

Beyond AP Calculus

		UNIT	Standards Addressed
Term 1	Linear Algebra	Unit 1: Linear Algebra	<ol style="list-style-type: none"> Systems of Linear Equations Row Reduction and Echelon Forms Vector Equations The Matrix Equation $Ax=b$ Solution Sets of Linear Systems Linear Independence Introduction to Linear Transformations The Matrix of a Linear Transformation
		Unit 2: Matrix Algebra	<ol style="list-style-type: none"> Matrix Operations The Inverse of a Matrix Characterizations of Invertible Matrices Matrix Factorizations
		Unit 3: Determinants	<ol style="list-style-type: none"> Introduction to Determinants Properties of Determinants Cramer's Rule, Volume, and Linear Transformations
		Unit 4: Vector Spaces	<ol style="list-style-type: none"> Vector Spaces and Subspaces Null Spaces, Column Spaces, and Linear Transformations Linearly Independent Sets; Bases Coordinate Systems The Dimension of a Vector Space Rank Change of Basis
		Unit 5: Eigenvalues and Eigenvectors	<ol style="list-style-type: none"> Eigenvectors and Eigenvalues The Characteristic Equation Diagonalization
Term 2		Unit 6: Orthogonality	<ol style="list-style-type: none"> Inner Product, Length and Orthogonality Orthogonal Sets Orthogonal Projections The Gram – Schmidt Process Diagonalization of Symmetric Matrices
	DE Multivariable Calculus	Unit 1: Vectors and the Geometry of Space	<ol style="list-style-type: none"> Three-Dimensional Coordinate Systems Vectors The Dot Product The Cross Product Equations of Lines and Planes Functions and Surfaces Cylindrical and Spherical Coordinates

Beyond AP Calculus cont.

		UNIT	Standards Addressed
Term 2		Unit 2: Vector Functions	1. Vector Functions and Space Curves 2. Derivatives and Integrals of Vector Functions 3. Arc Length and Curvature 4. Motion in Space: Velocity and Acceleration 5. Parametric Surfaces
			1. Functions of Several Variables 2. Limits and Continuity 3. Partial Derivatives 4. Tangent Planes
Term 3	DE Multivariable Calculus	Unit 3: Partial Derivatives	5. The Chain Rule 6. Directional Derivatives and the Gradient Vector 7. Maximum and Minimum Values 8. Lagrange Multipliers
		Unit 4: Multiple Integrals	1. Double Integrals over Rectangles 2. Iterated Integrals 3. Double Integrals over General Regions 4. Double Integrals in Polar Coordinates 5. Applications of Double Integrals 6. Surface Area 7. Triple Integrals 8. Triple Integrals in Cylindrical and Spherical Coordinates 9. Change of Variables in Multiple Integrals
		Unit 5: Vector Calculus	1. Vector Fields 2. Line Integrals 3. The Fundamental Theorem for Line Integrals 4. Green's Theorem 5. Curl and Divergence 6. Surface Integrals 7. Stoke's Theorem 8. The Divergence Theorem
	DE Differential Equations	Unit 1: First Order Differential Equations	1. Introduction to Differential Equations 2. First Order Linear Differential Equations 3. Exact Equations 4. Substitution and Transformation

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		UNIT	Standards Addressed
Term 4	DE Differential Equations	Unit 1: First Order Differential Equations	<ol style="list-style-type: none"> 1. Introduction to Differential Equations 2. First Order Linear Differential Equations 3. Exact Equations 4. Substitution and Transformation
		Unit 2: Second Order Differential Equations	<ol style="list-style-type: none"> 1. Homogeneous 2nd Order Differential Equations 2. Nonhomogeneous 2nd Order Differential Equations Method of Variation of Parameters Method of Undetermined Coefficients
		Unit 3: LaPlace Transforms	<ol style="list-style-type: none"> 1. LaPlace Transformations (Definition) 2. Inverse LaPlace Transforms 3. Solve a Differential Equation by LaPlace Transforms 4. Solve a System of Differential Equations by LaPlace Transforms
		Unit 4: Power Series Solutions and Diagonalization	<ol style="list-style-type: none"> 1. Taylor Series Solutions to Differential Equations 2. Power Series Solutions to Differential Equations 3. Diagonalization
		Unit 5: Numerical Methods and Maple	<ol style="list-style-type: none"> 1. Euler's Method 2. Heun's Method 3. Nystrom's Method 4. Three-Term Taylor Series Method 5. Runge-Kuta

Major Assignments	Unit Tests
Field Trips	No Field Trips
Instructional Materials	Canvas