

Departmental Syllabus

(A guide for MATH 241 instructors)

Text: Stewart, J., *MATH 241/242/243 — University of Delaware*, Thomson, 2008, ISBN: 0-495-47922-5 (custom UD version).

- The use of calculators on exams is prohibited.
- It is expected that the textbook topics which follow will be covered.

Chapter 1: Functions and Models

- 1.5 Exponential Functions (review)
- 1.6 Inverse Functions and Logarithms (review)

Chapter 2: Limits and Derivatives

- 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
- 2.6 Limits at Infinity: Horizontal Asymptotes
- 2.7 Derivatives and Rates of Change
- 2.8 The Derivative as a Function

Chapter 3: Differentiation Rules

- 3.1 Derivatives of Polynomials and Exponential Functions
- 3.2 The Product and Quotient Rules
- 3.3 Derivatives of Trigonometric Functions
- 3.4 The Chain Rule
- 3.5 Implicit Differentiation
- 3.6 Derivatives of Logarithmic Functions

- 3.8 Exponential Growth and Decay
- 3.9 Related Rates
- 3.10 Linear Approximations and Differentials (*Do linear approximations*)
- 3.11 Hyperbolic Functions (*Don't cover inverse hyperbolic functions*)

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
- 4.7 Optimization Problems
- 4.9 Antiderivatives

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 9: Differential Equations

- 9.4 Models for Population Growth
- 9.6 Predator-Prey Systems (*optional*)