Spring 2-1-2018

M 221.01: Introduction to Linear Algebra

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SYLLABUS: MATH 221, LINEAR ALGEBRA

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Time and Place: MTWF 11-11:50, Room 311, Math Building.
Text: Strang, *Introduction to Linear Algebra, 4th Edition*, Wellesley-Cambridge, 2009.
Prerequisite: M 172 or 182, or consent of instructor.
Office Hours: Tues 2pm, Wed & Fri 3pm, but I am happy to schedule other times to meet.
Final Exam: 10:10-12:10, Thursday, May 10.

OVERVIEW: The main focus is on the problem of solving $Ax = b$. To this end, we will make use of Gaussian elimination, and building from there, learn about the four subspaces $N(A)$, $C(A)$, $N(A^T)$, and $C(A^T)$. We will then study projections and the least squares solution of $Ax = b$. The last part of the course switches gears and focuses on eigenvalues, eigenvectors, and the singular value decomposition of a matrix.

LEARNING GOALS:

1. To learn Gaussian elimination for solving $Ax = b$ and the LU decomposition of the matrix A.

2. To learn about the properties of the vector space $\mathbb{R}^n$, including notions of linear independence, basis, subspace, dimension, orthogonality.

3. To learn how to find bases for the four subspaces of a matrix A: $N(A)$, $C(A)$, $N(A^T)$, and $C(A^T)$.

4. To learn about projections, the least squares solution of $Ax = b$, and the QR decomposition of a matrix A.

5. To learn to compute determinants, eigenvalues, eigenvectors, and the eigenvalue and singular value decompositions of a matrix A.

ASSESSMENT: Your course grade be will determined as follows:

		Total points
Exam 1	E1	100
Exam 2	E2	100
Exam 3	E3	100
Final	F	100
HW/Quizzes	Q	100

NOTE: The final exam is optional, is comprehensive, and if taken counts as a fourth exam. Moreover, your final exam score can be used to cover a low score on a previous exam, in which case it would be counted twice.

HOMEWORK, QUIZZES, and EXAMS: Homework will be given daily and you will

be tested on the homework material with a quiz once a week, usually on Tuesdays. Exams will be based on homework and quiz material.

IMPORTANT NOTE: Announcements made in class are considered addenda to this syllabus. Make sure you stay informed as to the progress of the class.

CONDUCT & ACADEMIC HONESTY: *Please, keep your eyes on your own work.* Otherwise, I've not had many issues, but I've got to let you know: (i) your conduct should be in line with the Student Conduct Code, which you can find on the UM home page; and (ii) you must practice academic honesty, because it's the right thing to do, but also because academic misconduct is subject to penalty.

HOW TO BE SUCCESSFUL: Two things: (i) come to class and pay attention, and (ii) do the homework. When preparing for exams and quizzes, practice doing the homework and similar problems from the book until you are able to do them correctly without the aid of the book or notes. *Math is learned by doing. It is not learned by only reading the book and/or watching others work problems.* If you don't understand something, ask questions in class or during office hours immediately.

FOR ANY STUDENT WITH A DISABILITY: If you have a disability that has, or might have, an effect on your performance in this class, please let me know. I will do my best to accommodate you.