Department of Mathematics & Statistics
Concordia University

MATH 204
Vectors and Matrices
Winter 2020

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, 11th Edition, by H. Anton & C. Rorres (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. There is not enough class time to do all the examples and problems needed to learn the material thoroughly. The Department has therefore organized special tutorial sessions conducted every week to provide additional support to students outside the lecture room 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. Tutorials are an important resource to help you succeed in this course and students are strongly encouraged to participate and be active at these problem-solving sessions.

As an added incentive, several quizzes will be given during the tutorials, and up to five bonus marks will be added to your final mark from the quizzes.

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.

Calculators: Only calculators approved by the Department (with a sticker attached as a proof of approval), such as **Sharp EL 531** or the **Casio FX 300MS**, available at the Concordia Bookstore, are permitted for the class test and final examination. See http://www.concordia.ca/artsci/math-stats/services.html #calculators for details.

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 <u>Sunday March 8, 2020, at 10:00 A.M.</u> **Note that the time changes that day**. It is the Department's policy that tests missed for any reason, including illness, cannot be made up. If you miss the midterm for any valid reason, e.g. illness, religious, etc., 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 test.

NOTE: If you are taking another MATH 200 level course with a common midterm test <u>at the same time as this one</u>, 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.

Up to 5 bonus marks will be added from the quizzes (see **Tutorials**).

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: 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