



Course Code MATH-280	Course Title Linear Algebra I	ECTS Credits 6
Department Computer Science	Semester Fall, Spring	Prerequisites MATH-190
Type of Course Required	Field Mathematics	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 2 nd	Lecturer(s) Dr George Chailos
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

The main objectives of the course are to:

- Provide students with the fundamental theory of Linear systems of equations.
- Cover in detail the fundamental theory of Matrices, and develop the necessary skills in order for the students to be able to apply the theory of Matrices to Linear Systems
- Introduce students to eigenvalues, eigenvectors, and diagonalization of square matrices.
- Develop the theory of vectors in \mathbf{R}^n .
- Cover the elementary concepts from the theory of Linear transformations and utilize their main applications.
- Provide students with the necessary skills, in order for them to be capable of comprehending abstract algebraic notions, related to vector space theory.
- Discuss the fundamental concepts and the elementary theory of finite dimensional vector spaces in detail.

Learning Outcomes:

After completion of the course students are expected to be able to:

1. Solve linear systems using the general theory of linear systems as well as matrix theory.
2. Apply the basic concepts of n -vectors and their representation to \mathbf{R}^2 , \mathbf{R}^3 .
3. Define Linear transformations and apply them to systems theory.
4. Utilize and handle abstract vector spaces; prove basic theorems related to the notions of linear independence, span, basis, and dimension of the vector space.
5. Compute the eigenvalues and eigenvectors of square matrices.

Course Contents:

1. Linear systems and Matrices
 - General theory of Linear systems.
 - Theory and properties of Matrices, Invertibility of Matrices, Determinant of a Matrix.
2. Vectors and Linear Transformations
 - Vectors in the plane and n – vectors.
 - Introduction to the theory of linear Transformations.
3. Vector Spaces
 - Vector spaces and subspaces.
 - The basis and the dimension of a vector space.
 - The Rank of a Matrix and its applications.
4. Further theory of square Matrices
 - Eigenvalues and Eigenvectors of square matrices.
 - Diagonalization of Matrices.

Learning activities and Teaching Methods:

Lectures, Exercises, Assignments and Tests.

Assessment Methods:

2 Mid-Term Exams; Final Exam; Class Participation.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
B. Kolman and D. Hill	Introductory Linear Algebra: An applied first course.	Prentice Hall	2005	0-131-27773-1

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Lay, D.C	Linear Algebra and its Applications.	Addison Wesley	2005	0-321-28713-4