Course Name: Matrix Algebra **Course Code:** MATH106

General Information						
Course Code	**MATH106**	**Level/Year**	**2/1**	**Required (R) / Selected Elective (SE)**		**R**
Credit Hours	**Theory**	**3**	**Lab**	**-**	**Total**	**3**
Prerequisites	**Nil**	**Course Coordinator**		Dr. Elkhateeb Sabahi		
Corequisites	**Nil**					

Course Description

This course is designed to provide concept of matrix, types of matrices, basic algebraic operations on matrices, inverse of square matrix $A_{2\times2}$ and$A_{3\times3}$, Determinants and their properties and methods of calculationwhich will facilitate them for further studies.

Course Objectives: On completion of the course, the student will be able to:

- **Perform** matrix operations and apply fundamental algebraic techniques.
- **Solve** systems of linear equations using appropriate methods such as Gaussian elimination and matrix inversion.
- **Explain** the concepts of linear spaces and subspaces and **illustrate** these with relevant examples.

Course Contents

List of Topics

1) Matrices and algebraic operations 2) Inverses Rules of Matrix Arithmetic 3) Elementary Matrices and a Method for Finding A-1 4) Diagonal, Triangular and Symmetric Matrices 5) Systems of Linear Equations 6) Determinants and Vector Space

Textbook

- Howard Anton and Chris Rorres, Elementary Linear Algebra, Wiley, 2019.

Reference Materials

- Barnett, Ziegler and Bylenn –Precalculus, McGraw-Hill Education, 2010.
- R.E.Larson, R.P. Hostetler -Algebra and Trigonometry, Cengage Learning, 2006
- R. Aufmann, V. Baker and R.Nation - College Algebra and Trigonometry, Cengage Learning, 2010

Course Learning Outcomes

CLO#01	Distinguishing mathematical concepts relevant to Matrices and Matrix Operations, Definitions and its Properties, Types of Matrices, Operations on Matrices (Addition-Subtraction-Multiplication), Linear Combinations, Transpose and Trace.
CLO#02	Identify background science, features and structures of Mathematics problems in Inverses. Rules of Matrix Arithmetic, Properties of Matrix Operations, Inverse of 2 by 2 Matrix and its properties, Powers of a Matrix, Matrix polynomial.
CLO#03	Explain notations and concepts required for the solution of basic Elementary Matrices and a Method for Finding A-1:Elementary Matrices and Row Operations, Using Row Operations to Find A-1.
CLO#04	Apply theoretical, computational or practical aspect relevant to basic Diagonal, Triangular and Symmetric Matrices.
CLO#05	Compute numerical quantities for various parameters to approximate the solution in Linear Equations and Consistent and inconsistent linear systems.
CLO#06	Apply various mathematical rules, techniques and theorems in Application in Gaussian Elimination and Gauss–Jordan elimination, linear equations, A Basic Theorem, Elementary Row Operations.
CLO#07	Solve mathematical problem using critical thinking for Vector Space Axioms, examples and exercises.