MATH 2402 SYLLABUS

FALL 2000

Course Number:	Math 2402 A
Course Name:	Introduction to Linear Algebra
Lecture Time:	MWF 11:05–11:55 a.m.
Lecture Room:	Skiles 243
Instructor:	Dr. Christopher Heil Office: Skiles 260 Office Phone: (404) 894-9231 Email Address: `heil@math.gatech.edu`
Office Hours:	TBA, and by appointment
Contacting me:	I encourage you to contact me at any time by email. I try to check email evenings and weekends 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 and its Applications* (Second Edition), by David Lay
Material:	Linear Equations in Linear Algebra (Chapter 1) Matrix Algebra (Chapter 2) Determinants (Chapter 3) Vector Spaces (Chapter 4) Eigenvalues and Eigenvectors (Chapter 5) Orthogonality and Least Squares (Chapter 6)

Comments. This course is intended for Mathematics and Discrete Mathematics majors. This is the course where you find out what mathematics is really like. We want to know not only *what* is true, but *why* and *how* and, most importantly, how to *prove* that things are true. We will spend a lot of time proving things, I'll prove things in lecture and you'll prove things in homework. Our goal to is *understand* vectors and matrices, not merely to manipulate them, and to see how these objects fit into the broader, more abstract viewpoint of vector spaces.

Grading. We will have six take-home assignments, an in-class midterm exam, and a final exam, scored as follows:

6 Homeworks	15 points each
Midterm Exam	30 points
Final Exam	50 points
TOTAL	170 points

Letter grades will be based on your accumulated points at the end of the quarter, according to 90%, 80%, 70%, 60% cutoffs (although I may adjust the cutoffs downward at the end of the quarter, depending on class distribution):

153–170	A
136–152	B
119–135	C
102–118	D
0–101	F

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. Grades for degree candidates will be prorated, based on their scores on the homework and midterm only.

Homework. Homeworks will consist of problems selected from the book or problems that I make up. You will have one week to complete the assignment. A subset of these problems will be selected for grading.

Two or more of the homeworks will be designated "Take-Home Exams," and on these assignments you will be required to work independently. On the other homeworks you will be allowed (and encouraged) to work together with other students, as long as you each independently write up your own solutions.

On both kinds of homework you are 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.

If for any reason I suspect that any students collaborated on a take-home exam assignment, then the take-home exams will be replaced by one-hour in-class exams.

Exams. The date for the in-class midterm exam will be announced in class. Our scheduled date for the final is

Final Exam	Monday, December 11, 8:00–10:50 a.m.

The exams are closed-book and closed-notes, except that you may bring one 3 by 5 card with notes on it to each exam. The final is comprehensive. I discourage make-up exams, but please let me know as soon as possible if you must miss an exam for a VALID REASON.

MATH 2406 SYLLABUS

FALL 2004

Course Number:	Math 2406 A
Course Name:	Abstract Vector Spaces
Lecture Time:	MWF 10:05–10:55 a.m.
Lecture Room:	Skiles 246
Instructor:	Dr. Christopher Heil Office: Skiles 260 Office Phone: (404) 894-9231 Email Address: `heil@math.gatech.edu`
Office Hours:	MWF 11:05–11:55 a.m., and by appointment
Web site:	`http://www.math.gatech.edu/~heil`
Contacting me:	I encourage you to contact me at any time by email. I try to check email evenings and weekends 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) Applications of Vector Algebra to Analytic Geometry (Chapter 2) 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.

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

5 Homeworks	15 points each
Exam 1	35 points
Exam 2	35 points
Final Exam	55 points
TOTAL	200 points

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):

180–200	A
160–179	B
140–159	C
120–149	D
0–119	F

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	Monday, September 27 (in class)
Exam 2	Monday, November 8 (in class)
Final Exam	Monday, December 6, 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.

Academic Dishonesty. All students are expect 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/Honor`

MATH 2406 SYLLABUS

FALL 2008

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.

6 Homeworks	25 points each
Exam 1	50 points
Exam 2	50 points
Final Exam	100 points
TOTAL	350 points

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):

315–350	A
280–314	B
245–279	C
210–244	D
0–209	F

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.

