DEPARTMENT OF MATHEMATICS

MATH 1310 Matrices for Management and Social Sciences

Winter 2009

Sections:	A01 Developmental Section	A02
Instructors:	G.I. Moghaddam	R.D. Borgersen
Phone:	474-6849	474-6708
Email:	moghadm@cc.umanitoba.ca	borgersen2008@gmail.com.
Office:	429 Machray Hall	352 Machray Hall
Office Hours:	Mon., Wed. 10:30– 11:30 a.m. and Fri. 11:30 a.m. – 12:30 p.m. or by appointment	Mon.1:30 - 2:30 p.m., Tue. 10:00 - 11:30 a.m. and Fri. 10:30 - 11:30 a.m. or by appointment
Lectures:	305 St. Paul's College 12:30 p.m.-1:20 p.m. M/W/F, and 11:30 a.m.- 12:20 p.m. Th	408 Tier Building 8:30 a.m.-9:45 a.m. T/R
Labs/Tutorials	One of the following (Wednesdays):	One of the following (Thursdays):
(required)	B01- T, 11:30 a.m., 418 Machray	B04- W, 10:20 a.m., 385 University College
	B02- T, 11:30 a.m., 124 Machray	B05- W, 11:30 a.m., 315 Machray
	B03- T, 11:30 a.m., 519 Allen	B06- W, 2:30 p.m., 419 Machray
		B07- W, 3:30 p.m., 419 Machray

TEXT: Introductory Linear Algebra (Custom Edition for the University of Manitoba, 2007). A Student's Solution Manual is available in the Bookstore.

WEBPAGE: http://home.cc.umanitoba.ca/∼moghadm/Math1310

COURSE OBJECTIVES: For students to gain familiarity with the basic concepts of matrices, linear equations, determinants, linear programming and to be familiar with some of the applications of these in a business/ economics context.

TUTORIALS AND QUIZZES: Beginning on Januray 12, there will be a tutorial/lab each week. There will be five quizzes held in the tutorial classes, written approximately every two weeks.

MIDTERM EXAM: There will be a mid-term test on **Tuesday, Feburary 24, 2009 at 5:30 p.m.** No make-ups or deferrals are permitted except for reasons the university normally finds acceptable for absence from a formal final exam.

GRADING: (calculators cannot be used for quizzes and exams):
Best four out of five quizzes (and assignments for A01) 16 % , Mid-term test 34 % and Final exam 50 %.

Section A01 is a developmental section with an additional teaching period per week, for a total of four teaching periods each week. This will enable us to do some review of relevant high school materials as well as more examples of the new topics.
As in other sections, students in the developmental section will be required to write a final exam, a midterm exam and five quizzes. However, in addtion, there will be four assignments. These are to be handed in for grading. The assignments and quizzes will count for 16 % of the final grade with the assignments being weighted 2% each and the average of the best four out of five quizzes accounting for the remaining 8%.

VW (voluntary withdrawal) DATE: Thursday, March 19, 2009.

Text: Introductory Linear Algebra (Custom Edition for the University of Manitoba, 2007)

Course Outline and Suggested Homework Exercises

Section	Topic and page numbers	Suggested Exercises
1	Linear Systems, 8 - 9	$1 - 27$ (odds), T.4
2	Matrices: matrix addition, scalar multiplication, the transpose of a matrix, 17 - 19	$1 - 7$, 9, T.5, T. 7
3	Dot product and Matrix Multiplication: the matrix-vector product written in terms of columns, linear systems, 28 - 31	$1 - 11$, 13, 19, 21, 26, 27-a, 31, 33, T.1, T.7
4	Properties of Matrix Operations, 39 - 42	$1 - 7$ (odds), $8 - 13$, 15, T.9, T.27, T.33
5	Solutions of Linear Systems of Equations: solving linear systems, homogeneous systems, polynomial interpolation, temperature distribution, $61 - 65$	1 -19, $20 - 31$ (odds), 35, 39, 41, 51, T.11
6	The Inverse of a Matrix: a practical method for finding A^{-1}, linear systems and inverses, $75 - 77$	1, 3, $5 - 9$, 13, 14, 20, $23 - 25$, T.1
7	The Determinant of a Matrix: elementary matrices, 85	$1 - 6$, 11
8	Properties of Determinants, 90 - 92	$1 - 7$, 11, 13
9	Cramer's Rule, 96 - 97	$1 - 3$, 5, 9
10	Markov Chains, $105 - 107$	$1 - 7$, 8-a, 10 - 15
11	Linear Economic Models: the Leontief closed model, the Leontief open model, $114 - 115$	$1 - 7$, 9, 11, 12
12	Vectors in the Plane: coordinate systems, vectors, length, using determinants to compute area, vector operations, angle between two vectors, unit vectors $129 - 130$	1 - 15, $17 - 23$ (odds), 24 - 27, T.4, T.5
13	n-Vectors: vector operations, visualizing R^3, dot product on R^n, 144 - 146	$1 - 13$, 17, $21 - 31$ (odds), T.14
14	Vector Spaces, $152 - 153$	1, 4, $11 - 19$ (odds)
15	Subspaces, $160 - 163$	1, 5, 6, 7, 9, 11, 17, $25 - 27$, T.12, T.13
16	Linear Independence, $172 - 174$	$1 - 5$, 7, $10 - 13$, 15, T.1, T.7, T.13
17	Basis and Dimension, $184 - 186$	$1 - 3$, $5 - 9$, 11, 17, 19, 21, 29
18	The Rank of Matrix and Applications: rank and singularity, applications of rank to the linear system $Ax = b$, $195 - 198$	$1 - 25$ (odds), 31, 35
19	The Linear Programming Problem; Geometric Solution: Standard linear programming problems, minimization problem as a maximization problem, reversing an inequality, slack variables, $213 - 215$	$1 - 23$, 25, 28. 29
20	The Simplex Method: matrix notation, selecting and initial basic feasible solution, selecting the entering variable, choosing the departing variable, obtaining a new tableau, $228 - 229$	$1 - 4$, $5 - 11$ (odds), 15

