

# MATH 151 – Calculus for management – SYLLABUS

Department of Mathematics  
Millersville University

## Description

Elementary calculus and its applications in business, economics, life and social sciences. Functions, limits and continuity. The derivative, applications in marginal analysis, optimization, differentials and error estimation. Antiderivatives, area under a curve and definite integrals; integration by parts. Exponential and logarithm functions; applications to growth and decay problems. Improper integrals. No credit toward a major or minor in mathematics. (4 credits)

This course may be taken for general education credit (G2)

## Prerequisites

C- or better in MATH 101 or math placement testing/evaluation before registration.

## Course Objectives

Students will become proficient in applying the techniques of calculus to problem solving situations. By the conclusion of this course the successful student will be able to:

- evaluate limits algebraically, graphically and numerically,
- solve problems involving the derivative, its definition, its relationship to limits, and its application to finding slopes of curves and rates of change,
- solve problems involving the fundamental formulas and techniques of differential calculus,
- solve problems involving the indefinite integral including problems requiring u-substitution and integration by parts
- solve problems involving the definite integral, its relationship to limits, and its application to finding areas,
- solve problems involving differentiating and integrating functions including polynomial, rational, exponential and logarithmic functions,
- solve problems involving the development of applications of the theoretical underpinnings of calculus,
- demonstrate understanding the notions of limits and continuity, some of the key formulas of calculus, and of some major theorems of calculus.

## Assessment

Assessment of student achievement of the course objectives will vary from one instructor to another. Typical assessment will be made through work in class, homework, and examinations.

## **Use of Technology**

Students are required to have access to a graphing calculator, preferably one supported by the department (the TI 83/83+, 84, or 86).

## **Topics**

Review of foundational topics

- Real numbers

- Equations of lines

- Nonlinear inequalities

- Functions

  - Linear, Quadratic, Polynomials, Rational

Limits and Continuity

- Concept of Limit

- Definition of Limit

- Evaluating limits, algebraically, graphically and numerically

- Continuity

Rates of Change and Derivatives

- Definition of the derivative

- Rules of Differentiation: power rule/product rule/quotient rule

- Higher Order Derivatives

- Non-differentiable functions

- Related Rates

Applications of Derivatives

- Graphing

- Optimization

- Marginal analysis and differentials

- Business and economics applications

Exponential and Logarithmic Functions

- Definitions/Derivatives

- Exponential growth and decay

- Applications

Integration

- Antiderivatives and indefinite integrals

  - General power rule

u-substitution  
Integration by parts  
Definite Integrals  
Fundamental theorem of calculus  
Area  
Applications

### **Recently Used Textbooks**

*Brief Calculus, An Applied Approach*, Tenth Edition by Larson, Cengage Learning, 2017