

# Elementary Linear Algebra

Math 233, Spring 2009

## Basic Course Information

- Study of matrices, matrix operations, and systems of linear equations, with an introduction to vector spaces and linear transformations. Elementary applications of linear algebra are included.
- Prerequisites: Math 213 or math 221
- Recommended materials: (see Calculators and Textbooks below for possible substitutes)
  - *Elementary Linear Algebra* (9<sup>th</sup> edition), Anton, John Wiley & Sons Inc, 2005.
  - TI-89 Calculator.

## Contact information

- Your instructor: Dr. Patrick Rault
  - This is my second semester teaching Elementary Linear Algebra at SUNY Geneseo. My primary research is in number theory, but I have also done some research in mathematics education.
- The best way to reach me is by e-mail:
  - **rault@geneseo.edu**
- I hold two office hours a week and reserve a third for special appointments; if you are not available during my two regular office hours and need to schedule an appointment with me outside of class, please e-mail me the times you are available so I can schedule a one-time extra office hour (I will likely invite the whole class). Office hours are a place where **anyone** may ask questions. Use them regularly and your understanding will improve, no matter whether you are doing well or poorly in the class.
  - **Office:** 326C South Hall
  - **Office Hours :** Mondays 7-8pm (in 338 South Hall), Wednesdays 3-4pm.
  - **Monday problem session:** The Monday office hour (listed above) is a problem session specifically for Elementary Linear Algebra students. We will be in a larger classroom in hopes of higher turnout.
  - **Appointments:**
    - ‡ If you are not available during my regular office hours and need to schedule an appointment with me outside of class, please first check my schedule on my website. Then e-mail a *list* of the appointment times you are available so I can schedule a one-time extra office hour (there may be other requests, and I will likely invite the whole class).
    - ‡ I expect that you've already asked or consulted someone about the problem. The Math Learning Center (see "additional help", below) is an excellent resource and is available more often than I am. Working with other students challenges your own understanding and can solve minor misunderstandings.
  - **Off-topic office hour:**
    - ‡ Thursdays 3-3:30pm
    - ‡ This office hour is specifically for off-topic questions. For example, if you have a question about the Fibonacci sequence, careers in mathematics, applications of linear algebra, or how a class problem relates to deeper mathematics, this is the time and place.
- All of this information (including a copy of the syllabus) will be available at both of the following:
  - **Course website:** [www.geneseo.edu/~rault/](http://www.geneseo.edu/~rault/)
  - **Mycourses:** <https://mycourses.geneseo.edu/>

## Additional help

- The Mathematics Learning Center
  - 332 South Hall
  - Provides tutoring to those in lower level math courses at no cost.
  - Staffed by 20 upper level math students, several of which hold special hours for Linear Algebra.
  - See <http://www.geneseo.edu/CMS/display.php?page=7189&dpt=math> for hours.

## Class structure

- **Gateway exams** : There will be four in-class gateway exams. These exams test specific skills (specified in advance) without which you will have serious difficulties in the rest of the class. Therefore, no partial credit will be given for major errors. You may retake a gateway exam as many times as you wish, with each score replacing the previous exam. However, each time you retake the exam the maximum possible score will be lowered by 10 percentage points (i.e. the first time your exam will be out of 100, the second out of 90, the third out of 80, etc).
- **Exams**: There will be one **midterm exam** and one **final exam**. The midterm exam will take place in the evening.
  - All exams are cumulative.
  - The final exam time is:
    - ‡ Thursday May 7<sup>th</sup>, 8-11am
    - ‡ NOTE: This may not be the time listed on the standard final exam schedule.
- **Webwork**: Weekly **homework** assignments for this course will be done through webwork, an online homework program. Webwork gives immediate feedback by telling you whether or not you found the correct answer. Some problems will allow you to keep submitting answers until you discover the correct answer, while others will have a limited number of attempts.
  - As some problems may not be suitable for webwork, there may be occasional supplemental written assignments.
  - Working through the homework with your peers at home is *essential* to understanding this class. Research has shown that students learn best through active learning (working through problems on their own) as opposed to passive learning (watching others solve problems).
  - To log into webwork, go to [http://webwork.geneseo.edu/webwork2/Math\\_233/](http://webwork.geneseo.edu/webwork2/Math_233/)
  - Most webwork assignments will be due at 5pm on Wednesdays. Note the 3-4pm office hour on Wednesdays was scheduled in case you have last minute questions.

