

# COURSE SYLLABUS

Welcome to Introduction to Linear Algebra! All of our students play an important role in our educational mission. We hope that you will find this to be a useful, fundamental course for your future studies.

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## 1. Course Description

**Course Title:** Introduction to Linear Algebra

**Course Meeting Times:** Lectures Mon and Wed, from 2:05 to 2:55 in Clough 144. Recitation times are on Friday 2:05—2:55 in the following rooms:

J1 Clough 129 with Kemi Ola – Office hours: Th 10am-11am Skiles 230

J2 Skiles 168 with Rohan Ghanta – Office hours: M 3pm-4pm Skiles 167

J4 Skiles 169 with Matthew Krumwiede – Office hours: F 12pm-1pm Skiles 230

J3 Skiles 170 with Gerardo Mora – Office hours: MW 5pm-6pm, T 10am-11am, and TW 6pm-7pm Skiles 230

## 2. Instructor and Contact Information

**Instructor:**

**Office:** Skiles 013, 404-419-0909

**Office Hours:** Wednesday 1-2, Friday 1-2 (and by appointment, email me).

**E-mail:** sbarone@math.gatech.edu

## 3. Textbook

**Textbook:** David C. Lay, *Linear Algebra and Its Applications*, 5<sup>th</sup> ed. We will cover most of chapters 1-6.

## 4. Course Organization

This course will consist of lectures meeting three times per week for 50-minute periods. You are required to attend all scheduled sessions at all times. Friday recitations are used for review and testing.

## 5. Course Websites

*You are responsible for obtaining any announcements or materials placed on T-square.* Please join our class page on Piazza (<https://piazza.com/class/ixphqoz8aqo1x2>) so you can view/participate in course-related discussions.

## 6. Course Goals, Topics, and Learning Objectives

Math 1553 offers an introductory course in linear algebra whose main **goals** are to

- introduce matrices and systems of linear equations,
- explore the solution of problems from a mathematical perspective, and to
- prepare students for the many applications of linear algebra in science and engineering courses.

Some of the **topics** we cover include the following.

The set of all solutions of a system of linear equations - with varying parameters - specifically through the parametric forms for solutions, the geometry of linear transformations, the characterizations of invertible matrices, and determinants.

Solving systems of linear equations through the use of matrices, including the methods of row reduction and LU decompositions.

The use of the characteristic polynomial to solve eigenvalue problems.

The use of a linear transformation to Describe the structure of a for instance by diagonalization.

To understand orthogonal projections and how they are used to find best-fit solutions to systems of linear equations that have no actual solution.

**Learning objectives** articulate what students are expected to do in a course. Throughout this course, it's expected that students will be able to do the following.

- A) **Construct**, or give examples of, mathematical expressions that involve vectors, matrices, and linear systems of linear equations.
- B) **Evaluate** mathematical expressions to compute quantities that deal with linear systems and eigenvalue problems.
- C) **Analyze** mathematical statements and expressions (for example, to assess whether a particular statement is accurate, or to describe solutions of systems in terms of existence and uniqueness).
- D) **Write** logical progressions of precise mathematical statements to justify and communicate your reasoning.
- E) **Apply** linear algebra concepts to model, solve, and analyze real-world situations.

## 7. MyMathLab Course Information

We will be utilizing MyMathLab (MML) for homework through a joint code for the Thomas *Calculus* text and the Lay *Linear Algebra* text. In order to register, you will need our course id listed below.

MyMathLab Course ID: **barone12745**

Important notes on MML:

- ⤵ If you already have an account on MyMathLab using this combined textbook within the past 18 months, then you do not need to purchase a new code. Login to your account on MyMathLab, select the option to add a new course, and enter our course ID.
- ⤵ If you already have a MyMathLab account that used either the Thomas or the Lay textbook in the past 18 months, but you were unable to add our course using the previous step, please send an email to [gatechmath@yahoo.com](mailto:gatechmath@yahoo.com) and include the following information:
  - 1 Your First and Last Name
  - 2 The email address used to register for MML
  - 3 Your Login ID for MML
  - 4 Our course ID (listed above)

You should receive a reply within 36 business hours from the Pearson support team regarding your account status. In the meantime, you can access our course using the “temporary access” option when registering. Please do not pay for a new code until you receive a reply from Pearson.

