

Math 221: Matrix Algebra September 2016

Course Web Page: <http://www.math.ubc.ca/~vatsal/>

Sections:

- Section 101 (Justin Tzou: TuTh 0930am in MATH 100)
- Section 102 (Nike Vatsal: MWF 10am in LSK 201)
- Section 103 (Nike Vatsal: MWF 1pm in MATH 100)
- Section 104 (Timm Treskatis: MWF 1pm LSK 201)
- Instructor in charge & course coordinator: Nike Vatsal

TAs:

Several TAs will be holding office hours for help with homework or other course material during the week. Exact times and locations will be posted on the course web page during Week 1.

Textbook: *Linear algebra and its applications*, by David Lay (Third Edition, as customized for UBC). Please note that the Third UBC Edition of the book is the only officially supported version; there are many other editions also available which you can try to use. However, your instructors cannot be held responsible for any changes in page numbering or changed material.

List of topics covered

- §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 \mathbf{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

Please see the course calendar below for the dates of the examinations.

iClicker component:

5% of your course grade will come from in-class Clicker questions. There will be one or two such questions every day. You are expected to buy and register a Clicker; for information see

<http://elearning.ubc.ca/connect/student-resources/register-your-iclicker-how-to/>

and

<http://bookstore.ubc.ca/books/course-materials-students/faqs/students-iclicker/>

The Clicker mark will be computed as 1 mark for submitting the wrong answer (participation), or 2 marks for submitting the right answer. **Using clicker registered to another person will be regarded as cheating and dealt with strictly.**

Practice problems — online and in the book:

No homework will be collected for this course, but there will be lots of opportunities to practice. 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 classes.

The WeBWork problems will be released at the beginning of term, and you can complete them on your own schedule. These problems are for practice only, and no marks will be recorded.

Please note the following items:

- i) You may attempt each question as often as you like until you solve the problem. 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.
- ii) The questions are generated randomly, and the numbers are different for each student.
- iii) Please try to do the problems by yourself, and without the use of other calculators or software. Since calculators and software are not allowed in the exams, you should practice working without them.
- iv) 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 don’t wait till the last minute.

Note that the textbook also has many practice problems with answers in the back. It is recommended that you try all these problems, so that you may track your understanding. **There will be a list of recommended problems posted on the course web page listed above.**

Evaluation:

The course mark will be computed as follows:

- Final exam (Date set by UBC): 65%
- Term Exam 1 (**October 3** for MWF sections, **October 6** for TuTh sections) : 10%
- Term Exam 2 (**November 9** for MWF sections, **Nov 10** for TuTh sections): 20%
- Clicker questions in class: 5%

The grade of those students who miss a midterm exam will be computed by adding the missing weight to the final. There will be **no makeup exams given under any circumstances.**

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