King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
SYLLABUS
Semester I, 2015-2016 (**151**)
(Dr. Jawad Abuhlail)

Course #:	Math 550
Title:	Linear Algebra
Prerequisites	Math 280 (Introduction to Linear Algebra)
Textbook:	Linear Algebra: by K. Hoffman & R. Kunze, 2nd edition, Prentice-Hall (1971).
Description:	Basic properties of vector spaces and linear transformations, algebra of polynomials, 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.

Week	Date(s)	Lecture	Section(s)	Topics
1	Aug. 23 – 25	Lecture 1	1.1, 2.1, 2.2 (review)	Fields, Vector Spaces, Subspaces
		Lecture 2	2.3	Bases and Dimension
2	Aug. 30 – Sep. 1	Lecture 3	2.4	Coordinates
		Lecture 4	3.1	Linear Transformations
3	Sep. 6 – 8	Lecture 5	3.2, 3.3	The Algebra of Linear Transformations, Isomorphism
		Lecture 6	3.4	Representations of Transformations by Matrices
4	Sep. 13 – 15	Lecture 7	3.5	Linear Functionals,
		Lecture 8	3.6, 3.7	The Double Dual, The Transpose of a Linear Transformation
Id al-Adha Vacation**: September 18 – 28, 2015**				
5	Sep. 29	Lecture 9	**First Major: Tuesday 29.9.2015 (6:30 – 8:30 pm)**	
6	Oct. 4 – 6	Lecture 10	6.1, 6.2	Introduction, Characteristic Values
		Lecture 11	6.3	Annihilating Polynomials
7	Oct. 11 – 13	Lecture 12	6.4	Invariant Subspaces
		Lecture 13	6.5	Simultaneous Triangulation; Simultaneous Diagonalization
8	Oct. 18 – 20	Lecture 14	6.6, 6.7	Direct-Sum Decompositions, Invariant Direct Sums
		Lecture 15	6.8	The Primary Decomposition Theorem
9	Oct. 25 – 27	Lecture 16	7.1	Cyclic Subspaces and Annihilators
		Lecture 17	7.2	Cyclic Decompositions and the Rational Form
10	Nov. 1 – 3	Lecture 18	7.3	The Jordan Form
		Lecture 19	7.4	Computation of Invariant Factors
11	Nov. 8 – 10	Lecture 20	7.5	Summary; Semi-simple Operators
		Lecture 21	**Second Major: Tuesday 3.11.2015 (6:30 – 8:30 pm)**	
12	Nov. 15 – 17	Lecture 22	8.1	Inner Products
		Lecture 23	8.2	Inner Product Spaces
13	Nov. 22 – 24	Lecture 24	8.3	Linear Functionals and Adjoints
		Lecture 25	8.4	Unitary Operators
14	Nov. 29 – Dec. 1	Lecture 26	8.5	Normal Operators
		Lecture 27	9.5 (partly)	Spectral Theory
15	Dec. 6 – Dec. 8	Lecture 28	10.1, 10.2	Bilinear Forms, Symmetric Bilinear Forms
		Lecture 29	10.3	Skew-Symmetric Bilinear Forms
16	Dec. 13	Lecture 30		Revision
			Final Exam: **Monday 21.12.2015 (7:00 – 10:00 pm).**	

Grading Policy:

First Major	**25%**	Assignments	**10%**
Second Major	**25%**	Final (Comprehensive)	**40%**