**Math 221: Matrix Algebra September 2017**

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

**Sections:**

- Section 101 (Brian Wetton)
- Section 102 (Nike Vatsal)
- Section 103 (Nike Vatsal)
- Section 104 (Dijana Kreso)
- Section 106 (Samuel Bach)
- 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.

**Piazza**: There will be a Piazza discussion group for the course, where you can ask your questions to your fellow students. Instructors will monitor the group, and answer questions as well.

**MATLAB**: UBC provides students with free access to the MATLAB software, which is a computer package for doing matrix algebra. You will find it useful to do some of the homework problems, and to check your answers as you practice. Note however that MATLAB/calculators are **not** allowed in exams.

You should download and install MATLAB; instructions may be found here:

https://it.ubc.ca/services/desktop-print-services/software-licensing/matlab#getMATLAB

**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

**Evaluation**:

The course mark will be computed as follows:

- Final exam (Date set by UBC): 55%
- Midterm Exam (**October 25** for MWF sections, **October 26** for TuTh sections) : 30%
- Online Homework (see separate information sheet) 10%
- 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.

**Practice problems from the book:**

No homework will be collected for this course, but 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.**