

MATH 433 – Honors Introduction to (Linear) Algebra

Week	Day	Ch.	Sec.	Topics
8/24 – 25	1	1	1, 2	Problems leading to linear algebra, mathematical induction.
8/28 – 9/1	2	2	3, 4	Fields, Vector spaces, examples; Subspaces, Linear dependence.
	3	2	5, 6	Basis and dimension; Row equivalence of matrices.
	4	2	6, 7	Finish row equiv.; General theorems.
9/3 – 9/8	5	2	7, 8	General theorems; Systems of linear equations.
	6	2	9, 10	Systems of homogeneous linear equations; Linear manifolds.
	7	3	11	Linear Transformations
9/11 – 9/15	8	3	11, 12	Linear Transformations and operations with matrices.
	9	3	13	The matrix of a linear transformation.
	10	4	14	Concept of symmetry
9/18 – 9/22	11	4	14, 15	Inner Products
	12	4	15	Inner Products, orthonormal basis, Gram-Schmidt process
	13	5	16, 17	Definition, existence and uniqueness of determinants
9/25 – 9/29	14	5	17, 18	Existence, uniqueness, multiplication theorem
	15	5	18	Multiplication theorem
	16	5	19	Properties of determinants
10/2 – 10/6	17	5	19	Properties of determinants
	18	6	20, 21	Polynomials and Complex Numbers
	19	6	21	Polynomials and Complex Numbers
10/9 – 13				FALL BREAK
	20	7	22	Basic concepts: minimal polynomial, eigenvalues, eigenvectors
	21	7	23	Invariant Subspaces, diagonalizable transformations
10/16 – 20	22	7	23, 24	Diagonalization, the triangular form theorem
	23	7	24	Triangular forms
	24	7	25	Rational and Jordan Canonical forms
10/23 – 27	25	7	25	Rational and Jordan Canonical forms
	26	8	25, 26	Canonical forms; Quotient spaces
	27	8	26	Quotient spaces
10/30 – 11/3	28	8	26	Dual vector spaces
	29	8	27	Bilinear forms and duality
	30	8	28	Direct sums and tensor products
11/6 – 10	31	8	28	Tensor products
	32	8	29	A proof of the elementary divisor theorem
	33	8	29	A proof of the elementary divisor theorem
11/13 – 17	34	9	30	Orthogonal transformations
	35	9	30, 31	Orthogonal transformations and the principal axis theorem.
	36	9	31	The principal axis theorem
11/20 – 24	37	9	32	Unitary transformations
	38	9	32	The spectral theorem
				THANKSGIVING
11/27 – 12/1	39	9	32	The spectral theorem
	40	10	33	Applications of linear algebra
	41	10	34	Applications of linear algebra