Common Course Outline
MATH 230
Calculus with Applications
4 Credits

Community College of Baltimore County

Description

MATH 230 – Calculus with Applications is highly application-oriented and explores topics of differential and integral calculus related to business, natural science and social science situations. Students will first learn the calculus of linear, polynomial, rational, logarithmic and exponential functions, and then expand their knowledge to multi-variable functions. The content of this course focuses on business applications. **This course is not intended for STEM majors.**

4 Credits

Prerequisites: ACLT 052 or ACLT 053; and MATH 163 with a grade of "C" or better, or consent of the department coordinator

Overall Course Objectives

Upon completion of this course students will be able to:
1. evaluate limits using substitution, tables and graphs;
2. utilize symbolic notation to define and evaluate functions;
3. explain the relationship between functions and their graphs;
4. apply and evaluate limits algebraically;
5. evaluate infinite limits and limits at infinity;
6. apply the definition of the derivative;
7. examine the mathematical contributions made by people from diverse cultures throughout history;
8. solve maximum and minimum problems using differential calculus;
9. solve marginal analysis problems using differential calculus;
10. use differential calculus to solve exponential growth and decay problems;
11. evaluate and express solutions to mathematical problems with appropriate technology;
12. apply techniques and methods from differential and integral calculus to reality-based situations from business, management, and natural and social sciences;
13. articulate a solution to mathematical problems;
14. define differentiation and integration rules for various multi-variable functions; and
15. apply differentiation and integration rules to functions with several variables.

Major Topics

I. Basic Foundations
   A. Functions and graphs
   B. Algebra of functions
   C. Functions and mathematical models
   D. Limits
   E. One-sided limits and continuity
   F. Derivative

II. Differentiation
   A. Basic rules
   B. Product and quotient rules
   C. Chain rule
   D. Marginal functions in economics
   E. Higher order derivatives
   F. Implicit differentiation
   G. Differentials

III. Applications of the Derivative
   A. Increasing and decreasing functions
   B. Relative maxima and minima
   C. Concavity and points of inflection
   D. Curve sketching
   E. Optimization problems in business and economics

IV. Exponential and Logarithmic Functions
   A. Compound interest
   B. Differentiation of exponential and logarithmic functions
   C. Exponential functions as mathematical models

V. Integration
   A. Anti-derivatives and integration rules
   B. Integration by substitution
   C. Cost, area and the definite integral
   D. Fundamental theorem of calculus
   E. Area between curves
   F. Applications of the definite integral in business, economics and biology

VI. Additional Topics in Integration
   A. Integration by parts
   B. Separable differential equations
   C. Improper integration
   D. Applications of probability

VII. Functions of Several Variables
   A. Definitions and Graphs
   B. Partial Derivatives
   C. Lagrange Multipliers (optional)

Course Requirements

Grading procedures will be determined by the individual faculty member but will include the following:

Grading/exams
- At least three unit exams
- Comprehensive final examination to count at least 20% of final course grade
- Semester project to count at least 10% of final course grade
- Homework to be counted no more than 15% towards final course grade

Date revised: 01/30/2019