MATH 2406 SYLLABUS

FALL 2011

Course Number:	Math 2406 F
Course Name:	Abstract Vector Spaces
Lecture Time:	TuTh 12:05–1:25 a.m.
Lecture Room:	Skiles 254
Instructor:	Dr. Christopher Heil Office: Skiles 109 Office Phone: (404) 894-9231 Email Address: `heil@math.gatech.edu`
Office Hours:	Mon 1-2, Tues 1:30-2:30, Thurs 11-12, 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
Recommended Text:	*How to Read and Do Proofs* by D. Solow
Material:	Web Notes on Proofs 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.

8 Homeworks	20 points each
Exam 1	50 points
Exam 2	50 points
Final Exam	100 points
TOTAL	360 points

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):

324–360	A
288–323	B
252–287	C
216–251	D
0–215	F

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 must be TYPED, and the pages should be stapled. You may use any software that you like to type your homework. LaTeX is recommended, and templates will be supplied with the first homework assignment. 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	Tuesday, October 4 (in class)
Exam 2	Tuesday, November 15 (in class)
Final Exam	Thursday, December 15, 11:30 p.m.–2:20 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.

MATH 2406 SYLLABUS

SPRING 2002

Course Number:	Math 2406 A
Course Name:	Abstract Vector Spaces
Lecture Time:	MWF 12:05–12:55 p.m.
Lecture Room:	Skiles 254
Instructor:	Dr. Christopher Heil Office: Skiles 260 Office Phone: (404) 894-9231 Email Address: `heil@math.gatech.edu`
Office Hours:	TBA, and by appointment
Contacting me:	I encourage you to contact me at any time by email. I try to check email evenings and weekends 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* (Third Edition), by S. Friedberg, A. Insel, and L. Spence
Material:	Vector Spaces (Chapter 1) Linear Transformations and Matrices (Chapter 2) Elementary Matrix Operations (Chapter 3) Determinants (Chapter 4) Diagonalization (Chapter 5) Inner Product Spaces (Chapter 6) Canonical Forms (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.

Grading. We will have six or seven take-home assignments, an in-class midterm exam, and a final exam. With six homeworks, the scoring would be as follows:

6 Homeworks	15 points each
Midterm Exam	30 points
Final Exam	50 points
TOTAL	170 points

Letter grades will be based on your accumulated points at the end of the quarter, according to 90%, 80%, 70%, 60% cutoffs (although I may adjust the cutoffs downward at the end of the quarter, depending on class distribution):

153–170	A
136–152	B
119–135	C
102–118	D
0–101	F

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. You will have one week to complete the assignment. A subset of these problems will be selected for grading.

Two or more of the homeworks will be designated "Take-Home Exams," and on these assignments you will be required to work independently. On the other homeworks you will be allowed (and encouraged) to work together with other students, as long as you each independently write up your own solutions.

On both kinds of homework you are 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.

If for any reason I suspect that any students collaborated on a take-home assignment that was designated to be done independently, then the remaining take-home assignments will be replaced by one-hour in-class exams.

Exams. The date for the in-class midterm exam will be announced in class. Our scheduled date for the final is

Final Exam	Monday, April 29, 11:30 a.m.–2:20 p.m.

The exams are closed-book and closed-notes, except that you may bring one 3 by 5 card with notes on it to each exam. The final is comprehensive.

Syllabus for Abstract Vector Spaces (Math 2406), Spring 2009

January 6, 2009

Instructor: Ernie Croot

Meeting Times: MWF 2:05 - 2:55.

Place: Skiles 243.

Office: Skiles 103.

Course Webpage: www.math.gatech.edu/∼ecroot/2406/2406.html

Office Hours: Tuesday 2:00-3:00 and Wednesday 3:00-4:00 (tentative)

Textbook: *Linear Algebra: A first course, with Applications to Differential Equations*, by Tom Apostol. Because the textbook does not cover all the topics I plan to discuss, I will hand out lecture notes on occasion (the book is good for the basics, but doesn't cover the heavier stuff at all).

Course grade: Your grade will be computed according to the following formula: You will have two midterms, each worth 20% of the grade; homework will be worth 30%; and the final will be worth 30%. The letter grade you receive will be based on the standard 60,70,80,90 plan (90 and higher is an A; 80 to 90 is a B; etc.).

When working your homeworks, if you do not turn them in on the due date, and do not provide a valid reason (e.g. medical, attend a funeral), you will get a grade of 0 for that homework. If you turn it in late on the due date (e.g. outside of class), I take no responsiblity for it being sent to the grader (i.e. you may not get a grade for the HW because it got lost on the way to the grader).

