

Math 221, Matrix Algebra

Spring 2016

Sections:

Section 201, MWF 3-4 (Weiwei Ao)

Section 202, TuTh 11-12:30 (Liu Yong)

Section 203, MWF 1-2 (Kalle Karu)

Textbook: *Linear Algebra and its applications* by David Lay. The UBC bookstore sells a custom edition paperback that only contains chapters from the full book used in the course. The hardcover full textbook can also be used.

Web site: www.math.ubc.ca/~karu/m221.

Homework. Webwork assignments will be posted weekly. Please check the course web site on how to get started with Webwork. No late homework can be accepted with Webwork.

Exams. There will be two midterm exams and one final exam. The dates of the midterm exams are:

- Exam #1: February 3 (MWF classes) or February 4 (TuTh classes)
- Exam #2: March 16 (MWF classes) or March 17 (TuTh classes)

Midterm exams take place during regular class hours. The final exam is a $2\frac{1}{2}$ hour long exam scheduled by the university. No electronic aids (calculators, cell phones, etc.), notes or books are allowed on any exam.

Evaluation. Your final grade will be based on your performance on homework (10%), first midterm (20%), second midterm (20%) and final exam (50%).

Approximate schedule and topics covered.

- Week 1, Jan. 4 – Jan 8.
 - 1.1 Systems of linear equations
 - 1.2 Row reduction and echelon forms.
- Week 2, Jan. 11 – Jan 15.
 - 1.3 Vector equations.
 - 1.4 The matrix equation $Ax = b$.
 - 1.5 Solution sets of linear equations.
- Week 3, Jan. 18 – Jan 22.
 - 1.6 Applications of linear systems.
 - 1.7 Linear independence.
- Week 4, Jan. 25 – Jan 29.
 - 1.8 Introduction to linear transformations.
 - 1.9 The matrix of a linear transformation.
- Week 5, Feb. 1 – Feb 5.
 - Exam #1**
 - 2.1 Matrix operations.
- Week 6, Feb. 8 – Feb 12.
 - Family day on Monday, no class.
 - 2.2 The inverse of a matrix.
 - 2.3 Characterisations of invertible matrices.
- Week 7, Feb. 15 – Feb 19.
 - Spring Break.
- Week 8, Feb. 22 – Feb 26.
 - 2.8 Subspaces of R^n .
 - 2.9 Dimension and rank.
- Week 9, Feb. 29 – Mar 4.
 - 3.1 Introduction to determinants.

3.2 Properties of determinants.

- Week 10, Mar. 7 – Mar 11.

5.1 Eigenvalues and eigenvectors.

5.2 The characteristic equation.

- Week 11, Mar. 14 – Mar 18.

Exam #2

5.3 Diagonalization

- Week 12, Mar. 21 – Mar 25.

5.4 Eigenvectors and Linear systems

5.6 Discrete dynamical systems

Good Friday, no class.

- Week 13, Mar. 28 – Apr. 1.

Easter Monday, no class.

6.1 Inner product, length, and orthogonality

6.2 Orthogonal sets

6.3 Orthogonal projections

- Week 14, Apr. 4 – Apr. 8.

6.4 Gram-Schmidt process

6.5 Least squares problem

6.6 Applications to linear models