- ⤵ If you do not have a MyMathLab account using the Thomas or Lay textbooks, or if your account is over 18 months old, you will need to purchase a new code for our course. Please refer to the registration document, located in the “Resources” section on t-square, to create your new account.

When signing up for MyMathLab, it will be immensely helpful to me (for grading purposes) if you will set your STUDENT ID to your USERID for the GT system (i.e., your T-square USERID, as in “gburdell3”, etc).

MyMathLab comes with an entire electronic version of the textbook; it is your choice if you would also like to own the textbook in print. You may purchase a MyMathLab code either from the bookstore or on-line while registering at <http://www.mymathlab.com>. If you prefer to own a hardcopy of the text, the bookstore offers packages of MyMathLab combined with a loose-leaf or hardcover version of the Thomas and/or Lay textbook(s) that is less expensive than purchasing the text(s) and code separately.

**PLEASE NOTE:** Georgia Tech has a special code package that includes both textbooks. This code can only be purchased through the campus bookstores or directly from Pearson. Codes purchased by other vendors will not work! Possible ISBNs for this text are: 1323131760, 1323132112, 132313204X, 1323132104, or 1323132120.

## 8. Study Groups

The School of Mathematics and the Center for Academic Success will be organizing study groups this spring for students enrolled in Math 1553. These groups will meet in the Math Lab, Clough 280, from 5:00-6:00 pm on Mondays-Thursdays and from 11:00 am-12:00 pm on Tuesdays and Thursdays. During these times, lecture assistants for Math 1553 will be available to assist in your studying.

## 9. Course Requirements and Grading

**HOMEWORK:** Homework will be assigned on-line and will consist of exercise problems on MyMathLab. You are expected to understand **all** homework problems for the tests and quizzes. Exercises on MyMathLab will be due every Thursday at 11:59 PM (except during class recesses or as announced in class). Please note, there may be more than one section due each Thursday.

**PARTICIPATION:** Weekly handwritten homework problems will be assigned and posted on the course website to be completed by the student and turned in with the weekly quiz on Friday (see below). I will give opportunity for the students to ask questions during lecture and you will often need some extra help to complete the handwritten homework assignments so read them early and try them as soon as they are posted and bring your questions to lecture.

**QUIZZES:** A weekly quiz will be given each Friday beginning on the second week of classes, except on midterm test days. Quizzes are administered during the last 10 to 15 minutes of class, and will be based on the homework assignments due that week. The lowest quiz grade will be dropped. No books, notes, calculators, cell phones, or other electronic devices are allowed during the quizzes.

**MIDTERMS:** We will have three 50-minute midterm exams. Tentative dates are on the last page of the syllabus. Midterms cover the following sections.

Midterm 1: 02 10 17 covers everything up to and including Section 1.9

Midterm 2: 03 10 17 covers everything up to and including Section 3.3

Midterm 3: 04 07 17 covers everything up to and including Section 5.5

No books, notes, calculators, cell phones, or other electronic devices are allowed during the tests and quizzes. Solutions to quizzes and midterms will be posted on the course website and/or Piazza.

**FINAL EXAM:** The final exam is comprehensive: it will cover all course materials. Students will write their exam in the room where they have their lectures. All students must take the final examination. Students who are unable to attend the scheduled final exam for any reason are responsible for notifying their instructor **prior to the exam and as soon as possible**. Final exams will not be returned, but students are welcome to view their graded final exam with their instructor.

## 10. Grades

Final grades will be calculated using whichever of the following weights yields the highest grade.

Assessment	Percentage of Average	Percentage of Average
Participation	5%	5%
Homework (lowest dropped)	10%	10%
Quizzes (lowest dropped)	10%	10%
Midterms	45%	30%
Final Exam	30%	45%

Letter grades will be determined based on the following intervals.

