

## Math 221: Matrix Algebra Winter Term 2 2013

**Course Webpage:** <http://www.math.ubc.ca/~alexandra/221.html>

### Sections:

Section 201 - Dale Peterson

Section 202 - Alexandra Pettet (instructor in charge & course coordinator)

Section 203 - Dale Peterson

**Textbook:** David C. Lay, *Linear algebra with Applications* –  
revised third custom edition for the University of British Columbia

### Topics

Please see the schedule on the webpage for a detailed week-by-week schedule.

- §1.1 Systems of linear equations
- §1.2 Row reduction and echelon forms
- §1.3 Vector equations
- §1.4 The matrix equation  $A\mathbf{x} = \mathbf{b}$
- §1.5 Solution sets of linear equations
- §1.6 Applications of linear systems
- §1.7 Linear independence
- §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
- §2.3 Characterizations of invertible matrices
- §2.5 Subspaces of  $\mathbb{R}^n$
- §2.6 Dimension and rank
- §3.1 Introduction to determinants
- §3.2 Properties of determinants
- §4.1 Eigenvalues and eigenvectors
- §4.2 The characteristic equation
- §4.3 Diagonalization
- §4.6 Discrete dynamical systems
- §5.1 Inner product, length, and orthogonality
- §5.2 Orthogonal sets
- §5.3 Orthogonal projections
- §5.5 Least-squares problem
- §5.6 Applications to linear models

## Grading scheme

Grades will be based on two midterms exams, a final exam, weekly WebWork assignments, and any additional quizzes or homework that may be given by the instructor. The distribution is as follows:

- Homework/Quizzes: 10%.
- $2 \times$  Midterm: 20% each.
- Final Exam: 50%.

The two midterm exams will be in-class and scheduled by the instructor. The final exam will be common to all sections and scheduled by the university.

## Exam policy

Students are required to bring ID to all exams. The use of calculators, textbooks, cell phones, or study aids of any kind during exams is not permitted. Discussion, or otherwise exchanging information with others, during exams is considered cheating.

No make-up exams will be given. Students who observe religious holidays on term exam dates must let the instructor know during the first two weeks of class. If another conflict (e.g., medical) arises, the instructor must be consulted in a timely manner, and sufficient documentation concerning the reason for conflict must be provided. Travel plans are not accepted as a cause of conflict.

The instructor reserves the right to revise or round off grades if circumstances warrant. In order to make course grade standards consistent across sections, the raw final grade will be scaled.

## Use of the WeBWorK system

Online homework for the course will be provided via the WeBWorK system. You can find this system by going to the WeBWorK site at

<https://webwork.elearning.ubc.ca/webwork2/>

and logging in with your CWL ID. Note however that the course website may not be active before the first day of class. There will be one assignment released per week, due as indicated on the course week-by-week schedule. Questions about the homework or the online system may be addressed to either your instructor or to the course TAs. Please note the following:

- (1) You may attempt each question as often as it specifies. There is no penalty for a wrong answer. This is to help you correct your own mistakes, and to get instant feedback on your attempts.
- (2) The questions are generated randomly, and the numbers are different for each student.
- (3) Please try to do the problems by yourself, and without the use of other calculators or software. Since calculators and software are not allowed for the exams, you should practice working without them.

- (4) If you really get stuck, you can request help by clicking the “email instructor” button. However, it may take some time to get a response, so please do not wait until the last minute.
- (5) In general, it is a good idea to start the assignments early, rather than waiting until the last minute. The deadlines are enforced by the system, and it will shut down automatically when time is up, so do give yourself plenty of extra time in case of difficulties.

Please note that the textbook also provides many practice problems with answers in the back. It is recommended that you try all problems (relevant to topics listed above) so that you may track your understanding.