MATHEMATICS 170

CALCULUS FOR BUSINESS, BEHAVIORAL & SOCIAL SCIENCES

I.  Introduction

   A.  Catalog Description

   This course takes a problem-solving approach to the concepts and techniques of single variable differential calculus, with an introduction to multivariate topics.  Applications are selected primarily from business and the behavioral and social sciences.  Students will not receive credit for MATH 170 if they have already taken MATH 181 and/or MATH 280, without prior permission of the department.  This course is not intended for mathematics majors, but is a recommended course for students going on to graduate school in business, some social sciences, or desiring more quantitative courses in their studies.  Students who have received credit for MATH 258 may not receive credit for MATH 170.  *Prerequisite: Three years of high school mathematics.*   Satisfies the Mathematical Approaches core requirement.  Offered Spring term only.

   B.  Objectives

   Students will learn the concepts and techniques of calculus needed for solving problems selected primarily from business and the behavioral and social sciences.  Students will learn to use technology appropriate for problem solving using elementary functions.

   C.  Prerequisites

   Three years of high school mathematics.

II.  Required Topics

   A.  Functions

      1.  Definition of a function

      2.  Multiple representations of functions

         • Symbolic

         • Graphical

         • Numerical

      3.  Algebra of functions

      4.  Review of certain functions

         • polynomial functions

         • power functions

         • rational functions

      5.  Finding zeros of functions

   B.  Limits and Continuity

         • Intuitive idea of a limit of a function

         • Definition of continuity of a function at a point.

         • Consequences of continuity

- Intermediate Value theorem
- Extreme Value theorem
- Bisection method

C. The Derivative

1. Definition
2. Interpretation
   - Slope of a curve at a point
   - Rate of change
3. Differentiability and Continuity
4. Rules of differentiation
5. Applications
   - Curve sketching
   - Optimization Problems
   - Implicit differentiation and Related Rates

D. The Exponential and Logarithm Functions

1. Exponential Functions and their derivatives
2. Logarithm Functions and their derivatives
3. Exponential Growth and Decay

E. Multivariate Calculus

1. Functions of Several Variables
2. Partial Differentiation
3. Maxima and Minima
4. The Method of Lagrange Multipliers

III. Optional Topics

A. An introduction to integral calculus.

IV. Bibliography

Lial, Miller & Greenwell        Calculus with Applications, Brief Version, Addison Wesley

Larson, Hostetter & Edwards     Brief Calculus with Applications,   Houghton Mifflin

Coughlin & Zitarelli            Calculus with Applications, Saunders/HBJ

Goldstein, Lay & Schneider      Brief Calculus and its Applications,    Prentice Hall