

Prepared by the Department of Mathematics

Date of Departmental Approval: December 6, 2017

Date Approved by Curriculum and Programs: January 31, 2018

Effective: Fall 2018

1. **Course Number:** MAT180
Course Title: Applied Calculus
2. **Description:** This course is designed for students planning to apply mathematics to management and social science topics. Topics include a review of polynomial, exponential, and logarithmic functions and their application to business, an introduction to limits, continuity and the derivative, and applications of the derivative.
3. **Student Learning Outcomes (instructional objectives, intellectual skills):** Upon successful completion of this course, students are able to do the following:
 - Perform algebraic functions.
 - Evaluate limits and continuity
 - Evaluate derivatives
 - Evaluate marginal analysis
 - Apply product, quotient and chain rules
 - Evaluate implicit differentiation and related rates
 - Evaluate differentials
 - Analyze and perform graphical derivatives
 - Evaluate concavity and perform curve sketching
 - Analyze elasticity of demand
 - Evaluate exponential, logarithmic functions and derivatives
4. **Credits:** 3 credits
5. **Satisfies General Education Requirement:** No
6. **Prerequisites:** grade of C- or higher in MAT175 (College Algebra) or satisfactory basic skills assessment score
7. **Semester(s) Offered:** Varies
8. **Suggested General Guidelines for Evaluation:** Comprehensive final exam, tests, quizzes, homework, and student math project.
9. **General Topical Outline (Optional):**
 - I. Review of Functions
 - A. Real numbers and Algebra Review
 - B. Introduction to Functions
 - C. Linear Functions
 - D. Graphs of Functions
 - E. Functions in Economics
 - G. Higher-Order Derivatives
 - H. Implicit Differentiation
 - I. Related Rates
 - J. Differentials
 - II. An Introduction to Limits
 - A. Introduction to Limits
 - B. Continuity
 - C. One-Sided Limits
 - D. Limits at Infinity
 - E. Infinite Limits
 - III. Derivatives
 - A. Introduction to the Derivative
 - B. Basic Rules for Differentiation
 - C. Rates of Change
 - D. Marginal Analysis
 - E. The Product and Quotient Rules
 - F. The Chain Rule
 - IV. Additional Applications of the Derivative
 - A. Increasing and Decreasing, Graphs, and Critical Numbers
 - B. Relative Extrema and Curve Sketching
 - C. Concavity, the Second Derivative Test, and Curve Sketching
 - D. Absolute Extrema
 - E. Applications of the Extrema
 - F. Elasticity of Demand
 - V. Exponential Functions and Logarithmic Functions
 - A. Exponential Functions
 - B. Logarithmic Functions
 - C. Differentiation of Exponential Functions
 - D. Differentiation of Logarithmic Functions