Outline of the content of the course: This course aims to rigorously treat the theory of vector spaces. You will be expected to produce and understand mathematical proofs of all the basic theorems from the text; indeed,

your exams will each have one or two proof problems, and the homeworks will include many exercises requiring you to provide proofs.

The basic topics that we will cover include the following, and possibly more, depending on the time we have: vectors, dot products, norms, matrices (and various theorems about them), vector spaces, bases, linear independence, linear transformations, the spectral theorem, the Rayleigh principle, orthogonal vectors, rational canonical forms, Cayley-Hamilton theorem, Jordan canonical forms, solutions to certain linear differential equations, Markov processes and chains.

Course Syllabus

Professor: Dr. Christine Heitsch **Office:** Skiles 226 **Phone:** (404) 894 - 4758

Email: heitsch@math.gatech.edu **Webpage:** http://www.math.gatech.edu/~heitsch

Office Hours: Monday and Wednesday 4:30 – 5:30pm. If you need to see me at another time, please email me to set up an appointment.

Lectures: Mon, Wed 3:05 – 4:25 in Skiles 243.

Textbook: Tom M. Apostol, *Linear Algebra: a first course, with applications to differential equations.*

Course Description: "A thorough development of the theory of linear algebra and an introduction to multilinear algebra, with selected applications."

Prerequisites: Math 1502: Calculus II (or equivalent).

Course Topics: Vector Algebra (Chapt. 1); Applications of Vector Algebra to Analytic Geometry (Chapt. 2); Linear Spaces (Chapt. 3); Linear Transformations and Matrices (Chapt. 4); Determinants (Chapt. 5); Eigenvalues and Eigenvectors (Chapt. 6); Eigenvalues of Operators Acting on Euclidean Spaces (Chapt. 7).

Grading Scheme: Grades will be calculated according to the following distribution:

30% Final Exam

60% Three Midterm Exams (20% + 20% + 20%)

10% Homework

Grades will be assigned on the standard scale:
A 90 or higher **B** 80 – 89 **C** 70 – 79 **D** 60 – 69 **F** Below 60

On an individual basis, significant improvement over the semester will be taken into account. The overall class distribution will also be carefully considered.

Final Exam: The final exam is scheduled for Monday, December 7th in the afternoon from 2:50AM - 5:40 PM. The exam will be cumulative and count for 30% of the final grade.

Midterm Exams: There will be three in-class exams, each counting for 20% of the final grade, for a total of 60%. The exams will be closed book, closed notes, no calculator, individual tests. The **tentative** exam dates are:

Midterm 1 Monday, September 14th

Midterm 2 Monday, October 5th

Midterm 3 Monday, November 16th

Exam dates will be confirmed at least a week in advance.

Homework: Homework will be assigned on a regular basis, and typically due one week later at the beginning of class. **Late homework will not be accepted.**

A subset of the homework problems will be selected for grading. Assignments must be neatly and clearly written in complete, correct English sentences. Homework must be written on the front side of the page only, and multiple pages must be stapled together. Illegible and/or unintelligible solutions will receive no credit.

Collaboration is allowed (and even encouraged) when working on homework problems. However, **each student must write-up and submit an independent solution in his/her own words**.

Attendance: Regular attendance is expected. Exceptions will be accommodated only for valid, documented reasons including (1) official representation of the Institute and (2) medical emergencies. Note that makeup exams will be given only under extraordinary circumstances.

Exceptions: If you will not be able to meet the requirements of the class as stated, you must contact me within the first two weeks of class.

Academic Integrity: Students are reminded of the obligations and expectations associated with the Georgia Tech *Academic Honor Code* and *Student Code of Conduct*, available online through the Office of Student Integrity (`http://www.deanofstudents.gatech.edu/osi`) and the Honor Advisory Council (`http://www.honor.gatech.edu/index.php`).

Any violations must be reported to directly to the Dean of Students.

Practice Problems: In addition to the homework assignments, numerous "practice problems" from the book will be suggested. You are strongly encouraged to work these problems and other additional exercises on your own and/or with other students to master the course material.

Additional Resources:

- T-Square — `http://t-square.gatech.edu`
- 2406A webpage — `http://www.math.gatech.edu/~heitsch/2406a.html`
- "Writing Proofs" by Prof. Chris Heil, Georgia Tech — `http://www.math.gatech.edu/~heil/handouts/proofs.pdf`
- "How to write proofs: a quick guide" by Dr. Eugenia Cheng, U Sheffield — `http://cheng.staff.shef.ac.uk/proofguide/`

Updates: This syllabus is subject to modification. Any changes will be announced in class and posted on the course website.

