

# MATH 419, Fall 2021

## Linear Spaces and Matrix Theory

**Sec 1:** TTh 8:30-10:00AM, 2153 GGBL

**Sec 2:** TTh 12:00-1:30PM, 4440 EECS

**Instructor:** Smadar Karni, 4834 East Hall, 647-9720, karni@umich.edu

**Office Hours:** T 10:30-11:30AM, W 12-1PM (these hours may change) or by appointment.

**Text:** Linear algebra and its applications, 4th ed. G. Strang, Thomson Learning Inc. 2006.

This course is an introduction to linear algebra and the theory of matrices and linear spaces, with attention to applications in science and engineering. The course covers the first six chapters of the book. Concepts, calculations, and the ability to apply principles to solve problems are emphasized over proofs, but arguments are rigorous. This course should be very useful for students in applied mathematics, and in all areas of science and engineering.

### Topics:

linear equations, Gaussian elimination, matrix factorization, vector spaces, linear independence, basis, linear transformations, projections, least squares, orthogonal vectors, Gram-Schmidt process, determinants, eigenvalues and eigenvectors, matrix diagonalization, positive definite matrices and singular value decomposition.

### Midterm Exam Date:

Sections 1 & 2: Monday, October 25, 2021, 6-8PM (time may change if we go online).

### Final Exam Date:

~~Sec 1: Monday, December 13, 2021, 1:30PM - 3:30PM.~~

~~Sec 2: Friday, December 17, 2020, 8:00AM - 10:00AM.~~

Sections 1 & 2: Tuesday, December 14, 2021, 6:00PM-8:00PM

**Grading:** Homework (30%), Midterm (30%), Final (40%)

Weekly homework assignments will be given out for a total of 10-11 homework sets. The lowest hw score will be dropped. It is important to do the homework, not only because it is graded but also in order to learn the course material well. Homework will be posted and uploaded on Gradescope. The midterm and final exam scores together with homework scores will determine the course grade, and the homework scores will be used to push the course grade up or down in borderline cases. Late homework will only be accepted with prior permission. Very late homework will not be graded.