**Math 221: Matrix Algebra September 2012**

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

**Sections:**

- Section 102 (Mathieu Huruguen)
- Section 103 (Zinovy Reichstein)
- Section 104 (Dale Peterson)
- Instructor in charge & course coordinator: Vinayak 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
§4.4 Eigenvectors and linear transformation
§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, and the detailed week-by-week schedule.

**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 classes.

There will be one assignment posted per week, each due on the following Wednesday, as per the course schedule. Questions about the HW or the online system may be addressed to either your instructor or to the course TAs.

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 calulators 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.

v) In general, it's a good idea to start the assignments early rather than waiting till the last minute. The deadlines are enforced by the system, and it will shut down automatically when time is up, so give yourself plenty of extra time in case of problems.

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.

**Evaluation:** The course mark will be computed in one of two ways, with the higher one being taken:

Final exam: 45%
Term exams: 3 x 15% each.
Online WeBWorK assignments: 10%,

or

Final exam 60%
Best 2 midterms 2 x 15%
Online WeBWorK assignments: 10%.

The grade of those students who miss a midterm exam will be computed by the second method. 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.