Math 2406 – Abstract Vector Spaces

Lectures: MWF 11:05 – 11:55 in Skiles 254

Instructor: Plamen Iliev
E-mail: iliev@math.gatech.edu (I can answer only if you use your GT account!)
Office hours: MW 12-1pm in Skiles 227

Textbook: *Linear Algebra* by Tom M. Apostol

Prerequisite: Calculus I and Calculus II

Syllabus:

- Vector Algebra (Chapter 1);
- Applications of Vector Algebra to Analytic Geometry (Chapter 2);
- 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).

Grading: Grades will be based on homework (20%), two tests (20% each) and final exam (40%).

Homework: Homework will be assigned periodically. A proper subset of each assignment will be graded. You may consult with each other on the homework assignments, but you must write up and submit your own work in class on the due date. Late homework will not be accepted.

Test dates:

- Test 1 - Friday, October 2, 2009
- Test 2 - Friday, November 20, 2009
- Final exam – Thursday, December 10, 2009, 8:00-10:50am

School Calendar

Math 2406, Abstract Vector Spaces

Section M
Lectures : MW 15:05-16:25 in Skiles 271
by Michael Loss (loss@math.gatech.edu)
Office; Skiles 214 B
Office hours : M11 -12, T 12-1
or by appointment

Course Outline and Calendar:

This link takes you to a specification of course objectives, topics of study, a course calendar with week by week reading assignments, test dates and other important dates.

Short course description:

Abstract Vector Spaces or Linear Algebra is the study of linear problems. Linear equations are the only equations that we can solve in a systematic fashion
using the four fundamental operations of arithmetic. Virtually all non-linear equations are solved using linearization, i.e., Newton' methos.

Oscillatory phenomena can be understood in terms of eigenvalues and eigenvectors. This is especially important in quantum physics which is essentially a linear theory.

Why then the word `abstract'? The same linear structures appear in many different concrete situations. Abstract understanding is nothing but realizing that ideas of many different
domains of applications are essentially the same. E.g., realizing that the space of solutions of linear homogeneous system of differential equations
is a linear space is crucial in solving such systems.

Abstract vector spaces provides a frame in which we can view many seemingly dofferent problems under a common apsect.

Grading Policy

There will be graded homework, three tests, and a comprehensive final exam. The lowest test score will be dropped.
The homework counts 20%, the test test grades count 20% each,
and the final exam counts 40%.

There will be make up tests only for jury duty, institutionally approved activities and illness

There will be make up tests only for jury duty, institutionally approved activities and illness. Official documentation is required as proof.

Abstract Vector Spaces, Math 2406
Course Syllabus
Spring Semester 2011

Instructor: Andrzej Swiech
Lectures: MWF 10:05-11:55 pm, Skiles 246
Office: Skiles 235B
Office Hours: M 2:00-3:00 pm, T 3:00-4:00 pm, W 1:00-2:00 pm
Phone: (404) 894-2705
E-mail: swiech@math.gatech.edu

Course web page: http://www.math.gatech.edu/∼swiech/2406.html

Math Lab: Skiles 257

Textbook: T. Apostol, *Linear Algebra*, John Wiley & Sons, 1997.

Prerequisities: MATH 1502 (Calculus II), MATH 1512 (Honors Calculus II), MATH 1522 (Linear Algebra for Calculus) or an equivalent to one of these.

Intended Audience: Math and Discrete Math majors, Math minors, students intending to take proof-based upper-level mathematics courses, such as MATH 4107 (Abstract Algebra), MATH 4150 (Introduction to Number Theory), MATH 4317 (Analysis I).

Course Description: This is a proof-based study of linear algebra at an intermediate level. Its main objective is to develop mathematical thinking and reasoning while learning the main concepts of abstract linear algebra. A lot of time will be devoted to proofs. You will not only learn what is true but why things are true and how to prove them. We intend to cover the following material:

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

Grading: There will be two tests (February 14, April 1), four homework assignments, and the final exam. Your final score will be scaled to 100% and calculated according to the following rule: Homework will count for 30% of the final score, each test for 15%, and the final exam for 40%. You will get an A, respectively B, C, and D if your final score is greater than 85%, respectively 70%, 55%, and 40%. These requirements may be lowered if the overall average score of the class is low (i.e. your grade may get curved up).

