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M 221.01: Introduction to Linear Algebra

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Department of Mathematical Sciences
Spring 2022
Linear Algebra

Instructor: Professor Emily Stone **E-mail Address:** stone@mso.umt.edu
Office: MATH 313 **Office Phone:** 243-5365
Office Hours: M 2-3, W 12-1, F 10-11

Course Description: In this course we will cover the first 6 chapters of the classic textbook by Strang, along with video content from Strang, in class homework sessions and quizzes.

Learning Outcomes: Upon completion of this course, a student will be able to

1. Solve systems of linear equations and solve matrix equations;
2. Identify linearly dependent and independent sets of vectors;
3. Compute bases for column, row and null spaces;
4. Represent linear transformations with matrices;
5. Compute and use determinants;
6. Compute eigenvalues and eigenvectors, and determine if a matrix is diagonalizable;
7. Determine and use orthogonality;
8. Use linear algebra to solve basic applied problems;
9. Prove elementary statements in linear algebra.

Texts: • *Introduction to Linear Algebra*
Gilbert Strang, 5th Ed., Wellesley-Cambridge Press

Prerequisite: M 172

Important Dates:

Jan. 26:	Last day to drop via Cyberbear
Feb. 7:	Last day to drop classes/change sections with instructor approval
Feb 21:	Presidents' Day Holiday - no classes
May 6:	Last Day for Drop Petitions

Exams: (tentative for Exams 1, and 2)

Feb. 18	Exam 1
March 4	Exam 2
May 13	Final Exam, 10:10-12:10

Grading:

Quizzes	30% of course grade
Exams (3)	60% of course grade
Participation	10% of course grade

SOME COMMENTS

The class essentially will be “flipped”. We will be using MIT’s open courseware for linear algebra, which includes some very nice lectures by Strang himself. You are to watch the relevant video lecture before you come to class. (I will post the link to the lecture(s) each week on Moodle.) In class I will point out some highlights of the section and we will work on problems together from the HW. I will take attendance and note participation in the discussions, as that will be a (small) part of your grade. The course moves quickly and hopefully this discipline will help keep everyone current as we go. If you let the work slide for even a few days, it might be quite difficult to catch up.

Homework Assignments/Quizzes: Homework will be assigned weekly, but not collected. Instead there will be quizzes on Tuesdays that cover the HW problems and the content of the video lectures.

Readings: In mathematics lectures, a new term is often defined at the beginning of the class period and then used repeatedly throughout the session. It is helpful to be prepared for class by reading the text ahead of time. Thus, when a new topic is introduced in class, it is *not* the first time you have seen it! The reading assignments are designed to help you make better use of class time, they are to be done *before* the material is covered in class.

Computing: You will need access to a software package to do the HW. I will work examples in MATLAB in class, but there are many other options. You can do the calculations in Python/Jupyter notebooks, R, Julia, Mathematica, Maple, or any package you find that carries out the operations needed. These packages are on some of the computer labs on campus, for instance the Math Building lab has MATLAB, Python, and R, for sure. If you choose to download one on your own computer, you might ask someone from your home department what they recommend for their classes, so you can use the package in future courses as well.

Exam Information: There will be two in-class exams and a final given on the dates listed at the bottom of the first page of this syllabus. The final exam will not be cumulative, it will cover only the last third of the course. Make-ups for an exam will not be given unless you have a valid excuse and you contact me prior to the exam.

Grading: Grading will be done on the usual percentage scale, 90-100% A, 80-89 % B, etc.

Students with Disabilities: The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office for Disability Equity (ODE). If you anticipate or experience barriers based on disability, please contact the ODE at: (406) 243-2243, ode@umontana.edu, or visit www.umt.edu/disability for more information. Retroactive accommodation requests will not be honored, so please, do not delay. As your instructor, I will work with you and the ODE to implement an effective accommodation, and you are welcome to contact me privately if you wish.

Academic Misconduct: All students need to be familiar with the Student Conduct Code. You can find it in the “A to Z Index” on the UM home page. From this, please note that all students are expected to practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University.

Final Note: Announcements made in class are considered addenda to this syllabus.