## Grading

This course will be graded as follows:

- 40% Gateway exams (10% each)
- 25% Midterm exam
- 25% Final exam
- 10% Webwork

A numerical average will be computed using the weights indicated above, and converted to a letter grade according to a scale created at the end of the semester. After each exam a new scale will be created specifically for that exam; these scales will be used in computing the final scale at the end of the semester. The following scale is a guideline; achieving the given score will *guarantee* the given letter grade, however the scale may be modified in favor of increasing students' letter grades

A 93-100%            C+ 77-79%            A- 90-92%            C 73-76%            B+ 87-89%

C- 70-72%

B 83-86%

B- 80-82%

B 83-86%

E 0-59

D 60-69%

### **Calculators**

- Calculators will not be allowed on gateway exams but will be allowed on the midterm and final exams. When allowed, the calculator will be a tool to help you quickly solve problems and to check your work. You should certainly be able to solve every problem without a calculator.
- I will teach linear algebra methods for a TI-89 calculator. You may instead use an earlier TI model, but you will be responsible for learning how to use it.
- There are calculator tutorials on the mathematics department website for the TI-89 on general use and Linear Algebra functions.

### **Textbooks**

- An earlier edition of the textbook should suffice in my class. Homework problems will be taken from webwork, not the textbook. The format of each edition may be slightly different, but to my knowledge there are no major differences. However, if you choose to use an earlier edition of the textbook then it is your responsibility to notice differences; for instance if I state “The Midterm Exam will cover chapters 1, 2, and 4 with the exception of sections 1.7 and 2.4 ” this reference is to the most recent edition of the textbook.

### **Collaboration**

Group work: I encourage you to work with several classmates on homework assignments. Each of you will have your own strengths and weaknesses. Teaching a classmate tests your own understanding of the material. Making studying a social activity is the best way to improve your grade.

A-students: If your aim is to get an A in the course I strongly recommend that you work mostly on your own. Problem solving skills are best mastered by practicing on your own. When working with another student, you should try your best not to look at their work. Instead, ask him or her for a tip or for the key concept which was used to solve the problem.

### **Special needs**

- If you have any special needs (hearing impaired, handicapped, color blind, etc) that I can do anything in my class to better accommodate you, please contact me.

### **Questions/Concerns**

- If you have other questions or concerns, please see me in my office hours. Lecture time is valuable, so I would prefer to discuss your concerns outside of class.

### **Schedule**

What follows is an approximate schedule. Exact exam dates will be announced one week in advance for gateway exams and two weeks in advance for the midterm exam.

- Gateway exam 1 will cover chapter 1.
- Gateway exam 2 will cover chapter 2.
- Gateway exam 3 will cover chapters 4 and 5.
- Gateway exam 4 will cover chapters 6 and 7.
- The midterm exam will cover chapters 1, 2, 4, and part of chapter 5.
- The final exam will cover chapters 1, 2, 4, 5, 6, 7, 8, and part of chapter 9.

## Study Buddies

1) Name: \_\_\_\_\_ E-mail / phone: \_\_\_\_\_

2) Name: \_\_\_\_\_ E-mail / phone: \_\_\_\_\_

3) Name: \_\_\_\_\_ E-mail / phone: \_\_\_\_\_

4) Name: \_\_\_\_\_ E-mail / phone: \_\_\_\_\_