BROOME COMMUNITY COLLEGE
Binghamton, New York

COURSE TITLE APPLIED BUSINESS CALCULUS MAT 146

CLASS LECTURE HOURS 3 **LAB HOURS** 0 **CREDIT HOURS** 3

DIVISION DEAN Julia Peacock

DEPT. CHAIRPERSON Paul O'Heron **DATE** Spring 2004

PREREQUISITE: MAT 136 Intermediate Algebra and Trigonometry or equivalent.

Learning objectives of Course:
The student should be able to:

1. After a brief review :
   - Write and recognize the equations of lines and parabolas.
   - Define a function and determine the domain of a given function.
   - Graph polynomials, rational functions and functions involving radicals.
   - Find the points of intersection of two functions.
2. Understand the concept of limit and use limit rules to evaluate limits.
3. Understand the concept of continuity and find points of discontinuity of a given function.
4. Define a derivative and find derivatives of functions using the definition.
5. Understand the geometric interpretation of a derivative (slope of tangent line).
6. Use the rules of differentiation to find derivatives of more complex functions.
7. Use differentiation to solve max-min problems and to aid in curve sketching.
8. Find anti-derivatives of functions.
9. Evaluate definite integrals using the Fundamental Theorem of Calculus.
10. Understand the geometric interpretation of the definite integral (area under curve.)
11. Graph logarithmic and exponential functions.
12. Apply the properties of logarithms and exponents to solving equations (e.g., growth, compound interest, present value).
13. Differentiate and integrate logarithmic and exponential functions and apply this knowledge to solve problems in business and economics.
14. Apply differentiation (rate of change of a function) to solve problems in business and economics (e.g., marginal cost and revenue, maximization of profits.)
15. Apply integration to solve problems in business and economics (e.g., total value, expected value.)

Calculator objectives:

1. Graphing functions derived from applications to reinforce Calculus solutions.
2. Find limits graphically.
3. Find the slope of a tangent line to a curve at a specified point.
4. Graph a function and the tangent line at a specified point on the function.
5. Explain why the graphing calculator really does not draw a vertical asymptote for functions.
6. Graph a function and its derivative on the same axes.
7. Find relative extrema and inflection points of a function.
8. Evaluate definite integrals.
9. Show and determine the area under a curve.

CATALOG COURSE DESCRIPTION:

Review of analytic geometry of lines and parabolas, functions, and their graphs; limits and continuity; differentiation rules and applications; integration techniques and applications; exponential and logarithmic functions and applications. Recommended for Social Science Health science and Business students. Not for Mathematics majors or science majors in the A.S. degree program. 3 class hours; Prerequisite: MAT 136 Intermediate Algebra and Trigonometry or equivalent.

MAT 14 6
Introduction to Calculus
Course outline

Review
- Functions of a Single Variable
- Modeling
- Linear Functions
- Quadratic Functions; Parabolas
- General Polynomial Functions
- Rational Functions
- Function Composition
- Intersection of Graphs

Limits and Continuity
- The Limit of a Function
- Limits Involving Infinity and One-Sided Limits
- Continuity
- Average and Instantaneous Rates of Change

Differentiation
- Definition of Derivative
- Basic Rules of Differentiation
- The Chain Rule
- The Product and Quotient Rules
- Marginal Analysis in Business and Economics

Applications of the Derivative
- Relative Maximum and Minimum Values of a Function
- Absolute Extreme Values
- The First Derivative Test
- The Second Derivative Test
- Applications to Curve Sketching
- Applied optimization Problems
- Increasing and Decreasing Functions

The Exponential and Logarithmic Functions
- The Exponential Function
- Compound Interest
- The Logarithmic Function
- Derivatives of the Exponential and Logarithmic Functions
- Applications of the Exponential Function

Antidifferentiation and the Definite Integral
- Antiderivatives
- Integration by Substitution

The Definite Integral
- Area Under a Curve
- Fundamental Theorem of Calculus
- Applications