AL IMAM MOHAMMAD IBN SAUD ISLAMIC UNIVERSITY
COLLEGE OF ENGINEERING
DEPARTMENT OF CIVIL ENGINEERING

Course Information	
Course Code & Name	MATH226 LINEAR ALGEBRA **TOTAL CREDITS: 3** (THEORY HRS: 3, TUTORIAL: 1)
Prerequisite/s	MATH 106 Calculus II

Course Description
Basic concepts and techniques of linear algebra; includes systems of linear equations, matrices, determinants, vectors in n-space, and eigenvectors, together with selected applications, such as Markov processes, linear programming, economic models, least squares and population growth.

Textbook	
Title	Linear Algebra
Author	Gareth Williams
Publisher	Jones and Bartlett

Course Contents	
Gauss elimination and Matrices	Linear equations and systems, Matrix notation , Method of elimination,
	Row and row reduced echelon form of a matrix.
	Matrix operations. Inverse of a square matrix by Gauss Elimination.
	Factorization A=LU
Determinants	Determinants and their properties, Cofactor expansions, Cramer's Rule.
Vector Spaces, Linear independence, Basis	Introduction to vectors and matrices. Vectors in R^2 and R^3, Dot product, norm, distance, orthogonal vectors. Angle between two vectors.
	Vector spaces, rank, Nullspace
	Linear independence of vectors, Spanning subspace,
	Basis and dimension, orthogonality, projection
	Gram-Schmidt normalization,
Eigenvalues & Eigenvectors	Eigenvalues & eigenvectors of a square matrix, characteristic polynomial of a square matrix; Matrix diagonalization. Application to differential equations
Linear transformations	Basic definitions, the matrix of a transform, Coordinates and change of basis,
	homomorphism and isomorphism, Diagonalization
Applications	Matrices in Engineering, Graphs and Networks, Markov Matrices, Population, Gaussian Elimination in Practice

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Academic Coordinator   **Official Stamp**