Math 4305 Fall 2026 Syllabus

[Classical Mathematical Methods in Engineering, 3 Credit hours, (AG) CRN80368 and (AU) CRN80367]

Lectures: Mon, Wed, in person in Skiles368. Lectures run from 15:30-16:45. Lectures will be recorded, and recordings placed in Media Gallery. Students may also watch lectures remotely through Zoom. A link will be sent before classes.

Instructor Information

Doron Lubinsky, lubinsky@math.gatech.edu,
Office hours: Monday, Wednesday 14:00-15:00 via Zoom or in person in Skiles 237A

Course Description

Description
The course provides an introduction to elementary and advanced topics in linear algebra. This includes a selection from
(1) Linear systems. Gauss-Jordan elimination (row reduction)
(2) Linear transformations in n dimensions and their matrices
(3) Composed transformations and matrix products. The inverse
(4) Subspaces, bases, dimension, coordinates with respect to bases
(5) Image and kernel. Rank and nullity
(6) General linear spaces and subspaces
(7) Linear transformations in general linear spaces. Matrices with respect to bases
(8) Orthogonal projections
(9) Orthonormal bases, Gram-Schmidt process, and QR factorization
(10) Least squares
(11) General Inner product spaces
(12) Determinants. Geometric properties
(13) Eigenvalues and eigenvectors
(14) Diagonalization. Matrix iterations
(15) Orthogonal diagonalization of symmetric matrices and quadratic forms
(16) Singular value decomposition

Course Objectives and Learning Outcomes

- Solving systems of linear equations.
- Applying theory of matrices and determinants
- Solving Least Squares Systems .
- Computing eigenvalues and eigenvectors
- Diagonalizing and decomposing matrices

Course Materials

Course Textbook

Linear Algebra with Applications, Fourth edition, by Otto Bretscher, Prentice Hall, 2009.

Additional Materials/Resources

The homeworks, test information sheets, solutions to tests, and videos of classes will all be posted in folders in "Files" in Canvas or in Media Gallery. Grades will be posted in Canvas. There will be a weekly announcement posted in Canvas.

Grading Policy and Weighting

There will be regular Homework, 2 midterm tests, and a final exam

The items are weighted as follows:
Homework: 35%
Midterm tests: 40% (Each midterm counts 20%)
Final exam: 25% (Every student must write the final exam)
No extra credit.

Makeup Tests

These will only be given where there is a letter from the Dean of Students, or approved university absence.

Grading Scale

You can be guaranteed at least the following grades if your percentage lies in the specified range:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

There will also be a curve that might allow e.g. an A for a grade slightly lower than 90%. This is decided at the end of the course based on the distribution of final percentages in the class.

Attendance Policy

Students are encouraged to attend lectures in person or remotely, but this is not required.

Additional Criteria for Successful Completion of the Course

Collaboration & Group Work

Students may discuss homework problems with each other, but should complete their own solutions. There must not be any communications between fellow students during tests.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Makeup Tests will only be given where there is a letter from the Dean of Students, or approved university absence.
There is no allowance for late homework submission. In cases of medical emergency, missed homework assignments will not be counted.

Academic Honesty/ Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit http://www.catalog.gatech.edu/policies/honor-code/ or http://www.catalog.gatech.edu/rules/18/.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Statement about acceptable student/ faculty conduct

Students are expected to take their responsibilities seriously, attend class either remotely or later watch the recorded lectures, behave respectfully to fellow students, to the grader, and the instructor. They should complete all homeworks in a timely manner, and ask for help where appropriate.

The instructor is expected to provide clear lectures and instructions for the components of the course, to treat students courteously, to ensure fair and timeous grading, to allow regrades, and to coordinate the course conscientiously.

Mobile Devices may not be used in the Classroom

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or http://disabilityservices.gatech.edu/, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs