Course Number: Math 2406 A

Course Name: Abstract Vector Spaces

Lecture Time: MWF 11:05–11:55 a.m.

Lecture Room: Skiles 246

Instructor: Dr. Christopher Heil
Office: Skiles 109
Office Phone: (404) 894-9231
Email Address: heil@math.gatech.edu

Office Hours: MWF 2:30-3:30 and by appointment

Course web page: http://www.math.gatech.edu/~heil

Contacting me: I encourage you to contact me by email. I try to check email daily and to respond to questions quickly. Please don’t be afraid to set up other appointment times if you are having trouble getting in touch with me.

Textbook: Linear Algebra by T. Apostol

Material: Vector Algebra (Chapter 1)
         Linear Spaces (Chapter 3)
         Linear Transformations and Matrices (Chapter 4)
         Determinants (Chapter 5)
         Eigenvalues and Eigenvectors (Chapter 6)
         Eigenvalues of Operators Acting on Euclidean Spaces (Chapter 7)

Prerequisites. You must have taken MATH 1502 (Calculus II), MATH 1512 (Honors Calculus II), MATH 1522 (Linear Algebra for Calculus), or an equivalent to one of these.

Intended Audience. This course is intended for:
   (1) Mathematics and Discrete Mathematics majors,
   (2) Mathematics minors,
   (3) Students intending to take proof-based upper-level mathematics courses, such as MATH 4107 (Abstract Algebra I), MATH 4150 (Introduction to Number Theory), or MATH 4317 (Analysis I).

Comments. This course is a proof-based study of linear algebra. One of the main goals of this course is to let you see what mathematics is really like. While your previous math courses mostly concentrated on formulas and facts, telling you what is true, here we want to find out why things are true and how things fit together, and, most importantly, we want to prove that things are true. This requires a new way of thinking, and moreover this new way of thinking is what underlies all
higher mathematics courses. We will spend a lot of time proving things, I’ll prove things in lecture and you’ll prove things in homework and exams.

**Academic Dishonesty.** All students are expected to comply with the Georgia Tech Honor Code. Any evidence of cheating or other violations of the Georgia Tech Honor Code will be submitted directly to the Dean of Students. The institute honor code is available at http://www.deanofstudents.gatech.edu/integrity/policies/honor_code.php

**Grading.** We will have six homework assignments, two in-class exams, and a final exam.

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<th>Points</th>
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<tr>
<td>6 Homeworks</td>
<td>25 points</td>
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<tr>
<td>Exam 1</td>
<td>50 points</td>
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<tr>
<td>Exam 2</td>
<td>50 points</td>
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<td><strong>Final Exam</strong></td>
<td><strong>100 points</strong></td>
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<td><strong>TOTAL</strong></td>
<td><strong>350 points</strong></td>
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Letter grades will be based on your accumulated points at the end of the semester, according to 90%, 80%, 70%, 60% cutoffs (although I may adjust the cutoffs downward at the end of the semester, depending on class distribution):

<table>
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<th>Points</th>
<th>Grade</th>
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<tr>
<td>315–350</td>
<td>A</td>
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<tr>
<td>280–314</td>
<td>B</td>
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<tr>
<td>245–279</td>
<td>C</td>
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<td>210–244</td>
<td>D</td>
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<td>0–209</td>
<td>F</td>
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At the end of the course, I’ll evaluate the class distribution and decide if a curve is needed. I’ll only curve down from the above cutoffs, not up.

**Homework.** Homeworks will consist of problems selected from the book or problems that I make up. Assignments will be posted on the course web site. A subset of the problems will be selected for grading.

Homeworks should be NEATLY written on the FRONT SIDE of the page only, and must be STAPLED. LATE HOMEWORKS WILL NOT BE ACCEPTED.

You are allowed (and encouraged) to work together with other students on the homework, as long as you each INDEPENDENTLY WRITE UP YOUR OWN SOLUTIONS. You are also allowed (and encouraged) to ask me questions, although you should try to think about the problems before asking. I strongly encourage you to work extra problems from the book on your own.

**Exams.** The tentative dates for the exams are:

- **Exam 1** Wednesday, September 24 (in class)
- **Exam 2** Wednesday, October 29 (in class)
- **Final Exam** Friday, December 12, 2:50 p.m.–5:40 p.m.

The exams are closed-book and closed-notes, except that you will be allowed to bring one 8.5x11 sheet of notes (you can write on both sides) to each exam. The final is comprehensive.

Makeup exams are given only in extraordinary circumstances.