

# MTH 261B : TOPICS IN LINEAR ALGEBRA

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## Transcript title

Topics in Linear Algebra

## Credits

1

## Grading mode

Standard letter grades

## Total contact hours

10

## Lecture hours

10

## Prerequisites

MTH 112Z or higher (except MTH 211, MTH 212, MTH 213, MTH 244, and STAT 243Z) or minimum placement Math Level 22.

## Recommended preparation

MTH 261A.

## Course Description

Provides additional topics in linear algebra for students taking MTH 261A, Introduction to Linear Algebra. Topics include: using technology to row-reduce matrices, find inverses, calculate determinants, eigenvalues and eigenvectors; using determinants and the rank-nullity theorem to investigate solution sets and matrix invertibility; vector spaces and subspaces; and diagonalization and the eigenvector problem.

## Course learning outcomes

1. Use technology to perform matrix computations including row-reduction, finding inverses, and calculating determinants, eigenvalues and eigenvectors.
2. Draw conclusions about the solution sets of linear equations and the invertibility of matrices using determinants and the rank-nullity theorem.
3. Investigate topics in vector spaces including: determining whether a subset is a subspace, determining a basis and dimension of a given subspace, including the null space and column space of a matrix and the eigenspaces of square matrices.
4. Investigate the relationship between the eigenvector problem and diagonalization.

## Content outline

1. Introduction to technology
  - a. row-reduction computation
  - b. finding inverses
  - c. calculating determinants
  - d. eigenvalues and eigenvectors
2. Cramer's Rule
3. Rank-nullity Theorem
4. Definition of a subspace
5. Determine a basis and dimension of a given subspace

- a. null space
- b. column space
- c. eigenspaces
6. Diagonalization
  - a. performing calculation
  - b. relationship to the eigenvector problem

## Required materials

No required materials.