

WeBWorK: Every student will be given access to an online system called **WeBWorK**. The system provides you with many exercises and practice problems. Students will use this system to do online assignments (see **Assignments** below). In addition, before the midterm test and before the final exam, a number of practice problems will be posted in **WeBWorK** to help you review the material of the course.

Assignments: Students are expected to submit assignments online using **WeBWorK**. Late assignments **will not** be accepted. Assignments contribute 10% to your final grade. Working regularly on the assignments is essential for success in this course. Students are also strongly encouraged to do as many problems as their time permits from the list of recommended problems included in this outline, as well as practice problems. A solutions manual for all odd-numbered questions is packaged with the textbook.

Calculators: Only calculators approved by the Department (with a sticker attached as proof of approval) are permitted for the class test and final examination. For a list of Approved calculators see <http://www.concordia.ca/artsci/math-stats/services.html#calculators>.

Midterm Test: There will be one 90-minute **midterm test**, based on the material of weeks 1-7, which will contribute up to 25% to your final grade (see the **Grading Scheme below**). The test will be **common** for all sections of this course and will be held on **Sunday March 12, 2023 at 17:00 (i.e. 5:00 P.M.)**. (Note that Daylight Saving Time begins on Sunday March 12.)

Students who are unable to write the midterm test for a valid reason must write to their instructor to request a 90% final exam. Such a request will not be granted unless it is made in writing (by email), the reason is valid, and is supported by documentation or other evidence. Valid reasons for missing a midterm test include: conflicts with other exams or religious observances (must be reported to the instructor in advance); illness ([Short-Term Absence form](#) or valid medical note required); bereavement. Students who miss the midterm test but do not request a 90% final, as described above, will not be granted a 90% final, and will forfeit the marks for the midterm test.

Travel arrangements are not considered a valid reason for missing the midterm test.

NOTE: If you are taking another MATH 200 level course with a common midterm test at the same time as this one, you may choose which of the two tests you want to write. You must then inform the instructor of the other course that you will not write that test because of the time conflict between the two courses. In this case, the 90%-10% formula will apply to that other course.

Final Exam: The final examination will be three hours long and will cover all the material in the course.

NOTE: Students are responsible for finding out the date and time of the final exams once the schedule is posted by the Examinations Office. Conflicts or problems with the scheduling of the final exam must be reported directly to the Examinations Office, not to your instructor.

Grading Scheme: The final grade will be based on the higher of (a) or (b) below:

- a) 10% for the assignments,
25% for the midterm test,
65% for the final exam.
- b) 10% for the assignments,
10% for the midterm test,
80% for the final exam.

NOTE: If you miss the midterm test for a valid reason and make a written request, with supporting documentation/evidence, that is approved by your instructor, then your final grade will be based on: 10% for the assignments, 90% for the final exam.

IMPORTANT: PLEASE NOTE THAT THERE IS NO "100% FINAL EXAM" OPTION IN THIS COURSE.

Weeks	Section	Topics	Recommended problems
1	1.1 1.2	Systems of Linear Equations Gaussian Elimination	1.1: 12,15b,20, 21 1.2: 3,6,8,17, 18, 22
2	1.3	Gaussian Elimination Matrices and Matrix Operations	1.2: 23, 25, 26, 28, 33, 37 1.3: 3fj,6de,7d
3	1.4 1.5	Inverses; Algebraic Properties of Matrices Elementary Matrices; Method to find A^{-1}	1.4: 1b,2c,17,22,29 1.5: 4cd,15, 17
4	1.6 2.1	Linear Systems and Invertible Matrices Determinants by Cofactor Expansion	1.6: 5,12,16,19 2.1: 3c,25 Chapter 1 Supplementary Exercises: 9, 10, 11, 13 a, b, c
5	2.2 2.3	Evaluating Determinants by Row Reduction Properties of Determinants, Cramer's Rule	2.2: 11 2.3: 22,27, 34, 35 Chapter 2 Supplementary Exercises: 15, 31, 32
6	3.1 3.2	Vectors in 2-space, 3-space, Norm, Dot Product, Distance in R^2, R^3	3.1: 10d, 20, 21, 27 3.2: 9,11a
7	3.3	Orthogonality Midterm Review class (if time permits!)	3.3: 4, 8, 13, 21, 25, 27
8	3.4 3.5	Geometry of Linear Systems Cross Product	3.4: 4,10,13,16 3.5: 7,16,18 Chapter 3 Supplementary Exercises: 1abcdef, 4, 6, 7, 12, 13, 14, 16, 23
9	4.1 4.2	Real Vector Spaces Subspaces	4.1: 17,18 4.2: 1,6,8a,11a
10	4.3, 4.4 4.5	Spanning Sets, Linear independence Coordinates and Basis	4.3: 2, 3, 6, 8abcd, 4.4: 1, 2, 7 4.5: 3, 7, 13
11	4.6 1.8	Dimension Linear Transformations	4.6: 1,5,8, 18 1.8: 13abc, 27, 29, 32, 36, 37, 46
12	5.1 5.2	Eigenvalues and Eigenvectors Diagonalization	5.1: 5ab,7, 8, 14, 19, 20, 21, 22, 24, 25ab, 32, 33 5.2: 6, 7, 8, 19, 20c
13		REVIEW	

This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: <https://www.concordia.ca/conduct/academic-integrity.html>" [*Undergraduate Calendar, Sec 17.10.2*]

Behaviour

All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications.

Concordia students are subject to the [Code of Rights and Responsibilities](#) which applies both when students are physically and virtually engaged in any University activity, including classes, seminars, meetings, etc. Students engaged in University activities must respect this Code when engaging with any members of the Concordia community, including faculty, staff, and students, whether such interactions are verbal or in writing, face to face or online/virtual. Failing to comply with the Code may result in charges and sanctions, as outlined in the Code.

Use of Zoom

Note: Zoom is included as an institutionally-approved technology. This means we have been assured of the privacy protections needed to use freely within the classroom.

Zoom might be used in this course to facilitate learning at a distance. It may be used to record some or all of the lectures and/or other activities in this course. If you wish to ensure that your image is not recorded, speak to your instructor as soon as possible.

Also, please note that you may not share recordings of your classes and that the instructor will only share class recordings for the purpose of course delivery and development. Any other sharing may be in violation of the law and applicable University policies, and may be subject to penalties.

Intellectual Property

Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing of course content may constitute a breach of the [Academic Code of Conduct](#) and/or the [Code of Rights and Responsibilities](#). As specified in the [Policy on Intellectual Property](#), the University does not claim any ownership of or interest in any student IP. All university members retain copyright over their work.

Extraordinary circumstances

In the event of extraordinary circumstances and pursuant to the [Academic Regulations](#) the University may modify the delivery, content, structure, forum, location and/or evaluation scheme. In the event of such extraordinary circumstances, students will be informed of the change.