MATH 3406N S2027 Syllabus

Course Information

- **Instructor:** Thang Lê
- **Website:** https://letu.math.gatech.edu/
- **Email:** letu@math.gatech.edu (Email is the best way to contact the instructor.)
- **Office Hours:** Mondays, 10–11 am and Thursdays, 10–11am in Skiles 102B, and by appointment. Occasionally, office hours may be moved to Zoom; a link will be provided.
- **Class Meetings:** Tuesdays and Thursdays, 2:00pm - 3:15 pm in Skiles 255.
  Note that there are several sections of Math 3406 this semester. You are required by GT policy to attend only the section for which you are registered.

Course Materials

- **Required Textbook:** *Linear Algebra Done Right*, 4th edition, by Sheldon Axler. The textbook can be downloaded for free at https://linear.axler.net/LADR4e.pdf. The School of Mathematics provides a detailed description of MATH 3406, available at: https://math.gatech.edu/courses/math/3406
- **Content:** We'll cover most of chapters 1–3 and 5–8. This is a second course in linear algebra designed to develop a higher-level, more abstract understanding of the subject. We will move beyond the computational aspects of your first course and delve into the rigorous proofs and theoretical foundations that are essential for many STEM fields, particularly math and data science. Key topics will include linear operators, inner product spaces, Spectral Theory of normal and symmetric matrices, the Singular Value Decomposition (SVD), the Jordan canonical form, and the Cayley–Hamilton theorem, as well as their applications.
- **Prerequisites:** MATH 1553, 1554, 1564, 1502, 1512, or 1522. You're expected to be familiar with solving linear systems, Gaussian elimination, Row Reduced Echelon Forms, matrices, and determinants. For a refresher, you are encouraged to review Chapters 1-4 of the free textbook, *Interactive Linear Algebra*, and work through the examples. Please be aware that this foundational material is just the starting point. Our course will proceed to cover more advanced topics at a significantly higher level.

Communication and Expectations

- **Piazza:** Please use the Piazza forum on Canvas for questions that may benefit the entire class. This will prevent duplicate questions and encourage discussion. Please check if your question has already been answered before posting. All discussions should remain professional and courteous. Comments on Piazza are moderated and not anonymous.

- **Attendance:** Attendance and active participation in every lecture are expected. Please arrive on time and avoid leaving early. You're responsible for all missed materials, assignments, and announcements.
- **Honor Code:** As a Georgia Tech student, you are expected to adhere to the Honor Code. Any evidence of academic dishonesty, including but not limited to using unauthorized aids, copying work will be reported to the Dean of Students.

Grading

- **Breakdown:**
  - Midterm Exams (2): 35%
  - Final Exam: 30%
  - Quizzes (3): 20%
  - Homework: 15%
- **Letter Grades:**
  - A: 90% and above
  - B: 80–89.9%
  - C: 70–79.9%
  - D: 60–69.9%
  - F: below 60%
- **Note:** Grades are not rounded. For example, 89.9% is a B. Any changes to the grade cutoffs will be in your favor (i.e., the cutoff for an A may be lowered to an 89%, but will not be raised above 90). Such changes will apply to all students uniformly. Individual "grade bumps" will not be considered; please don't submit such requests.

Assessments and Policies

- **Homework:** This course includes 11-12 homework assignments designed for comprehensive practice. To manage workload while still providing feedback, only six specific assignments will be formally graded. These must be submitted electronically through Gradescope on their due dates.
  You should make every effort to complete the homework assignments and seek help with problems you have not been able to solve. Homework is extremely important as it helps you to attain a deep understanding of the materials. Write up your work clearly so that you can understand it yourself upon review. You are encouraged to collaborate with classmates but must write up your own work. Selected problems from each submitted assignment will be graded. Test/quiz problems will be similar in style to homework.
  Late homework: Accepted up to one day after the due date with a 15% penalty.
  Using AI Tutors & Software: Feel free to use AI tools as a personal tutor to help you study and understand the material. The key is to use it for learning, not for getting answers. All graded work must be your own, as you won't have access to these tools during exams.
  Computational Software (MATLAB, etc.): Certain homework problems will be designated as "Software-Optional." For these problems, you are welcome to use computational software

(e.g., MATLAB) to perform calculations. Using these tools is encouraged and carries no penalty; simply cite the software in your answer.

- **Quizzes:** There will be three quizzes, tentatively scheduled for January 26, March 2, and April 13. Dates will be confirmed one week in advance. The first two are 15–20 minutes long, and the third is 30 minutes, and are held at the end of the class period.

- **Midterms and final:** Two full-period, in-class midterm exams are tentatively scheduled for February 9 (or 11) and March 30. The final exam will be cumulative and held on May 4, 2:40 PM - 5:30 PM. All exams must be taken in person on the Georgia Tech campus. No request to take an early final exam is granted. Please plan your travel accordingly.
- **Makeup Policy:** Makeups are only granted for excused absences (e.g., university-approved, religious holidays, illness confirmed by the Dean of Students, or family emergencies confirmed by an academic advisor or the Dean's office).
    - For excused absences on a midterm, the relevant portion of the final exam will serve as a makeup.
    - For quizzes 1 or 2, the weight will be shifted to your remaining quizzes.
    - For an excused absence on quiz 3, the relevant portion of the final exam will be used as a makeup.
- **Regrades:** You have three days after an assessment is graded (except for the final exam) to submit a regrade request on Gradescope. Note that your grade could go up or down.
- **Gradescope:** Homework, Quizzes and exams are submitted via Gradescope. For all in-class exams and quizzes, a 5-minute period will be provided at the end for scanning and uploading your answers. This time is exclusively for submission. Altering your work in any way during this period is strictly forbidden and will result in an automatic grade of zero. The physical copy of your exam/quiz must also be turned in.
- No books, notes, calculators, cell phones, or other aids or electronic devices are allowed during quizzes or exams. On all assignments, you are expected to show your work and use correct reasoning and notation in order to receive full credit.

Additional Information

- **Disability Accommodations:** If you need accommodations, please contact the Office of Disability Services (ODS) and let the instructor know as soon as possible.
- **Getting Help:** Office hours are your time to ask questions and work through problems. Please come prepared for a discussion, not just to be given answers.
- **Study Tips:** Learning mathematics requires steady effort. Expect to spend 2–3 hours on average for each lecture to review and complete assignments. Avoid cramming, and seek help early from the instructor, MathLab, or tutors if you start to fall behind.
- **Disclaimer:** This syllabus and the course schedule are subject to change. Any changes will be announced in class and on Canvas.