

**MATH 204**  
Vectors and Matrices  
*Fall 2021*

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.

**Preface:** All assessment items for this course will be conducted entirely ONLINE. **Even if your section's lectures are in-person, your midterm and final exams will be conducted online via the Concordia Online Exams (COLE) platform, with online proctoring. For more details see the ADDENDUM at the end of this Course Outline.**

**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 his office hours during which 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 ONLINE tutorial sessions conducted every week to provide additional support to students outside the online lecture environment. These online 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:** In addition to Tutorials, 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.

**Midterm Test:** **There will be one midterm test, based on the material of weeks 1-6, 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 October 24, 2021, at 2:30 P.M.** Students who will not be able to write the test that day for a valid reason, e.g. religious (to be reported to the section's **instructor** in advance) or illness (*Short-Term Absence form or a valid medical note required*), may write an alternate midterm test on **Saturday October 30, 2021, at 10:00 A.M.**

**NOTE:** It is the Department's policy that tests missed for any reason, including illness, cannot be made up. If you miss both the main and the alternate midterm **tests** for a valid reason, supported by appropriate documentation, the final exam will count for 90% of your final grade, and the assignments will count for the remaining 10%.

**Final Exam:** The final examination will be online two 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.

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

Lectures	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 1.7	Linear Systems and Invertible Matrices Diagonal, Triangular and Symmetric Matrices	1.6: 5,12,16,19 1.7: 44, 45 Chapter 1 Supplementary Exercises: 9, 10, 11, 13 a, b, c
5	2.1 2.2 2.3	Determinants by Cofactor Expansion Evaluating Determinants by Row Reduction Properties of Determinants, Cramer's Rule	2.1: 3c,25 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	<b>Midterm Review class (if time permits!)</b> Orthogonality	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 of $R^n$ ONLY) 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		<b>REVIEW</b>	

**Academic Integrity and the Academic Code of Conduct**

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: [concordia.ca/students/academic-integrity](http://concordia.ca/students/academic-integrity)." [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.

### **Zoom**

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 will be used in this course to facilitate learning at a distance (remote sections and tutorials). 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.

### **Addendum:**

**All assessment items for this course will be conducted entirely ONLINE. Even if your section's lectures are in-person, both your midterm and your final online exam will be provided through the Concordia Online Exams (COLE) platform with online proctoring (also known as auto-proctoring).** More information about the COLE system may be found at the [COLE website](#). Additionally, an online proctoring tool called Proctorio will be used to provide proctoring during the exam. This type of proctoring is known as auto-proctoring, as there is no invigilation during the exam. Instead, your professor will review the recording after the exam.

Please note the following with respect to online proctored exams:

- That the exam will take place during the exam period at the designated date and time set by the professor (midterm) or the Exams office (final). All exam times will be set to Eastern Standard/Daylight Time.

- That Proctorio is used to help uphold academic integrity. Proctorio's Terms of Service may be reviewed at <https://proctorio.com/terms>. Recordings made and information collected during the exam may be used for this purpose, in accordance with the Academic Code of Conduct.
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- That your image, voice and screen activity, including IP address, may be recorded throughout the duration of the exam.
- That you are required to turn on your webcam and it must be pointed toward your face and workspace at all times during the exam, failing which your exam may be deemed invalid.
- That you must show your Concordia University Identification card to validate your identity. Alternative government-issued photo identification will be accepted, though it is not recommended. Only identification in English or French will be accepted.
- That any recording made will only be viewed by authorized university personnel and personnel authorized pursuant to University policies (no external entity has authorization to review the recording).
- That you will be responsible for ensuring appropriate, properly functioning technology (webcam, a microphone, appropriate browser and an ability to download any necessary software, as well as a reliable internet connection with a minimum of a 3G connection).
- That you are very strongly recommended to enter the virtual test site found at the [COLE website](#) and become familiar with the software that will be used for your exam before starting the exam.
- That you will need a quiet place within which to take the exam. Earplugs may also be used to allow you to focus for the duration of the exam. Noise cancelling headphones are not allowed.

Students who are unable to write an exam because they are unable to meet the above conditions and requirements are advised that they will need to drop the course. More information can be provided on the next offering of this course by consulting the Department. Students are advised that the drop deadline (DNE) for this course is **September 20, 2021**.

Students who require additional accommodations for their exams due to a documented disability should contact the Access Centre for Students with Disabilities as soon as possible ([acsinfo@concordia.ca](mailto:acsinfo@concordia.ca)).

If you face issues during the exam, you should inform your professor of those issues immediately. Please note that there are in-exam supports you should spend time getting to know. [Visit the COLE website](#) for more information.