

**King Fahd University of Petroleum & Minerals**  
**Department of Mathematics & Statistics**  
**Syllabus MATH 225**  
**Second Semester 2022-2023 (T222)**  
**Instructor: Dr. Laradji**

**Course:** MATH 225 (Introduction to Linear Algebra)  
**Textbook:** Linear algebra with applications, Steven J. Leon, 10<sup>th</sup> edition, Pearson  
**Course Description:** Matrices and systems of linear equations. Vector spaces and subspaces. Linear independence. Basis and dimension. Inner product spaces. The Gram-Schmidt process. Linear transformations. Determinants. Diagonalization. Real quadratic forms.  
**Prerequisite:** MATH 102  
**Objective:** This course introduces the basic concepts and techniques of elementary linear algebra.

Week	Date	Section	Topic
1	Jan. 15-Jan. 19	1.1-1.2	Systems of linear equations -Row echelon form
2	Jan. 22 – Jan. 26	1.3-1.4	Matrix arithmetic - Matrix algebra
3	Jan. 29 – Feb. 2	1.5-2.1	Elementary matrices- The determinant of a matrix
4	Feb. 5 – Feb. 9	2.2-2.3	Properties of determinants - Additional topics
5	Feb. 12 – Feb. 16	3.1-3.2	Vector Spaces: Definitions & examples - Subspaces
6	Feb. 19 – Feb. 21	3.3-3.4	Linear independence -Basis & dimension
	Feb. 22 – Feb. 23		Saudi Founding Day
7	Feb. 26 – Mar. 2	3.5-3.6	Change of basis - Row space & column space
8	Mar. 5 – Mar. 9	4.1-4.2	Linear transformations: Definitions & examples - Matrix representations of linear transformations
9	Mar. 12 – Mar. 16	4.3-5.1	Similarity - Orthogonality: Scalar product in $\mathbb{R}^n$
10	Mar. 19 – Mar. 23	5.2-5.4	Orthogonal subspaces - Inner product spaces
11	Mar. 26 – Mar. 30	5.5	Orthonormal Sets
12	Apr. 2 – Apr. 6	5.6-5.7	The Gram-Schmidt Orthogonalization Process – Orthogonal Polynomials
13	Apr. 9 – Apr. 13	6.1	Eigenvalues & Eigenvectors
14	Apr. 30 – May 4	6.3	Diagonalization
15	May 7 – May 11	6.6	Quadratic Forms
16	May 14 May 15 May 16		Normal Wednesday Classes Normal Thursday Classes Exam Preparation Break

**Assessment (out of 300):**

- Exam 1: 75 (Wednesday 20 February 2023, 6:30 PM, Sections 1.1 – 2.3)
- Exam 2: 75 (Wednesday 29 March 2023, 6:30 PM, Sections 3.1 – 4.3)
- HW/Quizzes: 50
- Final Exam: 100 (TBA, Comprehensive)

**Attendance and Academic Integrity:** All KFUPM policies regarding attendance and ethics apply to this course. (See the Undergraduate Bulletin.)