**A:** 90% and higher, **B:** [80%, 90%), **C:** [70%, 80%), **D:** [60%, 70%), **F:** [0%, 60%).

For example, a final grade of 89.99% is converted into a B, a final grade of 79.99% is converted into a C, and so on. You will be guaranteed a minimum of the following grading scale, but do not expect any adjustments. Any changes to these intervals would only be made after the final exam.

**Midterm grades** will be assigned on **February 17**. A satisfactory grade will be assigned to all students with a midterm average of 70% or higher (based on the above weighting of grades).

## 11. Expectations

**Students** are expected to attend lectures and recitations, behave in a respectful manner to their instructor, TA, and fellow students, complete all assignments in a timely and professional manner, study the subject matter outside of class time, review this syllabus, review their graded work for potential marking errors and to review where mistakes were made (if any), and for asking for help when needed.

**Teaching assistants** are responsible for facilitating learning activities during recitations, holding office hours, marking, and responding to questions from students via email and during office hours and recitations.

As your **instructor**, my role is to provide learning objectives that define what you are expected to be able to learn, facilitate interactive lectures, coordinate with teaching assistants to grade student work and facilitate learning activities, provide students with assessments that both develop and measure your understanding and knowledge of the subject matter, provide feedback on your performance, provide solutions to midterms and quizzes, and be available for assistance when requested.

## 12. Class Policies

**Attendance:** You are expected to come prepared and actively participate in every lecture and recitation session. In the event of an absence, you are responsible for all missed materials, assignments, and any additional announcements or schedule changes given in class. Class disruptions of ANY kind will NOT be tolerated and may result in your removal from the classroom and/or loss of participation points for that day.

Please show courtesy to your fellow classmates and instructor by adhering to the following class rules:

Turn off all laptops, cellular phones, i-pods and other electronic devices, unless you have a *documented* need to use such devices for note-taking, during class.

Come to class on time and stay for the entire class period.

Refrain from conversing with your fellow students.  
Put away any reading materials unrelated to the course.

**Academic Dishonesty:** All students are expected to comply with the Georgia Tech Honor Code (the honor code can be found at <http://www.policylibrary.gatech.edu/student-affairs/code-conduct>). Any evidence of cheating or other violations of the Georgia Tech Honor Code will be submitted directly to the Dean of Students. Cheating includes, but is not limited to:

Using an unapproved calculator, books, or any form of notes on tests.

Copying directly from **any** source, including friends, classmates, tutors, internet sources (including Wolfram Alpha), or a solutions manual.

Allowing another person to copy your work.

Taking a test or quiz in someone else's name, or having someone else take a test or quiz in your name.

Asking for a regrade of a paper that has been altered from its original form.

Using someone else's name to gain participation points for them, or to take quizzes or tests for them, or asking someone else to use your identity for any graded or participation submission.

**Regrading of Papers:** If a problem on your test has been graded in error, you must submit a regrade request to me (the instructor, not your TA!) **in writing**, along with your paper, **no more than one week after the tests have been returned in class**. Should you wish to have your paper regraded, *do not change or add to the work on your paper!* If you must write on your returned paper, be sure to write in a different color ink and clearly indicate what you have added. A regrade request can only be submitted if you have done something **CORRECT** on your test that has been marked as incorrect. You **MUST** check your answers with the solutions **BEFORE** submitting such a request.

**Make-Ups:** In an emergency situation, I may allow a make-up test if I am notified prior to the exam and provided with a reasonable, **written** confirmation of your absence. Any make-ups must be completed before the corresponding test has been graded and returned to other students. If you will miss a test due to a university-sponsored event or athletics, please provide me with the official documentation in advance.

**Students with Disabilities and/or in need of Special Accommodations:** Georgia Tech complies with the regulations of the Americans with Disabilities Act of 1990 and offers accommodations to students with disabilities. If you are in need of classroom or testing accommodations, please make an appointment with the ADAPTS office to discuss the appropriate procedures. More information is available on their website, <http://www.adapts.gatech.edu>. Please also make an appointment with me to discuss your accommodation, if necessary.