HELP CENTRE:
Students can go for assistance with mathematical problems (on a first-come, first-served basis) to 318 Machray Hall. The Help Centre starts operation on Janurary 19 and is open for most of each weekday (shorter hours on Friday). Students are also welcome to seek help from their instructors.

The Department of Mathematics, the Faculty of Science and the University of Manitoba regard acts of **academic dishonesty** in quizzes, tests, examinations or assignments as serious offences and may assess a variety of penalties depending on the nature of the offence.

Acts of academic dishonesty include bringing unauthorized materials into a test or exam, copying from another student, plagiarism and examination personating. Students are advised to read section 7 (Academic Integrity) and section 4.2.8 (Examinations: Personations) in the "General Academic Regulations and Requirements" of the current Undergraduate Calendar. Note, in particular that cell phones and pagers are explicitly listed as unauthorized materials, and hence may not be present during tests or examinations.

Penalties for violation include being assigned a grade of zero on a test or assignment, being assigned a grade of "F" in a course, compulsory withdrawal from a course or program, suspension from a course/program/faculty or even expulsion from the University. For specific details about the nature of penalties that may be assessed upon conviction of an act of academic dishonesty, students are referred to University Policy 1202 (Student Discipline Bylaw) and to the Department of Mathematics policy concerning minimum penalties for acts of academic dishonesty.

The Student Discipline Bylaw is printed in its entirety in the Student Guide, and is also available on-line or through the Office of the University Secretary. Minimum penalties assessed by the Department of Mathematics for acts of academic dishonesty are available on the Department of Mathematics web page.

Information concerning the Mathematics Diagnostic Test and
Remedial Mathematics Program "Preparing for University Mathematics"

The Department of Mathematics has developed two new programs available **on a voluntary basis** to all students registered in Mathematics courses 1200, 1210, 1300, 1310, 1500, 1510, 1520, 1700 and 1710.

The diagnostic test is a voluntary online 50 question test, whose purpose is to measure your potential for success in the above Mathematics courses. The questions test your knowledge and skill in topics contained in the high school mathematics curriculum, principally Pre-Calculus 40S. The test provides you with an assessment of your knowledge and skill level, and provides advice about actions you should take in order to increase your chances of success in mathematical courses.

Access to the Mathematics Diagnostic Test is gained from your personal WebCT Homepage. (If you have not already done so, you must claim your UMnetID from the University's homepage at address "http://pasweb.cc.umanitoba.ca/webapp/gu/claimid/" in order to logon to your WebCT homepage.)

From your WebCT homepage select the link "Mathematics Diagnostic Test." Follow the instructions in order to complete the test, submit your test for grading, and immediately obtain results of your test. Finally, from your WebCT homepage, you should select the "Test Feedback" link, which will appear after you have submitted your test for grading. It will provide you with advice as how you should interpret the results of your test. If your results on the diagnostic test indicate that you would benefit by improving your mathematical skills, you should purchase a copy of the notes prepared for this purpose, entitled "Preparing for University Mathematics." The notes are available at the Bookstore. There are two methods in which you could use these notes to improve your mathematical skills and knowledge:

1. Self-study: carefully work through those sections of the notes in which weaknesses have been identified by the diagnostic test,

2. Enroll in one of the sections of the non-credit course MATH 0500 "Preparing for University Mathematics": this course will be offered on Saturday mornings (9:00 am until noon) during the first half of the term. Enrollment in each section will be limited to 25 students. During these sessions a graduate student from the Department of Mathematics will serve as a tutor, helping you and the other students registered in that section work your way through the course material.

It is very important to note that in order for the remedial course to be of any benefit, students must complete it as thoroughly and as quickly as possible, whether it be done by self-study or tutor-guided study.