Math 221, Section 205, Winter 2017

Matrix Algebra

- Instructor: Geo Kam-Fai Tam, email: geotam@math.ubc.ca (course coordinator: Kai Behrend)
- Time/Place: Mon Wed Fri 13:00-14:00, LSK 201
- Office Hours: Mon Wed 14:00 - 15:00 (immediately after class) or by appointment, in LSK 300
- Textbook: Linear algebra and its applications, by David Lay (Third Custom Edition for UBC)
- Syllabus: The following is a (rough) schedule of all sections of the textbook which you are responsible for on the final exam.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
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| 1    | 1.1 Systems of linear equations  
     | 1.2 Row reduction and echelon forms |
| 2    | 1.3 Vector equations  
     | 1.4 The matrix equation $Ax = b$  
     | 1.5 Solution sets of linear systems |
| 3    | 1.6 Applications of linear systems (skip chemical equations)  
     | 1.7 Linear independence  
     | 1.8 Introduction to linear transformations |
| 4    | 1.9 The matrix of a linear transformation  
     | 2.1 Matrix operations  
     | 2.2 The inverse of a matrix (skip elementary matrices) |
| 5    | 2.3 Characterizations of invertible matrices  
     | 2.5 Subspaces of $\mathbb{R}^n$ |
| 6    | 2.6 Dimension and rank  
     | 3.1 Introduction to determinants  
     | 3.2 Properties of determinants |
| 7    | 4.1 Eigenvectors and eigenvalues  
     | 4.2 The characteristic equation |
| 8    | reading break |
| 9    | 4.3 Diagonalization  
     | 4.4 Eigenvectors and linear transformations  
     | 4.6 Discrete dynamical systems |
| 10   | 5.1 Inner product, length, and orthogonality  
     | 5.2 Orthogonal sets |
| 11   | 5.3 Orthogonal projections  
     | 5.5 Least-square problems |
| 12   | |
| 13   | |

- Additional material: you may check the notes written by the course coordinator, Kai Behrend.  
  [https://www.math.ubc.ca/~behrend/math221/syllabus.html](https://www.math.ubc.ca/~behrend/math221/syllabus.html)
• Homework
No Homework will be collected. The sections on quizzes and exams below contain lists of problems you should do to prepare for the quiz or exam in question. You are strongly urged to complete all these practice problems, at a minimum. Doing more problems from the book will be helpful as well.

• Quizzes
There will be a 15 minute quiz every Friday, at the end of class. Exceptions are first and last weeks, and midterm weeks (so 9 quizzes altogether).
Each quiz covers materials on Monday and Wednesday of the week (or otherwise specified). When computing your quiz score, the two lowest scores will be dropped.

• Exams
The following applies to all exams in Math 221: No aids of any kind: no calculators, no notes, no books, no cell phones or any electronic devices.

  – Midterm Exam I (50 min in class). Week 5: Friday, February 3.
    Midterm I covers all material from the syllabus up to and including Section 2.2 from the textbook.
  – Midterm Exam II (50 min in class). Week 10: Friday, March 10.
    Midterm II covers all material from the syllabus up to and including Section 4.2 from the textbook. The emphasis is on material covered after Midterm I.
  – Final Exam. To be scheduled by the university.
    The final exam covers the whole course. Check the syllabus above for details on the material that will be tested on the final exam.

• Marking: Your final grade will be based on the quizzes, two midterm exams and the final exam:

  – Quizzes: 10%
  – Midterm 1: 20%
  – Midterm 2: 20%
  – Final: 50%

No further concession will be made, for any (including medical) reasons.

• If you miss one of the midterm exams for medical reasons, you need to promptly inform the instructor, and provide a physician’s note specifically stating that you were medically unfit to write the missed exam on that day. No make-up exams will be given. Your grade will be based on the other course components.

• The math department offers free drop-in tutorials for Math 221.
  http://www.math.ubc.ca/~MLC/