



MAT 375 Linear Algebra with Applications

Winter 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email: TBA

COURSE OBJECTIVES

This course provides an in-depth study of linear algebra, exploring fundamental concepts and their applications in various fields. emphasizes geometric intuition to aid students in understanding fundamental principles. The course covers topics such as vectors, matrices, vector spaces, linear transformations, determinants, eigenvectors and eigenvalues, and further advanced topics. Applications from science, engineering, computer graphics, and differential equations are integrated and explored throughout the course.

Upon completion of this course, students will be able to:

1. Demonstrate proficiency in core linear algebra concepts, combining theoretical understanding with practical applications.
2. Integrate knowledge by applying linear algebra techniques to real-world scenarios.
3. Develop advanced problem-solving skills, particularly in complex linear algebra topics.
4. Strengthen the ability to write rigorous mathematical proofs.
5. Cultivate critical thinking and analytical skills crucial for advanced studies.

PREREQUISITES

MAT 130 Linear Algebra

GRADING

Grades will be determined by accumulating points, with 100 points being the



maximum, as follows:

ITEM	POINTS
Quizzes	20 Points
Assignments	30 Points
Midterm Exam	20 Points
Final Exam	30 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F.$$

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Ted Shifrin, Malcolm Adams, *Linear Algebra: A Geometric Approach*, 2nd Edition, W. H. Freeman, 2011.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	Topics: Topic 1: Foundations of Linear Algebra Topic 2: Vectors and Dot Product Topic 3: Hyperplanes and Linear Systems Topic 4: Selected Applications Assessments: Quiz#1



Module 2	Topics: Topic 5: Matrix Operations and Transformations Topic 6: Matrix Operations and Transpose Topic 7: Linear Transformations and Inverse Matrices Topic 8: Elementary Matrices Assessments: Assignment#1
Module 3	Topics: Topic 9: Vector Spaces: Subspaces of R^n and Basis Topic 10: Four Fundamental Subspaces Topic 11: Dimension and Graphic Examples Topic 12: Abstract Vector Spaces Assessments: Midterm Exam
Module 4	Topics: Topic 13: Projections and Transformations Topic 14: Matrix of a Linear Transformation Topic 15: Transformations on Abstract Vector Spaces Topic 16: Determinants and Geometry Assessments: Quiz#2
Module 5	Topics: Topic 17: Eigenvalues and Eigenvectors: Characteristic Polynomial Topic 18: Diagonalizability: Applications Topic 19: Spectral Theorem Topic 20: Advanced Topics Assessments: Assignment#2 Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately



prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (e.g., note taking, reading course documents).

ACADEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that



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students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.