Course content

The course is a fundamental branch of mathematics that focuses on linear structures and their applications. It provides essential mathematical tools and theories widely used in computer science, engineering, and other disciplines.
The following topics are covered in the course:

1. Matrix Theory: Includes operations on matrices, determinants, matrix inversion, and properties of matrices.
2. Linear Equations: Solving systems of linear equations using Gaussian elimination and matrix-based approaches.
3. Vector Spaces: Fundamental concepts of vector spaces, subspaces, basis, dimension, and orthogonality.
4. Eigenvalues and Eigenvectors: Theory and computation of eigenvalues, eigenvectors, and their role in matrix diagonalization.
5. Quadratic Forms: Standardization and applications of symmetric matrices.
6. Applications: Practical uses of linear algebra concepts in solving real-world problems, including transformations, optimization, and data analysis.

Course Objectives

Knowleage

1. Understand fundamental concepts and theories in linear algebra, including determinants, matrices, eigenvalues, linear spaces, and linear transformations.
2. Recognize the importance and applications of linear algebra in solving practical and theoretical problems.

Skills

1. Solve systems of linear equations using determinants and matrix theories.
2. Apply eigenvalue theory to diagonalize matrices and normalize quadratic forms of symmetric matrices.
3. Use linear algebra techniques to analyze and interpret solutions to linear problems.

Competencies

1. Identify and solve linear algebra problems using appropriate mathematical methods and computational tools.
2. Construct and interpret orthogonal and non-orthogonal bases for vector spaces.
3. Assess the diagonalizability of matrices and perform basis transformations to facilitate computations and applications.