



## Math 234: Calculus for Business (4 credit hours)

### Course Description

This is a standard course in Calculus with an emphasis on applications to business. Topics for this course include functions, limits, continuity, the derivative, differentiation of functions with applications, exponential and logarithmic models, integration, Riemann sums, and the Fundamental Theorem of Calculus.

Prerequisite: College Algebra

### Course Objectives

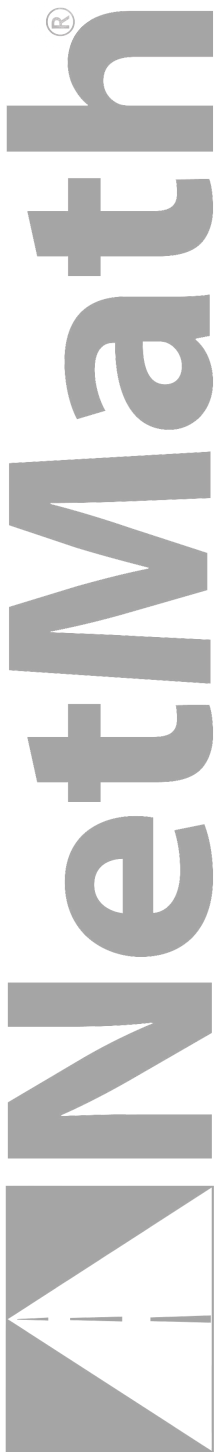
After completing this course a successful student will be able to understand and apply the topics listed above. He/she will also be able to utilize numerical, computational, and estimation techniques and devise methods of measurement. Through exploration, a successful student will be able to use concepts and relationships to describe and model mathematical ideas with business applications. Most importantly, a student completing this course will be able to communicate mathematical ideas through descriptive language as well as mathematical symbols.

### Course Content and Format

#### *Content*

A brief outline of topics for this course appears below:

- Growth
  - Linear, power, and exponential functions
  - Interpolation of data and dominant terms in the global scale
- Logs and Exponentials
  - Doubling time and half-life
  - Exponential models and finance
- Instantaneous Growth Rate
  - Finding the limiting case of average growth rates
  - Calculating derivatives using the instantaneous growth rate formula
- Rules of Derivatives
  - How product and chain rule are related
  - Calculating instantaneous percentage growth rate
  - Discovering max and min of a function and/or its graph/model



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- Differential Equations
  - Applications including carbon dating and business sales
  - Applying the Race Track principle and Euler's faker
- Parametric Plotting
  - Plotting ellipses, curves, and surfaces
  - Applications including projectile motion
- Integrals for Measuring Area
  - Properties of Integrals and area formulas
  - Integration using Trapezoidal rule and Riemann sums
- The Fundamental Theorem of Calculus
  - Defining and applying the theorem to distance, velocity, and acceleration
  - Finding the area between two curves
  - Relating the fundamental formula to differential equations
- Measurements
  - Measuring area, volume, density, mass
  - Approximating arc length and finding accumulated growth
- Transforming Integrals
  - Measuring area inside closed curves
  - Polar measurements
- 2D Integrals
  - Gauss-Green Formula
  - Area and volume measurements with calculation strategies
- Integral Techniques
  - Integration by parts
  - Solving differential equations through separation of variables

*Format*

Course content is drawn from *Calculus & Mathematica* written by Bill Davis, Horacio Porta and Jerry Uhl ©2006-2010.

Math 234 utilizes the CAS-ILE system. See <https://cas-ile.illinois.edu/> for more information. This online system helps students learn math topics through dynamic exploration and visualization.

Exams for Math 234 are taken online.