0701M245

Linear Algebra and Differential Equations

Instructor: TBA
Time: June 13, 2022 - July 15, 2022
Office Hours: 2 hours (according to the teaching schedule)
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, Determinan,Vector spaces, Linear transformations, Eigenvalues and eigenvectors, First order linear differential equations, n-th order linear differential equations, Systems of linear differential equations.

Required Textbook(s)

Goode, Annin, Differential Equations and Linear Algebra, Fourth Edition, published by Pearson/Prentice Hall.

Course Schedule

The schedule gives an overview of the major concepts in this course. The actual days on which the topics will be covered are subject to change at the discretion of the course instructor. Numbers in parentheses refer to the related textbook chapters.

Week 1:

- 1.1 Differential Equations Everywhere
- 1.2 Basic Ideas and Terminology

- 1.3 The Geometry of First-Order Differential Equations
- 1.4 Separable Differential Equations
- 1.5 Some Simple Population Models
- 1.6 First-Order Linear Differential Equations
- 2.1 Matrices: Definitions and Notation
- 2.2 Matrix Algebra

Week 2:

- 2.3 Terminology for Systems of Linear Equations
- 2.4 Row-Echelon Matrices and Elementary Row Operations
- 2.5 Gaussian Elimination
- 2.6 The Inverse of a Square Matrix
- 3.1 The Definition of the Determinant
- 3.2 Properties of Determinants
- 3.3 Cofactor Expansions

Week 3:

- 3.4 Summary of Determinants
- 4.1 Vectors in Rn
- 4.2 Definition of a Vector Space
- 4.3 Subspaces
- 4.4 Spanning Sets
- 6.1 Definition of a Linear Transformation
- 6.2 Transformations of R2

Week 4:

- 6.3 The Kernel and Range of a Linear Transformation
- 6.4 Additional Properties of Linear Transformations
- 6.5 The Matrix of a Linear Transformation
- 7.1 The Eigenvalue/Eigenvector Problem
- 7.2 General Results for Eigenvalues and Eigenvectors
- 7.3 Diagonalization
- 8.1 General Theory for Linear Differential Equations

Week 5:

- 8.2 Constant Coefficient Homogeneous Linear Differential Equations
- 8.3 The Method of Undetermined Coefficients: Annihilators
- 8.4 Complex-Valued Trial Solutions
- 9.1 First-Order Linear Systems
- 9.2 Vector Formulation
- 9.3 General Results for First-Order Linear Differential Systems
- 9.4 Vector Differential Equations: Nondefective Coefficient Matrix

Grading Policy

Quizzes	15 %
Homework	25 %
Midterm Exam	30 %
Final Exam	30%
TOTAL	**100 %**

There is a **quiz every Tuesday, a midterm on the third Friday and a Final Exam on the final Friday**. As well, homework will be due throughout the weeks.

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.