Math 20580 Fall 2024

Introduction to Linear Algebra and Differential Equations

Approximate Schedule

Week 1	Aug 28	**Poole** 2.1, 2.2: Systems of Linear Equations, Row Reduction & Echelon Form
	30	2.2: Gauss-Jordan elimination, Reduced Echelon Form, & Free and Leading Variables
Week 2	Sept 02	2.3, 3.1, 3.3: Spans & Matrix Operations
	04	3.6: Linear Transformations
	06	2.3, 3.5: Linear Independence & Subspaces
Week 3	09	3.5: Row, Column, Null space of a Matrix & Basis for a Subspace
	11	3.5: Dimension, Rank, & Nullity
	** 13	6.3: Coordinate Systems in $\mathbb{R}^n$ – NO CLASS. Instead, a VIDEO will be available.
Week 4	16	6.3: Change of Basis
	18	6.1: Vector Spaces & Subspaces
	20	6.2: Linear Independence, Basis, & Dimension of a Vector Space
Week 5	23	6.2: More on Linear Independence, Basis, & Dimension of a Vector Space
	24	*Exam I* – 8:00–9:15am.
	25	6.4: Linear Transformations Between Vector Spaces
	27	6.2, 6.5: Kernel & Range, Isomorphisms, & Coordinates in a Vector Space
Week 6	30	6.3, 6.6: Change of Basis in a Vector Space & The Matrix of a Linear Transformation
	Oct 02	6.6: More on the Matrix of a Linear Transformation
	04	4.2: Introduction to Determinants
Week 7	07	4.2: Determinants & Cramer's Rule
	09	4.1, 4.3: Eigenvectors and Eigenvalues of a Linear Transformation
	11	4.4: Similarity of Matrices
Week 8	14	4.4 Diagonalization of a Matrix
	16	4.1, 4.3: Complex Eigenvalues
	18	1.2, 5.1, 5.2: Inner Product, Length, Orthogonality & Orthogonal Complements
	21	
	23	*Fall Break*
	25	
Week 9	28	5.1, 5.2: Orthogonal Projections & Orthonormal Sets
	30	5.1, 5.2: More on Orthogonal Projections & Orthonormal Sets
	31	*Exam II* – 8:00–9:15am.
	Nov 01	5.3: Orthonormal Sets, The Gram-Schmidt Process, & Intro to QR Factorization
Week 10	04	5.3, 7.3: QR Factorization & Least Squares Solutions to Inconsistent Equations
	06	7.3: More on Least Squares Solutions to Inconsistent Equations
	08	**Zill** 1.1, 1.2: Classification of Differential Equations, Solutions, & Initial Value Problems
Week 11	11	2.1, 2.2: Direction Fields, Autonomous Equations, & Separable Equations
	13	2.3, 2.4: Linear First Order ODEs & Intro to Exact Equations
	15	2.4, 3.1: Exact Equations & Modeling with First Order ODEs
Week 12	18	2.4, 3.1: More on Exact Equations & Modeling with First Order ODEs
	19	*Exam III* – 8:00–9:15am.
	20	4.1: Second Order Linear ODEs
	22	4.1, 4.2: Solving Second Order ODEs, Wronskians, & Reduction of Order
Week 13	25	4.3: Second Order Homogeneous Equations with Constant Coefficients
	27	*Thanksgiving Break*
	29	*Thanksgiving Break*
Week 14	Dec 02	4.4 Nonhomogeneous Equations & Solutions Via The Method of Undetermined Coefficients
	04	4.4, 4.6: The Methods of Undetermined Coefficients & Variation of Parameters
	06	4.6: More on the Method of Variation of Parameters
Week 15	Dec 09	5.1: Mechanical Vibrations
	11	5.1: More on Mechanical Vibrations
	13	Reading day – no class
	18	*Final Exam* – 1:45–3:45pm.