**Calculators:** While you may need a scientific calculator for help with some of the homework problems, the use of calculators is **NOT ALLOWED** on in-class assessments.

**Announcements:** I will frequently update the class pages with class information and materials. *You are responsible for obtaining any announcements or materials placed on my web page, MyMathLab, or T-square.* Though not required, it is also to your advantage to join our class page on Piazza ([www.piazza.com](http://www.piazza.com)) so you can view/participate in course-related discussions.

**Additional Help:** *Asking questions is a key to success!* Please stop by my office hours or your LA's office hours whenever you have questions. Free help is also available Monday-Thursday in the Math Lab, located on the second floor of Clough Commons.

**Please note:** items on the syllabus and course schedule are subject to change. Any changes to the syllabus and/or course schedule will be relayed to the students in class and through T-square.

### 13. Campus-Wide Dates

01 09 17 First day of classes

01 16 17 Holiday

02 17 17 Progress report due

03 15 17 Withdrawal deadline: last day to withdraw with a grade of "W"

03 20-24 17 Spring Break

04 24 17 Last lecture

04 26 17 Reading and final exam periods begin

05 08 17 Grade submission deadline (noon)

05 09 17 Final grades available to students

For further information on campus-wide dates see <http://www.registrar.gatech.edu/calendar>

For **final exam schedules**, see <http://www.registrar.gatech.edu/students/exams.php>

## 14. Tentative Course Schedule

All dates in the table below are tentative, but please use this as an approximate class schedule. Section coverage may change depending on the flow of the course.

Week and Dates	Section Coverage	Topics
Week 1 Jan 9 - 13	Sections 1.1-1.2	Gauss-Jordan Elimination
Week 2 Jan 16 – 20	Sections 1.3-1.4 (no class on Jan 16)	Vector and Matrix Equations Homework #1 due Thursday, Quiz #1 on Friday
Week 3 Jan 23 - 27	Sections 1.4-1.5 Section 1.7	Linear Systems, Linear Independence Homework #2 due Thursday, Quiz #2 on Friday
Week 4 Jan 30 - Feb 3	Sections 1.8-1.9	Linear Transformations Homework #3 due Thursday, Quiz #3 on Friday
Week 5 Feb 6 - 10	Section 2.1 Test Review	Matrix Operations Homework #4 due Thursday, Midterm #1 on Friday (Ch. 1)
Week 6 Feb 13 - 17	Sections 2.2, 2.3	Inverses Homework #5 due Thursday, Quiz #4 on Friday
Week 7 Feb 20 - 24	Section 2.5 Section 2.8	LU Factorization, Subspaces Homework #6 due Thursday, Quiz #5 on Friday
Week 8 Feb 27 - Mar 3	Section 2.9 Section 3.1	Dimension and Rank, Determinants Homework #7 due Thursday, Quiz #6 on Friday
Week 9 Mar 6 - 10	Section 3.2 Test Review	Properties of Determinants Homework #8 due Thursday, Midterm #2 on Friday (Ch. 2,3)
Week 10 Mar 13 - 17	Sections 5.1-5.2	Eigenvalues and Eigenvectors Homework #9 due Thursday, Quiz #7 on Friday
Week 11, March 20 - 25	SPRING BREAK	NO CLASS
Week 12 Mar 27 - 31	Section 5.3 Section 5.5	Diagonalization, Complex Eigenvalues Homework #10 due Thursday, Quiz #8 on Friday
Week 13 Apr 3 - 7	Section 6.1-6.2 Test Review	Inner Products and Orthogonal Sets Homework #11 due Thursday, Midterm#3 on Friday (Ch. 5)
Week 14 Apr 10 - 14	Section 6.3 Section 6.4	Orthogonal Projections, Gram-Schmidt Homework #12 due Thursday, Quiz #9 on Friday
Week 15 Apr 17 - 21	Sections 6.4-6.5	Gram-Schmidt and QR Factorization, Least-Squares Homework #13 due Thursday, Quiz #10 on Friday
Week 16, Apr 24- 25	Final Instructional Days	Review for Final Exam
		Final Exam on April 28, 11:30-2:20