

**Departmental Syllabus**  
**Math 2840 -- Calculus and Analytic Geometry III**

**Textbook:** Calculus (Sixth Edition), by James Stewart

**Prerequisites:** MATH 2740 with a grade of "C" or better, or a score of 4 or 5 on the Advanced Placement BC examination.

**Calculators:** Graphing calculator required; TI-83, 84, 85 or 86 recommended.  
(NOTE: On occasion, individual instructors may restrict the use of any type of calculator).

**Course Description:** Analytic geometry of three dimensions, vector analysis, partial differentiation, multiple integrals, and line integrals.

**Topics and sections to be covered:**

**Chapter 13 – Vectors and the Geometry of Space**

- 13.1 Three-Dimensional Coordinate Systems
- 13.2 Vectors
- 13.3 The Dot Product
- 13.4 The Cross Product
- 13.5 Equations of Lines and Planes
- 13.6 Cylinders and Quadric Surfaces

**Chapter 14 – Vector Functions**

- 14.1 Vector Functions and Space Curves
- 14.2 Derivatives and Integrals of Vector Functions
- 14.3 Arc Length and Curvature
- 14.4 Motion in Space: Velocity and Acceleration

**Chapter 15 – Partial Derivatives**

- 15.1 Functions of Several Variables
- 15.2 Limits and Continuity
- 15.3 Partial Derivatives
- 15.4 Tangent Planes and Linear Approximations
- 15.5 The Chain Rule
- 15.6 Directional Derivatives and the Gradient Vector
- 15.7 Maximum and Minimum Values
- 15.8 Lagrange Multipliers

**Chapter 16 – Multiple Integrals**

- 16.1 Double Integrals over Rectangles
- 16.2 Iterated Integrals

- 16.3 Double Integrals over General Regions
- 16.4 Double Integrals in Polar Coordinates
- 16.5 Applications of Double Integrals
- 16.6 Triple Integrals
- 16.7 Triple Integrals in Cylindrical Coordinates
- 16.8 Triple Integrals in Spherical Coordinates
- 16.9 Change of Variables in Multiple Integrals

**Chapter 17 – Vector Calculus**

- 17.1 Vector Fields
- 17.2 Line Integrals
- 17.3 The Fundamental Theorem for Line Integrals
- 17.4 Green's Theorem
- 17.5 Curl and Divergence (optional)
- 17.6 Parametric Surfaces and Their Areas (optional)