

**GEORGIA PERIMETER COLLEGE
MATHEMATICS ACADEMIC GROUP
COMMON COURSE OUTLINE**

COURSE ABBREVIATION	MATH 1433
CREDIT HOURS	3
COURSE TITLE	APPLIED CALCULUS
PREREQUISITE	Math 1101, MATH 1111 or Math 1113 with a grade of C or better or placement

CATALOG DESCRIPTION

This course provides a non-rigorous introduction to the basic ideas and techniques of differential and integral calculus, especially as they relate to applications in business, economics, life sciences, and social sciences.

EXPECTED EDUCATIONAL RESULTS

As a result of completing this course, the student will be able to:

1. Locate and describe discontinuities in functions.
2. Evaluate limits for polynomial and rational functions.
3. Compute and interpret the derivative of a polynomial, rational, exponential, or logarithmic function.
4. Write the equations of lines tangent to the graphs of polynomial, rational, exponential, and logarithmic functions at given points.
5. Compute derivatives using the product, quotient, and chain rules on polynomial, rational, exponential, and logarithmic functions.
6. Solve problems in marginal analysis in business and economics using the derivative.
7. Interpret and communicate the results of a marginal analysis.
8. Graph functions and solve optimization problems using the first and second derivatives and interpret the results.
9. Compute antiderivatives and indefinite integrals using term-by-term integration or substitution techniques.
10. Evaluate certain definite integrals.
11. Compute areas between curves using definite integrals.
12. Solve applications problems for which definite and indefinite integrals are mathematical models.
13. Solve applications problems involving the continuous compound interest formula.

GENERAL EDUCATION OUTCOMES

- I. This course addresses the general education outcome relating to communication by providing additional support as follows:
 - A. Students develop their listening skills through lecture and through group problem solving.
 - B. Students develop their reading comprehension skills by reading the text and by reading the instructions for text exercises, problems on tests, or on projects. Reading the mathematics text requires recognizing symbolic notation as well as analyzing problems written in prose.
 - C. Students develop their writing skills through the use of problems which require written explanations of concepts.
- II. This course addresses the general education outcome of demonstrating effective individual and group problem solving and critical thinking skills as follows:
 - A. Students must apply mathematical concepts previously mastered to new problems and situations.
 - B. In applications, students must analyze problems and describe problems with either pictures, diagrams, or graphs, then determine the appropriate strategy for solving the problem.
- III. This course addresses the general education outcome of using mathematical concepts to interpret, understand, and communicate quantitative data as follows:
 - A. Students must demonstrate proficiency in problems-solving skills. These include business applications of the derivative and the integral.
 - B. Students must apply calculus concepts to marginal analysis and optimization problems, using their results to make business decisions and predictions.

COURSE CONTENT

1. The derivative, derivative formulas, and marginal analysis
2. Graphing and optimization
3. Special derivatives: exponential and logarithmic functions
4. Integration and applications in business and economics

ENTRY-LEVEL COMPETENCIES

Upon entering this course, the student should be able to do the following:

1. Analyze problems using critical thinking skills.
2. Construct meaningful mathematical statements using algebraic symbols and notation.
3. Solve the following kinds of equations
 - a. Rational (leading to linear and quadratic)
 - b. Logarithmic
 - c. Exponential
4. Solve the following kinds of inequalities
 - a. Rational
 - b. Factorable polynomial of degree 2, 3, or 4

5. State the definition of a function and use function notation.
6. Identify and graph the following types of functions in two variables
 - a. Linear
 - b. Quadratic
 - c. Exponential
 - d. Logarithmic
7. Define exponential and logarithmic functions; use the properties of logarithms.
8. Evaluate expressions involving exponential and logarithmic functions of x using a calculator.

ASSESSMENT OF EXPECTED EDUCATIONAL RESULTS

I. COURSE GRADE

The course grade will be determined by the individual instructor using a variety of evaluation methods. A portion of the course grade will be determined through the use of frequent assessment using such means as tests, quizzes, projects, or homework as developed by the instructor. Some of these methods will require the student to demonstrate ability in problem solving and critical thinking as evidenced by explaining and interpreting solutions. A comprehensive final examination is required which must count at least one-fifth and no more than one-third of the course grade.

II. DEPARTMENTAL ASSESSMENT

The course will be assessed every 5 years. The assessment instrument will consist of a set of free-response questions included as a portion of the final exam for all students taking the course. The assessment instrument will be graded by a committee appointed by the Academic Group.

USE OF ASSESSMENT FINDINGS

The Math 1433 committee, or a special assessment committee appointed by the Chair of the Executive Committee, will analyze the results of the assessment and determine implications for curriculum changes. The committee will prepare a report for the Academic Group summarizing its findings.

EFFECTIVE DATE: August, 2008
REVIEWED: January, 2009

APPROVED DATE: March, 2008