



## **CALCULUS I**

21:640:135 (4 credits)

### **COURSE DESCRIPTION:**

Functions, limits, continuity, the derivative and rules for differentiation, applications, introduction to definite and indefinite integration, calculus of exponential and logarithmic functions, calculus of trig and inverse trig functions.

### **PREREQUISITE:**

21:640:114 (Precalculus) or placement by examination.

### **IMPORTANT NOTE:**

Credit NOT given for both 21:640:119 (Basic Calculus) and 21:640:135 (Calculus I.)

### **TEXTBOOK:**

"Calculus Early Transcendentals Single Variable with My Math Lab," 3<sup>rd</sup> edition, by Briggs, published by Pearson. ISBN 9780134996714.

**DEPARTMENT WEBSITE:** <http://www.ncas.rutgers.edu/math>

**FREE TUTORING:** is available in the Rutgers Learning Center, Room 140 Bradley Hall (973-353-5608.)

### **THIS COURSE COVERSTHE FOLLOWING CHAPTERS AND SECTIONS:**

*The following topics will be covered, not necessarily in the order given. In particular, some material from Chapter 2 (Limits) may be integrated into the discussion of the derivative and its applications. Elementary material from Chapter 1 will be reviewed as necessary.*

#### Chapter 2: Limits

2.1 The Idea of Limits

2.2 Definitions of Limits

2.3 Techniques for Computing Limits

2.4 Infinite Limits (integrated into later sections, e.g. 3.8, 3.9, 4.3, 4.7)

2.5 Limits at Infinity (integrated into later sections, e.g. 3.8, 3.9)

2.6 Continuity

### Chapter 3: Derivatives

- 3.1 Introducing the Derivative
- 3.2 The Derivative as a Function
- 3.3 Rules of Differentiation
- 3.4 The Product and Quotient Rules
- 3.5 Derivatives of Trigonometric Functions
- 3.6 Derivatives as Rates of Change (1<sup>st</sup> part)
- 3.7 The Chain Rule
- 3.8 Implicit Differentiation
- 3.9 Derivatives of Logarithmic and Exponential Functions
- 3.10 Derivatives of Inverse Trigonometric Functions
- 3.11 Related Rates

### Chapter 4: Applications of the Derivative

- 4.1 Maxima and Minima
- 4.2 Mean Value Theorem
- 4.3 What Derivatives Tell Us
- 4.4 Graphing Functions
- 4.5 Optimization Problems
- 4.6 Linear Approximation and Differentials (cover just last subsection, i.e. "Differentials")
- 4.7 L'Hôpital's Rule
- 4.9 Antiderivatives

### Chapter 5: Integration

- 5.1 Approximating Area under Curves
- 5.2 Definite Integrals
- 5.3 Fundamental Theorem of Calculus
- 5.4 Working with Integrals
- 5.5 Substitution Rule

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