Soochow University

MAT 130 Linear Algebra

Winter 2024

Course Credits: 4
Contact Hours: 56 hours
Instructor: TBA
Email: TBA

COURSE OBJECTIVES

This is a course introduces linear algebra, the study of linear systems of equations, vector spaces, and linear transformations. Solving systems of linear equations is a basic tool of many mathematical procedures used for solving problems in science and engineering. Topics covered include complex numbers, vector geometry, systems of linear equations, matrices, determinants, vectors in Rn, and eigenvalues and eigenvectors. During the course we will concentrate on the mathematical theory and methods of linear algebra. Students will become competent in solving linear equations, performing matrix algebra, calculating determinants, and finding eigenvalues and eigenvectors.

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

1. Find solutions to problems requiring multiple steps, such as constructing and labeling a diagram, deriving equations, and interpreting results of computations;

2. Develop a working knowledge of the basic algebraic techniques of linear algebra, including elementary row operations, matrix algebra, and manipulation of determinants;

3. Understand the significance of concepts such as rank, span, and linear independence;

4. Interpret and apply definitions and theorems, and write logical arguments using complete sentences.

PREREQUISITES

None

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
Quizzes	20 Points
Assignments	20 Points
Midterm Exam	25 Points
Final Exam	35 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 ≥ 90 > B ≥ 80 > C ≥ 70 > D ≥ 60 > F.

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

COURSE MATERIALS

Required Texts:

David Poole, *Linear Algebra: A Modern Introduction,* 3rd Edition, Brooks/Cole: Cengage Learning, 2011.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	Topics: Topic 1: The Geometry and Algebra of Vectors Topic 2: Length and Angle Topic 3: The Dot Product Topic 4: Lines and Planes **Assessments:** Assignment #1

Module 2	**Topics:** Topic 5: Introduction to Systems of Linear Equations Topic 6: Direct Methods for Solving Linear Equations Topic 7: Spanning Set and Linear Independence Topic 8: Matrix Operations **Assessments:** Quiz #1
Module 3	**Topics:** Topic 9: Matrix Algebra Topic 10: Subspaces, Basis, Dimension and Rank Topic 11: Introduction to linear transformations Topic 12: Introduction to Eigenvalues and Eigenvectors **Assessments:** Assignment #2 Midterm Exam
Module 4	**Topics:** Topic 13: Determinants Topic 14: Eigenvalues and Eigenvectors of n*n Matrices Topic 15: Similarity and Diagonalization Topic 16: Orthogonality **Assessments:** Quiz #2
Module 5	**Topics:** Topic 17: Orthogonal Complements and Orthogonal Projections Topic 18: The Gram-Schmidt Process Topic 19: Orthogonal Diagonalization of Symmetric Matrices Topic 20: Final Exam Reviews **Assessments:** 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 (eg., note taking, reading course documents).

ACEDEMIC 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 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.