



Alabama Community College System

MTH 120 Calculus and Its Applications

I. MTH 120 Calculus and Its Applications – 3 Semester Hours

II. Course Description

This course is intended to give a broad overview of calculus. It includes limits, differentiation, and integration of algebraic, exponential, logarithmic, and multi-variable functions with applications to business, economics, and other disciplines. This course may also include LaGrange multipliers, extrema of functions of two variables, method of least squares, linear approximation, and linear programming.

III. Prerequisite

Grade of C or higher in MTH 112, 113, or 115 or appropriate placement score.

IV. Textbook

Due to the varied selection of quality college-level textbooks, each college will select the textbook needed to meet the requirements of this course.

V. Course Learning Outcomes

By the end of the course, students will be able to:

1. evaluate limits of functions,
2. differentiate functions,
3. integrate functions,
4. apply calculus concepts to multi-variable functions, and
5. utilize derivatives and integrals to solve real-world applications.

VI. Course Outline of Topics

Required Topics

1. Limits
 - a. Limits
 - b. Continuity
2. Differentiation
 - a. The derivative by definition of limits
 - b. Product and quotient rule
 - c. Chain rule
 - d. Higher-order derivatives
 - e. Implicit differentiation
 - f. Differentiation of exponential/logarithmic functions
3. Applications of Derivatives
 - a. 1st derivative test
 - b. 2nd derivative test
 - c. Curve sketching
 - d. Marginal functions in economics
 - e. Optimization
 - f. Compound interest
 - g. Elasticity of demand
4. Integration
 - a. Antiderivatives
 - b. Integration by substitution
 - c. Evaluating definite integrals
 - d. Area between two curves
 - e. Applications of integration
5. Functions of several variables
 - a. Functions of several variables
 - b. Partial derivatives

Optional Topics:

1. LaGrange multipliers
2. Extrema of functions of two variables
3. Method of least squares
4. Linear approximation
5. Linear programming
6. Multiple integration

VII. Evaluation and Assessment

Grades will be given based upon A = 90 – 100%, B = 80 – 89%, C = 70 – 79%, D = 60 – 69%, and F = below 60%.

VIII. Attendance

Students are expected to attend all classes for which they are registered. Students who are unable to attend class regularly, regardless of the reason or circumstance, should withdraw from that class before poor attendance interferes with the student's ability to achieve the objectives required in the course. Withdrawal from class can affect eligibility for federal financial aid.

IX. Statement on Discrimination/Harassment

It is the official policy of the Alabama Community College System and entities under its control, including all Colleges, that no person shall be discriminated against on the basis of any impermissible criterion or characteristic, including, without limitation, race, color, national origin, religion, marital status, disability, sex, age, or any other protected class as defined by federal and state law. (ACCS Policies 601.02 and 800.00)

X. Americans with Disabilities

The Rehabilitation Act of 1973 (Section 504) and the Americans with Disabilities Act of 1990 state that qualified students with disabilities who meet the essential functions and academic requirements are entitled to reasonable accommodations. It is the student's responsibility to provide appropriate disability documentation to the College.