Math 2114: Introduction to Linear Algebra
Spring 2022

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Office Hours:	TBD other times by appointment
Text:	*Linear Algebra: A Modern Introduction*, 4th ed. by Poole (w/ WebAssign access)
Supplemental Text:	*Elementary Linear Algebra*, 8th ed. by Larson
Canvas:	https://canvas.vt.edu
WebAssign Site:	https://www.webassign.net
Course Website:	https://www.math.vt.edu/undergrad-math/courses/math-2114.html

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Course Content and Delivery:
This course covers: Vector and matrix algebra, systems of linear equations, linear equations, linear independence, bases, matrices, determinants, eigenvalues and eigenvectors, orthonormal bases, rank, linear transformations, diagonalization, and some applications of all of the above. This is an *in-person course*; videos will be made available in extenuating circumstances.

Per Math Department policy, no further specifics of this course policy sheet may be made publicly available.

Tentative Schedule

Week 1 M.L.K. Junior Day
§1.1 - The Geometry and Algebra of Vectors
§1.2 - Length and Angle: The Dot Product
§2.1 - Introduction to Linear Systems

Week 2 §1.2 - Length and Angle: The Dot Product
§2.1 - Introduction to Linear Systems
§2.2 - Direct Methods for Solving Linear Systems

Week 3 §2.2 - Direct Methods for Solving Linear Systems
§2.3 - Spanning Sets and Linear Independence

Week 4 §2.3 - Spanning Sets and Linear Independence
Exam 1 Review
Exam 1

Week 5 §3.1 - Matrix Operations
§3.2 - Matrix Algebra
§3.3 - The Inverse of a Matrix

Week 6 §3.3 - The Inverse of a Matrix
§3.5 - Subspaces, Basis, Dimension, and Rank

Week 7 §3.5 - Subspaces, Basis, Dimension, and Rank
§6.3 - Change of Basis
§3.6 - Introduction to Linear Transformations

Week 8 Spring Break

Week 9 §3.6 - Introduction to Linear Transformations
Exam 2 Review
Exam 2

Week 10 §6.6 - The Matrix of a Linear Transformation (in a Nonstandard Basis)
§4.1 - Introduction to Eigenvalues and Eigenvectors
§4.2 - Determinants

Week 11 §4.2 - Determinants
§4.3 - Eigenvalues and Eigenvectors of $n \times n$ Matrices
§4.4 - Similarity and Diagonalization

Week 12 §4.4 - Similarity and Diagonalization

§3.7 - Applications (Markov Chains)

Week 13 §4.6 - Applications (Differential Equations)
Exam 3 Review

Exam 3

Week 14 §5.1 - Orthogonality in $\mathbb{R}^n$
§5.2 - Orthogonal Complements and Projections

Week 15 §5.3 - The Gram–Schmidt Process and QR-Factorization
§7.3 - Least Squares

Week 16 Mock Final Exam
Final Exam Review