Homework: As the course progresses I will be assigning homework problems. Homework assignments will be posted on the course web page. A subset of problems will will be selected for grading. Please check the course web page for the precise information about what is due and when. Late homework will not be accepted. Please write neatly and staple your homework papers.

Academic Dishonesty: Please be aware of the Georgia Tech Honor Code and follow it carefully. In particular please make sure that all the work you submit is your own.

Math 2406B (Fall 08) – Abstract Vector Spaces

Instructor : Prasad Tetali, office: Skiles 234, ph: 404-894-9238
Webpage: http://www.math.gatech.edu/∼tetali **email**: tetali@math.gatech.edu
Office Hours: Mon. Wed. 3:00-4:30pm (tentative) plus by appointment

Course Prerequisite: Math 1502 (Calc II), Math 1512 (Honors Calc II), Math 1522 (Linear Algebra for Calculus), or an equivalent to one of these.

Intended Audience. Math and Discrete Math majors; Math minors; students intending to take proof-based upper-level math courses, such as Abstract Algebra I, Intro to Number Theory, or Analysis I.

Course Textbook: **Linear Algebra by Tom M. Apostol** (John Wiley & Sons, 1997.)
Classroom: Skiles 256, Time: MWF 12-1pm

Syllabus: Material in Chapters 1 – 7 of the textbook:

- Vector Algebra
- Applications of Vector Algebra to Analytic Geometry
- Linear Spaces (aka Abstract Vector Spaces)
- Linear Transformations and Matrices
- Determinants (Axiomatic treatment)
- Eigenvalues and Eigenvectors
- Eigenvalues of Operators Acting on Euclidean Spaces

Course Objective. The course is a *proof-based* study (of an intermediate level) of Linear Algebra. And as such the objective is two fold: to develop mathematical thinking plus reasoning, and to learn a decent amount of linear algebra.

General grading policy : Homeworks 20%, Tests 40%, Final exam 40%
Test 1: **Sept. 15th** (Mon.) Test 2: **Oct. 24th** (Fri.)
Final exam: **December 10th** (Wed.) 8:00–10:50 am

Cutoffs for A, B, C, D: 90%, 80%, 70%, 60%; and below 50% is an F.

Additional Tips: No make-up tests will be allowed. Closed-book, closed-notes, in-class tests. One cheat-sheet will be allowed.

Homeworks will be assigned, collected and graded.

You are strongly advised to solve all the homework problems; Late submission of HWs is discouraged with a penalty of 20%.

Please write LEGIBLY and STAPLE your homework sheets.

Please feel free to ask questions at any time: before, after or during the class.

I check my email fairly regularly; happy to answer questions.

FALL 2008: MATH 2406B (Abstract Vector Spaces) : Prasad Tetali

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- Click here for an outline of the course
- Materials used in Math 2406 taught by Chris Heil in Fall 2004
- The Math Lab operated by the SOM provides tutoring help in Skiles 257
  For schedule Click here

- **HOMEWORKS:**

  - Homework 1
    (Due: Wednesday, September 3rd)
  - Homework 2
    (Due: Friday, September 12th)
  - Test 1
    (Monday, September 15th)
  - Homework 3
    (Due: Monday, September 29th)
    Section 3.13 : Problem 16 ; Section 3.17: Problems 4, 5
    Section 4.4 : Problems 6, 12, 14, 24, 25, 29
  - Homework 4
    (Due: October 10th)
    From the NOTES : Problems 17, 24, 27
    Section 4.12 : Problems 8, 19(f)
    Section 4.16 : Problem 15
  - Homework 5
    (Due: No Need To Submit)
    Section 4.21 : Problems 5, 6, 10
    Section 5.8 : Problems 3, 5(b), 9; Section 5.15 : Problems 2(c), 6
  - REMINDER : Test 2 (in class) on October 24th (Friday)
    Topics: Chapters 4 and 5
  - Homework 6
    (Due: Friday, November 14th)
    - ***Soln to Problem 4 was missing this part: Missing soln to HW 6
  - Homework 7 (Due: Friday, November 21st)

    Section 6.4 : Problems 2, 6, 7
    Section 6.10: Problems 4, 8(c,d,e), 13
    Solutions to HW 7
  - REMINDER : Test 3 (in class) November 24th (Monday)
    Topics: Chapter 6
  - FINAL EXAM on Wednesday, Dec. 10th : 8:00am -- 10:50am in CLASS (Skiles 256) Syllabus: Up to Chapter 6.

    TWO (Cheat) sheets allowed; closed notes, closed book.