

**Department of Mathematics**  
**136.130 Vector Geometry and Linear Algebra**  
**September - December 2005**

**TEXT:** Elementary Linear Algebra (Ninth Edition) by Anton

**COURSE OUTLINE:**

Systems of linear equations and matrices: Gaussian elimination, matrix operations, inverses, elementary matrices, and classes of matrices.

Determinants: co-factor expansion; evaluating by row reduction, properties, Cramer's rule.

Vectors and geometry in the plane  $\mathbf{R}^2$  and in the space  $\mathbf{R}^3$ : norm of a vector, vector operations, dot product, projections, cross product, lines and planes in  $\mathbf{R}^3$ , Euclidean n-space.

General vector spaces: real vector spaces, subspaces, linear independence, basis and dimension, row and column spaces, null space.

**MIDTERM TEST:** There will be a one-hour midterm test, which will be held on **Monday, October 24, 2005, 5:30-6:30 p.m.** No make-ups or deferrals are permitted except for reasons the University normally finds acceptable for absence from a final exam.

**CLASSES AND TUTORIALS:** Students should attend the lectures and must register in and attend one of the tutorial sections associated with their class section -NOT with some other class section. During the lectures your instructor will explain the most important parts of the material in the text and work through related examples. However, in order to learn the course thoroughly you will have to read and work through the text carefully. Do not expect to learn linear algebra either from your instructor alone or from the textbook alone. During the tutorial periods a teaching assistant will be available to answer your questions and work examples. Five short quizzes will be given in the tutorial periods. The tutorials begin on Thursday, September 15, 2005.

**GRADING:** There will be a two-hour final exam during the regular exam period in **December**. Your final grade will be based on 10% tutorial tests (best of 4 out of 5, **no deferrals allowed for any reason**), 30% midterm, and 60% final.

The **Voluntary Withdrawal** deadline is Wednesday, November 16, 2005.

**EXERCISES:** In order to pass 136.130 you will have to do a great deal of practice. Every student should work through the assigned problems in the exercises.

**CALCULATORS:** Calculators will **not** be permitted for any of the quizzes, tests or exams.

Students who wish additional practice may use any other linear algebra textbook.

Copies of old final exams can be found on the web; students are warned that the style and the content of the course does change somewhat from year to year and that there may be changes in both the form and content of the final exam.

**Plagiarism, cheating and impersonation at exams** are serious offences subject to disciplinary measures at the University that may lead to a failing grade, suspension or expulsion. The Department of Mathematics, the Faculty of Science and the University of Manitoba regard acts of academic dishonesty

in quizzes, tests, examinations or assignments as serious offenses and may assess a variety of penalties depending on the nature of the offense.

Acts of academic dishonesty include bringing unauthorized materials into a test or exam, copying from another student, plagiarism and examination personation. Students are advised to read section 7 (Academic Integrity) and section 4.2.8 (Examinations: Personations) in the "General Academic Regulations and Requirements" of the current Undergraduate Calendar. ***Note, in particular that cell phones and pagers are explicitly listed as unauthorized materials, and hence may not be present during tests or examinations.***

Penalties for violation include being assigned a grade of zero on a test or assignment, being assigned a grade of "F" in a course, compulsory withdrawal from a course or program, suspension from a course/program/faculty or even expulsion from the University. For specific details about the nature of penalties that may be assessed upon conviction of an act of academic dishonesty, students are referred to University Policy 1202 (*Student Discipline Bylaw*) and to the Department of Mathematics policy concerning minimum penalties for acts of academic dishonesty.

The *Student Discipline Bylaw* is printed in its entirety in the Student Guide, and is also available on-line or through the Office of the University Secretary. Minimum penalties assessed by the Department of Mathematics for acts of academic dishonesty are available on the Department of Mathematics web-page.

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report incidents of academic dishonesty to the Head of the Department.