Mathematics Department, KFUPM

Math 550 Syllabus (Term 231)

Instructor: Abdulilah Kadri
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Course Title: Linear Algebra **Course Credit Hours:** 3-0-3

Course Description:

Basic properties of vector spaces and linear transformations, characteristic values and diagonalizable operators, invariant subspaces and triangulable operators. The Primary Decomposition Theorem, cyclic decompositions, and the Generalized Cayley-Hamilton Theorem. Rational and Jordan forms, inner product spaces. The Spectral Theorem, bilinear forms, symmetric and skew symmetric bilinear forms.

Prerequisite: Graduate Standing

Textbooks:

Linear Algebra, by K. Hoffman & R. Kunze, Second Edition.

Linear Algebra Done Right, by S. Axler, Third Edition.

Grading Policy:

Homework	15%
Exam 1	25%
Exam 2	25%
Final Exam	35%

Course Schedule:

Week	Sections	Topics
1	1.1, 2.1, 2.2	Fields, Vector Spaces, Subspaces
	2.3	Bases and Dimension
2	2.4	Coordinates
	3.1	Linear Transformations
3	3.2, 3.3	The Algebra of Linear Transformations, Isomorphism
	3.4	Representation of Transformations by Matrices
4	3.5	Linear Functionals
	3.6, 3.7	The Double Dual, The Transpose of a Linear Transformation
5	6.1, 6.2	Introduction, Characteristic Values
	6.3	Annihilating Polynomials
6	6.4	Invariant Subspaces
	6.5, 6.6	Simultaneous Triangulation/Diagonalization, Direct-Sum Decomposition
7	6.7, 6.8	Invariant Direct Sums, The Primary Decomposition Theorem
8	7.1, 7.2	Cyclic Subspaces and Annihilators, Cyclic Decompositions and the Rational Form
9	7.3	The Jordan Form
	7.4	Computation of Invariant Factors
10	7.5	Summary; Semi-Simple Operators
11	8.1, 8.2	Inner Products, Inner Product Spaces
12	8.3	Linear Functionals and Adjoints
	8.4	Unitary Operators
13	8.5	Normal Operators
	9.5	Spectral Theory
14	10.1	Bilinear Forms
	10.2	Symmetric Bilinear Forms
15	10.3	Skew-Symmetric Bilinear Forms