Department of Mathematics & Statistics
Concordia University

MATH 204
Vectors and Matrices
Fall 2020

Instructor*: _____

Email: _____

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: **Due to exceptional circumstances, this course will be taught, and all assessments will be done completely ONLINE. Given the subject matter and nature of this course, at least one of the exams, including the midterm and/or the final exam will be given online through the Concordia Online Exams (COLE) platform with online proctoring. For more details read the ADDENDUM at the end of this Course Outline.**

Textbook: *Elementary Linear Algebra*, Custom Version, 11th Edition, by H. Anton & C. Rorres (JohnWiley & Sons).
The digital and print versions of the textbook will be available at:
https://www.bkstr.com/concordiastore/home
Note: Students should order textbooks as early as possible, especially for print versions in case books are backordered or there are any shipping delays.

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 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 25, 2020, at 10:00 A.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 (*a valid medical note required*), may write an alternate midterm test on **Saturday October 31, 2020, at 10:00 A.M.**

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

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: 21 1.2: 3,6,8,16
2	 1.3	Gaussian Elimination Matrices and Matrix Operations	1.2: 26,28 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
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
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
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	**Midterm Review** class (if time permits!) 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
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	Linear independence Coordinates and Basis	4.3: 2 4.4: 1, 12, 13
11	4.5 4.9	Dimension Matrix Transformations from R^n to R^m	4.5: 2,6,7 4.9: 1, 5, 9
12	 5.1 5.2	Examples of Matrix Transformations on the Plane. Eigenvalues and Eigenvectors Diagonalization	4.9: 31, 35 5.1: 5ab,10 5.2: 6, 7, 8, 20c
13		**REVIEW**	

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." *[Undergraduate Calendar, Sec 17.10.2]*

Disclaimer: In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in the course is subject to change.

Addendum: This course will be taught and all assessments will be completely online. A midterm and/or a 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.

Please note the following 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 your image, voice and screen activity will be recorded throughout the duration of the exam.
- 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 (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 or noise-cancelling headphones that are not connected to a device may also be used to allow you to focus for the duration of the exam.

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 21, 2020.

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 (acsdinfo@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.