

Syllabus and Course Information, Spring 2022

MATH 225 P1 at TR 11:00-11:50 in 1000 LINCOLN

1. Textbook: Linear Algebra and its Applications, 6th edition by David C. Lay, Stephen R. Lay, and Judi J. McDonald, Addison-Wesley

2. Syllabus:

Chapter 1: Linear Equations in Linear Algebra

- 1.1 Systems of Linear Equations
- 1.2 Row Reduction and Echelon Forms
- 1.3 Vector Equations
- 1.4 The Matrix Equation $Ax=b$
- 1.5 Solution Sets of Linear Systems
- 1.6 Applications
- 1.7 Linear Independence

Chapter 2: Matrix Algebra

- 2.1 Matrix Operations
- 2.2 The Inverse of a Matrix
- 2.3 Characterizations of Invertible Matrices
- 2.6 The Leontief Input-Output Model

Chapter 3: Determinants

- 3.1 Introduction to Determinants
- 3.2 Properties of Determinants
- 3.3 Cramer's Rule, Volume, and Linear Transformations

Chapter 4: Vector Spaces

- 4.1 Vector Spaces and Subspaces
- 4.2 Null spaces, Column Spaces, and Linear Transformations
- 4.3 Linearly Independent Sets: Bases
- 4.5 The Dimension of a Vector Space
- 4.6 Change of basis

Chapter 5: Eigenvalues and Eigenvectors

- 5.1 Eigenvalues and Eigenvectors
- 5.2 The Characteristic Equation
- 5.3 Diagonalization

Chapter 6: Orthogonality and Least Squares

- 6.1 Inner Product, Length, and Orthogonality
- 6.2 Orthogonal Sets
- 6.3 Orthogonal Projections
- 6.4 The Gram-Schmidt process
- 6.5 Least Squares Problems
- 6.6 Machine learning and linear models

3. Homework: Homework assignments will be posted on the MyLab website and you will submit your answers online. All the problems are important! You cannot master the course material without working through examples. As added incentive to do the homework, all exams (midterms and final) will include questions either taken directly from, or modeled closely on, the homework sets.

4. Exams: There will be two midterms and a final exam.

The (tentative) dates for the **midterms** are

- **Thursday February 17** and
- **Thursday March 31.**

Both midterms will be 50-minute exams at the usual class time. The dates will be confirmed and syllabi for the midterms will be announced at least one week in advance.

The tentative date of the **final exam** is

- **8:00-11:00 a.m., Thursday, May 12**

5. Grades: Your grade for the course will be determined by a weighted average of your scores for homework, 2 midterms and a final. The weights of each will be:

Homework	10% *
Midterms 1	25%
Midterms 2	25%
Final	40%

*** Your lowest homework score will be excluded**

Letter grades for the course will be `curved', with the class average corresponding to the boundary between a C and a B.

6. Instructor details and Office Hours:

Steve Bradlow
362 Altgeld Hall
Office Hours: 10am-11am on Thursday.