



**Faculty: of Civil and Environmental engineering and Architecture .
Depart : of Civil and Environmental engineering and Architecture**

Course Plan

Course Code: MAT 114

Course Name: Math(1)

Semester:

Academic Year : 2026

Course Description:

This course considers: systems of linear equations, Elimination methods (Gauss, Jordan), Matrices (operations and, Matrix methods for solving linear systems. Determinats, Vector spaces and subspaces, linear independence, Basis and Dimension, Inner product spaces, Orthonormal bases. Eigenvalues and Eigenvectors, Diagonalization, Jordan form, General Linear Transformation. Invers of a Linear Transformation, Kernel and range, Applications.

Credit hours : 3 hours

Theoretical :3 hours

Practical : 0hours

Course Objectives

The student will be able to :

- To introduce students to the techniques of matrices, and linear equations systems for solving problems, related to real application.
- To provide students with opportunities to develop their skills to be able to generate new ideas or to invent useful applications in the field of computer science and communication engineering.
- To think and to communicate mathematical ideas.

Textbook: Linear Algebra, A Modern Introduction,

Author: David Poole, Year: 2006

International Student Edition, ISBN: 0-534-99845-3

- Introduction to Matrix Algebra, K. Kaw
- Elementary Linear Algebra, K. R. Matthews
- Linear Algebra, W. W. L. Chen
- Elements of Abstract and Linear Algebra, E. H. Connell

Course Outline:

Week	Topic	Textbook Chapter
01	The Geometry and Algebra of Vectors	Ch 1
02	Length and Angle and The Dot Product	Ch 1
03	Lines and Planes	Ch 2
04	Systems of Linear Equations	Ch 2
05	Spanning Sets and Linear Independence, Applications	Ch 2
06	Matrix Algebra, The Inverse of a Matrix	Ch 3
07	The LU Factorization, Subspaces, Basis, Dimension and Rank	Ch 3
08	Determinants, Linear Transformations, Applications	Ch 3
09	Mid -Term Exam	
10	Eigen values and Eigenvectors	Ch 4
11	Similarity and Diagonalization	Ch 4
12	Orthogonality, Orthogonal Complements and Orthogonal Projections	Ch 5
13	Gram-Schmidt process, and the QR Factorization Orthogonal Diagonalization, of Symmetric Matrices	Ch 5
14	Vector Spaces, Subspaces, Linear independence, Basis, dimension Change of Basis	Ch 6
15	Linear Transformations, Kernel, Range, The Matrix of a L.T. Inner Product Spaces and complex Numbers	Ch 7
16	Final Exam	

Evaluation Methodology:

Quizzes and Homework :	30%
Laboratory:	None
Mid-Term Exam:	30%
Final Exam:	40%

Instructor's Information:

Name: *Dr. khalil yahya*

Signatures:

