

Departmental Syllabus
Math 2640 -- Calculus and Analytic Geometry I

Textbook: Single Variable Calculus (Sixth Edition), by James Stewart

Prerequisites: MATH 2450 or MATH 2530 with a grade of "C" or better, or mathematics proficiency level of 40.

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: Limits and continuity, differentiation, differentials, antiderivatives, the definite integral and applications.

Topics and sections to be covered:

(Chapter 1 consists of precalculus topics which most instructors will cover on an "as needed" basis throughout the course).

Chapter 2 – Limits

- 2.1 The Tangent and Velocity Problems
- 2.2 The Limit of a Function
- 2.3 Calculating Limits Using the Limit Laws
- 2.5 Continuity

Chapter 3 – Derivatives

- 3.1 Derivatives and Rates of Change
- 3.2 The Derivative as a Function
- 3.3 Differentiation Formulas
- 3.4 Derivatives of Trigonometric Functions
- 3.5 The Chain Rule
- 3.6 Implicit Differentiation
- 3.7 Rates of Change in the Natural and Social Sciences
- 3.8 Related Rates
- 3.9 Linear Approximations and Differentials

Chapter 4 – Applications of Differentiation

- 4.1 Maximum and Minimum Values
- 4.2 The Mean Value Theorem
- 4.3 How Derivatives Affect the Shape of a Graph
- 4.4 Limits at Infinity; Horizontal Asymptotes
- 4.5 Summary of Curve Sketching
- 4.6 Graphing with Calculus and Calculators (review purposes only)

- 4.7 Optimization Problems
- 4.8 Newton's Method
- 4.9 Antiderivatives

Appendix E

Sigma Notation

Chapter 5 -- Integrals

- 5.1 Areas and Distances
- 5.2 The Definite Integral
- 5.3 The Fundamental Theorem of Calculus
- 5.4 Indefinite Integrals and the Net Change Theorem
- 5.5 The Substitution Rule

Chapter 6 – Applications of Integration

- 6.1 Areas Between Curves
- 6.2 Volumes
- 6.3 Volumes by Cylindrical Shells
- 6.4 Work
- 6.5 Average Value of a Function (optional)

Chapter 9 – Further Applications of Integration

- 9.3 Applications to Physics and Engineering (Hydrostatic Force and Pressure)