MATH 550 Linear Algebra

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.

TEXTBOOKS

[**HK**]   Linear Algebra, by K. Hoffman – R. Kunze, Second Edition.
[**A**]   Linear Algebra Done Right, by S. Axler, Third Edition.

SYLLABUS

Week	Dates (2021)	Sections	Topics
1	Aug 29 – 31	1.1, 2.1, 2.2 2.3	Fields, VECTOR SPACES. Subspaces (Review) Bases and Dimension
2	Sept 05 – 07	2.4 3.1	Coordinates LINEAR TRANSFORMATIONS.
3	Sept 12 – 14	3.2-3.3 3.4	The Algebra of Linear Transformations, Isomorphisms Representation of Transformations by Matrices
4	Sept 19 – 21	3.5 3.6-3.7	Linear Functionals The Double Dual, The Transpose of a Linear Transformation
5	Sept 26 – 28	6.1-6.2 6.3	ELEMENTARY CANONICAL FORMS. Characteristic Values Annihilating Polynomials
6	Oct 03 – 05	6.4 6.5-6.6	Invariant Subspaces Simultaneous Triangulation/Diagonalization, Direct-Sum Decomposition
7	Oct 10 – **12**	6.7-6.8	Invariant Direct Sums, The Primary Decomposition Theorem
	Major Exam 1		
-	**Sunday Oct 17**	**-**	**STUDENT BREAK**
8	Oct 19	7.1-7.2	THE RATIONAL AND JORDAN FORMS. Cyclic Subspaces and Annihilators, Cyclic Decompositions and the Rational Form
9	Oct 24 – 26	7.3 7.4	The Jordan Form Computation of Invariant Factors
10	Oct 31 – Nov 02	7.5	Summary, Semi-simple Operators
11	Nov 07 – 09	8.1-8.2	INNER PRODUCT SPACES. Inner Products, Inner Product Spaces
12	Nov 14 – **16**	8.3 8.4	Linear Functionals and Adjoints Unitary Operators
	Major Exam 2		
13	Nov 21 – 23	8.5 9.5	Normal Operators Spectral Theory
-	**Nov 28 – Dec 02**	**-**	**MIDTERM BREAK**
14	Dec 05 – 07	10.1 10.2	BILINEAR FORMS Symmetric Bilinear Forms
15-16	Dec 12 – 14 Dec. 19	10.3	Skew-Symmetric Bilinear Forms
	Final Exam		