

Math 256

Introduction to Linear Mathematics – Spring 2008

67-256-001 11:30–12:30 MWF Swart 303

“Time was when all the parts of [mathematics] were dissevered, when algebra, geometry, and arithmetic either lived apart or kept up cold relations of acquaintance confined to occasional calls upon one another; but that is now at an end; they are drawn together and are constantly becoming more and more intimately related and connected by a thousand fresh ties, and we may confidently look forward to a time when they shall form but one body with one soul.”

- J.J. Sylvester (1814 - 1897)

The primary goal of this course is to develop a strong background in the major tools of Linear Algebra, especially matrices, vectors, and linear transformations. When you studied basic algebra in high school, one of the first types of equations you investigated was *linear* equations, such as $2x + 3y = 4$. In some ways, linear algebra is a method for studying generalizations of systems of linear equations (with lots more variables). However, the power of the subject reaches far beyond this. Linear Algebra provides us with tools for analyzing complex problems in a wide variety of disciplines, including engineering, biology, mathematics, economics and computer science.

When you investigated linear equations in high school, you studied them from several different perspectives: symbolic (you learned to manipulate the equations algebraically), numerical (you perhaps learned to solve them using a calculator or “guess-and-check”), and graphical (you learned that the equation $2x + 3y = 4$ determines a line in the plane.) We will approach Linear Algebra in the same way, using symbolic, numerical and geometric tools to better understand this rich and diverse subject.

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Office Hours: MF 8:10-9:10, T 10:20-11:20, W 9:10-10:10. I’m available at other times as well, by appointment. Just ask!

Text: *Linear Algebra With Applications*, 2nd or 3rd edition, by O. Bretscher. Note that the text can be purchased from online booksellers for greatly reduced prices!

Calculator: A graphics programmable calculator is required. I will use the TI-84 in class. Some activities may use **Maple**, a computer algebra system.

Course Topics: In this course, we’ll study matrices and matrix operations, linear functions and systems of linear equations, determinants, vector operations, eigenvalues and eigenvectors. In our investigation of these topics, we will cover chapters 1–3 and 6–7 of Bretscher’s text. If time allows, we will also discuss material from chapter 4.

You can learn mathematics *only* by doing it. Therefore, you will be active participants in the learning process in Math 256. Although I will lecture on some of the material in the course, much of the class will be student-generated, involving cooperative group-work and class discussions.

Assessment

Exams: There will be 3 evening exams, given from 6:00–9:00 pm in **Nursing/Education 151** on the following dates: **Thursday, March 6, Tuesday, April 15, and Thursday, May 15**. Each exam will be worth 23% of your total course grade. Arrangements for conflicts due to **University sponsored activities** must be made at least one week in advance.

Attendance: Attendance in this course is required, and will compose 5% of your grade. You will be allowed 2 absences without penalty. For each subsequent absence, you will lose one-half of a percentage point from your attendance grade. Note: arriving late to class or leaving early counts as one-half of a miss.

Quizzes: There will be weekly quizzes on the course material. Missed quizzes cannot be made up, though the lowest quiz/homework grade will be dropped at the end of the semester.

Homework: Extensive homework will be assigned, and I will collect some, but not all, of it. I will post solutions to selected problems by my office door (220 Swart).

Other Coursework: Over the course of the semester, we'll have a few other interesting activities and assignments, some perhaps involving the computer. On many days, we'll work in groups solving problems, and I'll sometimes have you hand in the results.

In summary, your grade will be determined by the following:

3 exams (23% each)	69%
Quizzes, Homework, Problem Writeups and other class assignments	26%
Attendance	5%
<hr/> Total	<hr/> 100%

Grading Scale: Grades in the course will be assigned according to the following approximate scale:

A	90	–	100%	of the course points
B	80	–	89%	
C	70	–	79%	
D	60	–	69%	
F	0	–	59%	

Intermediate grades (e.g. AB) will be assigned when a student is sufficiently close to the cutoff for the next highest grade.

Note: If You're Thinking of Majoring in Math...

... but aren't sure what career options would be available with a Math degree, then here are some resources that you can look at:

- *101 Careers in Mathematics* by Andrew Sterrett.
- *She Does Math!* by Marla Parker.
(Steve has copies of both of the above books.)
- <http://www.ams.org/careers/>
- <http://www.maa.org/careers/>