Department of Mathematics and Statistics

Syllabus of **MATH 280 (162)**

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Course: MATH 280

Title: Introduction to Linear Algebra

Textbook: Linear algebra with applications, Steven J. Leon, Pearson (2014).

Objective: This course introduces the basic concepts and techniques of elementary linear algebra to students

Students Learning Outcome: Upon successful completion of this course, a student should be able to:

- Use elementary row operation to solve systems of linear equations and decide whether a square matrix is singular or nonsingular.
- Express a nonsingular matrix as a product of elementary operations.
- Evaluate the determinant of a matrix using cofactor expansion or elementary row (column) operations.
- Find the inverse of a nonsingular matrix using its adjoint and solve some systems by Cramer's method.
- Construct a basis for a given vector space and evaluate its dimension.
- Represent a linear transformation by a matrix.
- Construct an orthonormal set using the Gram-Schmidt orthogonalization process
- Determine the eigenvalues and eigenspaces of a square matrix.
- Decide whether a given square matrix is diagonalizable or not.
- Diagonalize orthogonally a real symmetric matrix.

Attendance: KFUPM attendance policy will be enforced. A **DN grade** will be awarded to any student who accumulates **9** unexcused absences.

Grading Policy:

1. Two Major Exams (2 X 20%)
2. Final Exam (35%) (Comprehensive)
3. Homework (10%)
4. MATLAB projects (10%)
5. Participation (in Class/ Online) (5%)

Academic Integrity: All KFUPM policies regarding ethics apply to this course.

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Week	Section	Material
1	1.1 1.2	Systems of linear equations Row echelon form
2	1.3 1.4	Matrix arithmetic Matrix algebra
3	1.5	Elementary matrices
4	2.1 2.2 2.3	The determinant of a matrix Properties of determinants Additional topics and applications
5	3.1 3.2	Vector space: Definition and examples Subspaces
Exam I: Wednesday March 15, 2017 (1.1- 3.2)		
6	3.3 3.4	Linear independence Basis and dimension
7	3.5 3.6	Change of basis Row space and column space
8	4.1 4.2	Linear transformations Matrix representations of linear transformations
Midterm Vacation: April 2-8		
9	4.3 5.1	Similarity Orthogonality
10	5.2 5.4	Orthogonal subspaces Inner product spaces
Exam II: Wednesday April 26, 2017 (3.3- 5.2)		
11	5.5	Orthonormal sets
12	5.6 5.7	The Gram-Schmidt orthogonalization process Orhogonal polynomials
13	6.1	Eigenvalues and eigenvectors
14	6.3	Diagonalization
15	6.6	Quadratic forms
Final Exam: 9:00 pm, Monday June 5, 2017 (comprehensive)		