Hashemite University	Course Syllabus	Linear Algebra (1) (110101241) **3 Credit Hours**
Faculty of Science		**Pre-requisite:** None
Department of Mathematics		**Summer Summer 2021/2022**

Course Information

Lecture's Time	
Lecture's Room	
Instructor	Dr. *Abdallah Shihadeh*
Office Location	مبنى الرياضيات 123
Office Hours	
Text Book : Elementary Linear Algebra with Applications, by Howard Anton edition: *9th* **or** *11th*	
References(s)	(1) Linear Algebra, an Introduction, *Richard Bronson* (2) Linear Algebra, *S. Lang* (3) Applied Linear Algebra, *B. Noble, J.W. Daniel*.

Grading Policy:

Theory

First Exam	30%
Second Exam	30%
Final Exam	40%

Course Objectives

To present the fundamentals of linear algebra. To become familiar with the basic concepts of matrix algebra, vector spaces linear transformations, determinants, eigenvalues and eigenvectors, diagonalization, orthogonality, and projections.

Teaching and Learning Methods

1. Introducing new definitions and using examples to illustrate new concepts.
2. Proving the theorems which constitute the core of the course.
3. Solving some examples and assigning homework's.
4. Discussing some of the students' solutions of some sample assignment.
5. Making a discussion of the problems of each exam.

Chapter	Section	Topic	Week
I		**Systems of Linear Equations and Matrices**	
	1.1	Introduction to System of Linear Equations	
	1.2	Gaussian Elimination	
	1.3	Matrices and Matrix Operations	
	1.4	Inverses, Rules of Matrix Arithmetic	
	1.5	Elementary Matrices and a method for finding A^{-1}	
	1.6	Further results on Systems of Equations and Invertibility	
	1.7	Diagonal, Triangular, and Symmetric Matrices	
II		**Determinants**	
	2.1	The Determinant Function	
	2.2	Evaluation Determinants by Row Reduction	
	2.3	Properties of Determinant Function	
	2.4	Cofactor Expansion; Cramer's Rule	
V		**General Vector Spaces**	
	5.1	Real Vector Spaces	
	5.2	Subspaces	
	5.3	Linear Independence	
	5.4	Basis and Dimension	
	5.5	Row space, Column space, and Null space	
	5.6	Rank and Nullity	
VI		**Inner Product Spaces**	
	6.1	Inner Products	
	6.2	Angle and Orthogonality in inner product spaces	
	6.3	Orthogonal Bases; Gram-Schmidt Process	
	6.5	Orthogonal Matrices; Change of Basis	
VII		**Eigenvalues; Eigenvectors**	
	7.1	Eigenvalues and Eigenvectors	
	7.2	Diagonalization	
	7.3	Orthogonal Diagonalizations	
VIII		**Linear Transformations**	
	8.1	General Linear Transformations	
	8.2	Kernel and Range	
	8.3	Inverse Linear Transformations	
	8.4	Matrices of general Linear Transformations	
	8.5	Similarity	

Attendance is absolutely mandatory. Students who miss a 15% class sessions without a compelling excuse will qualifies the student to be dismissal.