

# MA322: Matrix Algebra and its Applications

## Instructor: Eric Clark

- Office: Patterson Office Tower 806
- Office Hours: 10-11 TWR (or by appointment)
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## Basic Information

- Lecture: MTWRF 11:30-12:30 in CB339
- Textbook: *Linear Algebra and its Applications* (3rd ed.) by David Lay

## Grading

- HOMEWORK:** There will be daily homework assignments. Doing the homework is absolutely essential for your success in any math class. However, homework will not be collected.
- QUIZZES (30%):** There will a quiz given **at the start of class** every Tuesday and Thursday (except June 28th, July 5th, and July 17th). The quiz will consist of questions directly from all homework assignments since the previous quiz. Quizzes will last no more than 10 minutes.
- EXAMS (70%):** There will be two midterms and a final exam (20%, 20%, 30%, respectively). Midterm 1 will roughly cover chapters one and two, while Midterm 2 will cover three and four. The final will be cumulative with an emphasis on chapters five and six.
- ATTENDANCE:** Your attendance will not be officially recorded, but if you are on the border between two letter grades, your attendance and participation may be taken into account.

## General Comments

- EXPECTATIONS:** This course may be different from math courses you have taken in the past. Our focus will not solely be on computations, but also on the theory behind the math. Therefore, more than ever, you will be expected to **read the appropriate chapters in the textbook after each lecture.**
- HOMEWORK:** It is fine to discuss homework problems with fellow students but **please write up careful solutions on your own.** I am also available for questions through email. I may not reply to emails I receive after 10pm until the next day. If you need to come to me with questions about the homework, please be prepared to tell me what you have tried, directions you have attempted, and where the problem is occurring.
- MAKE-UP EXAMS: No make-up exams will be given.** You are being told now when the exams for this class will be. Please make sure that you do not schedule other activities on the dates of exams. If you must miss a test for medical or other very serious reason, I will need written documentation explaining the situation.
- KEEP RECORDS:** Please hold on to all of your graded materials until you receive your final grade. You will be asked to produce these if there are any questions or complications regarding records during the term.
- CLASSROOM ETIQUETTE:** The classroom is a learning environment in which I expect everyone to behave maturely and with respect for others. During class time, please turn off your cell phone.
- CHEATING AND PLAGIARISM:** Cheating is considered an extremely serious offense and is grounds for failure of the course.

# Tentative Schedule

## June 7-8:

- Orientation
- (1.1) Systems of linear equations
- (1.2) Row reductions and echelon forms

## June 11-15:

- (1.3) Vector equations
- (1.4) The equation  $Ax = b$
- (1.5) Solution sets of linear systems
- (1.7) Linear independence

## June 18-22:

- (1.8) Introduction to linear transformations
- (1.9) The matrix of a linear transformation
- (2.1) Matrix operations
- (2.2) The inverse of a matrix

## June 25-29:

- (2.3) Characterizations of invertible matrices
- (2.5) Matrix factorization
- Review

## -MIDTERM 1: Thursday, June 28

- (3.1) Introduction to determinants

## July 2-6:

- (3.2) Properties of determinants
- (3.3) Cramer's rule, volume, and linear transformations

## -NO CLASS: Wednesday, July 4th

- (4.1) Vector spaces and subspaces
- (4.2) Null spaces, column spaces, and linear transformations

## July 9-13:

- (4.3) Linearly independent sets and bases
- (4.4) Coordinate systems
- (4.5) The dimension of a vector space
- (4.6) The rank of a matrix
- Review

## July 16-20:

## -MIDTERM 2: Monday, July 16

- (5.1) Eigenvectors and eigenvalues
- (5.2) The characteristic equation
- (5.3) Diagonalization
- (5.5) Complex eigenvalues

## July 23-27:

- (6.1) Inner products
- (6.2) Orthogonal sets
- (6.3) Orthogonal projections
- (6.4) The Gram-Schmidt algorithm
- (6.5) Least-squares problems

## July 30-August 2:

- Review

## -FINAL: Thursday, August 2