

# 0701M245

## Linear Algebra and Differential Equations

**Instructor:** TBA

**Time:** May 12, 2025 - June 13, 2025

**Office Hours:** By appointment.

**Contact Hours:** 60 (50 minutes each)

**Credits:** 4

**E-mail:** TBA

### Course Description

In this course we will study linear algebra and differential equations, the topics including matrices and linear equations, determinants, vector spaces, linear transformations, eigenvalues and eigenvectors, first-order linear differential equations,  $n$ -<sup>th</sup> order linear differential equations, systems of linear differential equations.

### Prerequisites

0701M230 Calculus II

### Required Textbook(s)

Edwards, Penney, Calvis. *Differential Equations and Linear Algebra*, 4th Edition, Pearson.

*You will need to purchase an access code for MyMathLab. This comes with an e-book, so it is optional to purchase the physical textbook. The cost of the homework software is \$79.99 per semester.*

## **Course Schedule**

The schedule gives an overview of the major concepts in this course. Numbers listed before each section refer to the related textbook chapters/sections.

### **Week 1:**

- 1.1 Differential Equations and Mathematical Models
- 1.2 Integrals as General and Particular Solutions
- 1.3 Slope Fields and Solution Curves
- 1.4 Separable Equations and Applications
- 1.5 Linear First-Order Equations
- 1.6 Substitution Methods and Exact Equations
- 3.1 Introduction to Linear Systems
- 3.2 Matrices and Gaussian Elimination
- 3.3 Reduced Row-Echelon Matrices

### **Week 2:**

- 3.4 Matrix Operations
- 3.5 Inverses of Matrices
- 3.6 Determinants
- 4.1 The Vector Space  $\mathbb{R}^3$
- 4.2 The Vector Space  $\mathbb{R}^n$  and Subspaces
- 4.3 Linear Combinations and Independence of Vectors
- 4.4 Bases and Dimension for Vector Spaces

**END OF MIDTERM MATERIAL**

**Week 3:**

**MIDTERM (1.1 - 1.6, 3.1 - 3.6, 4.1 - 4.4)**

- 6.1 Introduction to Eigenvalues
- 6.2 Diagonalization of Matrices
- Supplemental Material: Introduction to Linear Transformations
- Supplemental Material: The Matrix of a Linear Transformation

**Week 4:**

- 5.1 Introduction: Second-Order Linear Equations
- 5.2 General Solutions of Linear Equations
- 5.3 Homogenous Equations with Constant Coefficients
- 5.5 Nonhomogeneous Equations and Undetermined Coefficients
- 7.1 First-Order Systems and Applications

**Week 5:**

- 7.2 Matrices and Linear Systems
- 7.3 The Eigenvalue Method for Linear Systems

**FINAL EXAM (6.1 - 6.2, Supplemental Material, 5.1 - 5.5, 7.1 - 7.3)**

**Grading Policy**

Quizzes (Take Home)	25 %
Homework (Online)	15 %
Midterm Exam	30 %
Final Exam	30%
<b>TOTAL</b>	<b>100 %</b>

There will be a section of online homework for each section covered. Online homework will be due on the related exam's final due date. ***Online homework can be submitted late for partial credit up until the last day of class.***

Each week, a cumulative "written homework" (quiz) assignment will be given, where students will be required to write out all work and submit written work and answers. ***Written homework cannot be turned in late, as the key will be posted so students may use it to study for the related exam.***

## **Grading Scale**

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

<b>Definition</b>	<b>Letter Grade</b>	<b>Score</b>
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.

### **Exam Proctoring**

Both the midterm and the final exam in this course must be **visually proctored**. For most students, that will mean visual proctoring via Zoom where students will be required to show their immediate testing area to the proctor. Students may also use an approved Testing Center at a college or university if online proctoring is unsuitable. Contact the instructor at the beginning of the semester if you need an alternative to online proctoring.