暨南大學
JINAN UNIVERSITY

0701M340

Linear Algebra

Instructor: TBA

E-mail: TBA

Time: December 14, 2026 - January 15, 2027

Office Hours: by appointment

Contact Hours: 60 (50 minutes each)

Credits: 4

Course Description

Systems of linear equations, vector spaces and subspaces, bases, linear transformations, determinants, eigenvalues and eigenvectors, diagonalization of symmetric matrices, orthogonality.

Required Textbook(s)

Linear Algebra and Its Applications, 6th Edition, David C. Lay. ISBN: 9780135851159

Prerequisites

Calculus I

Course Goals

By the end of the course, students will be able to:

- Analyze and solve linear systems through row reduction, echelon forms, and matrix methods; describe solution sets in parametric terms and determine consistency

criteria.

- Utilize concepts of linear independence, subspaces, dimension, and rank to identify spanning sets, establish bases, and express coordinate representations in $\mathbb{R}^n$ and abstract vector spaces.
- Execute matrix operations and examine transformations—calculate matrix products, inverses, and factorizations; represent linear transformations using matrices; and assess whether a mapping is one-to-one or onto.
- Evaluate and interpret determinants and eigenvalues—compute determinants via their properties, apply Cramer's Rule, find eigenvalues and eigenvectors, and use diagonalization (including for complex eigenvalues) to streamline computations.
- Implement orthogonality in vector spaces—compute inner products, recognize orthogonal sets, determine orthogonal projections, and generate orthogonal bases via the Gram–Schmidt process.

Course Outline

Please note that the outline is meant to give an overview of the major concepts in this course. Changes may occur as needed to aid in the student`s development.

Module 1

- 1.1 Systems of Linear Equations
- 1.2 Row Reduction and Echelon Forms
- 1.3 Vector Equations
- 1.4 The Matrix Equation Ax = b
- 1.5 Solution Sets of Linear Systems
- **Homework 1**
- **Quiz 1**

Module 2

- 1.7 Linear Independence
- 1.8 Introduction to Linear Transformations
- 1.9 The Matrix of a Linear Transformation
- **Homework 2**
- **Quiz 2**

Module 3

- 2.1 Matrix Operations
- 2.2 The Inverse of a Matrix
- 2.3 Characterizations of Invertible Matrices
- **Homework 3**
- **Quiz 3**

Module 4

- 2.5 Matrix Factorizations
- 2.8 Subspaces of Rn
- 2.9 Dimension and Rank
- **Homework 4**
- **Quiz 4**
- **Exam 1**

Module 5

- 3.1 Introduction to Determinants
- 3.2 Properties of Determinants
- 3.3 Cramer's Rule, Volume, and Linear Transformations
- **Homework 5**
- **Quiz 5**

Module 6

- 4.1 Vector Spaces and Subspaces
- 4.2 Null Spaces, Column Spaces, and Linear Transformations
- 4.3 Linearly Independent Sets; Bases
- 4.4 Coordinates
- **Homework 6**
- **Quiz 6**

Module 7

- 4.5 The Dimension of a Vector Space
- 4.6 Change of Basis

- 5.1 Eigenvectors and Eigenvalues
- **Homework 7**
- **Quiz 7**

Module 8

- 5.2 The Characteristic Equation
- 5.3 Diagonalization
- 5.4 Eigenvectors and Linear Transformations
- 5.5 Complex Eigenvalues
- **Homework 8**
- **Quiz 8**
- **Exam 2**

Module 9

- 6.1 Inner Product, Length, and Orthogonality
- 6.2 Orthogonal Sets
- 6.3 Orthogonal Projections
- 6.4 The Gram – Schmidt Process
- **Homework 9**
- **Quiz 9**
- **Final Exam**

Grading Policy

Your grade in this course will be determined by your performance in the following categories:

Homework	15 %
Quizzes (Top 8 out of 9)	20 %
Exams	40 %
Final Exam	25 %
Total	**100%**

Grading Scale

The instructor will use the grading system as applied by JNU:

Definition	Letter Grade	Score
Excellent	A	90~100
Good	B	80~89
Satisfactory	C	70~79
Poor	D	60~69
Failed	E	Below 60

Academic Integrity

As members of the Jinan University academic community, students are expected to be honest in all of their academic coursework and activities. Academic dishonesty, includes (but is not limited to) cheating on assignments or examinations; plagiarizing, i.e., misrepresenting as one's own work any work done by another; submitting the same paper, or a substantially similar paper, to meet the requirements of more than one course without the approval and consent of the instructors concerned; or sabotaging other students' work within these general definitions. Instructors, however, determine what constitutes academic misconduct in the courses they teach. Students found guilty of academic misconduct in any portion of the academic work face penalties that range from the lowering of their course grade to awarding a grade of E for the entire course.