GEORGIA PERIMETER COLLEGE  
MATHEMATICS ACADEMIC GROUP  
COMMON COURSE OUTLINE  

COURSE ABBREVIATION MATH 2431  
CREDIT HOURS 4 semester hours  
COURSE TITLE Calculus I  

PREREQUISITES MATH 1113 with a grade of "C" or better or placement by examination  

CATALOG DESCRIPTION  
This course includes the study of the derivative and its applications, limits and continuity, anti-differentiation, the definite integral, and the Fundamental Theorem of Calculus. Algebraic, trigonometric, exponential, and logarithmic functions are studied.  

EXPECTED EDUCATIONAL RESULTS  
As a result of completing this course, the student will be able to:  
1. Investigate limits using algebraic, graphical, and numerical techniques.  
2. Investigate derivatives using the definition, differentiation techniques, and graphs. The classes of functions studied include algebraic, trigonometric, inverse trigonometric, exponential, logarithmic, hyperbolic and implicit.  
3. Apply the derivative as a rate of change, optimize functions, use Newton's Method, and sketch curves.  
4. Define the definite integral and use Riemann sums to approximate definite integrals.  
5. State and apply the Fundamental Theorem of Calculus.  
6. Graph and use parametric equations.  

GENERAL EDUCATION OUTCOMES  
I. This course addresses the general education outcome relating to communication by providing additional support as follows:  
A. Students improve their listening skills by taking part in general class discussions and in small group activities.  
B. Students improve their reading skills by reading and discussing the text and other materials. Reading mathematics requires skills somewhat different from those used in reading materials for other courses in that students are expected to read highly technical material.  
C. Unit tests, examinations, and other assignments provide opportunities for students to practice and improve mathematical writing skills. Mathematics has a specialized vocabulary that students are expected to use correctly.  

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 to non-template problems and situations.  
B. In applications, students must analyze problems, often through the
use of multiple representations, develop or select an appropriate
mathematical model, utilize the model, and interpret results.

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 problem-solving skills by
      solving application problems relating to rates of change and optimization
      problems.
   B. Students must sketch and interpret graphs using concepts such as
      limits, continuity, derivatives, increasing and decreasing, local extrema,
      concavity, and points of inflection.
   C. Students must be able to approximate definite integrals using
      numerical techniques, including situations in which only numerical data from
      the function is available.

IV. This course addresses the general education outcome of locating,
organizing, and analyzing information through appropriate computer
applications (including hand-held graphing calculators). As a result of
taking this course, the student should be able to use technology to:
   A. sketch graphs, create tables of values, and approximate limits of
      functions.
   B. implement Newton's method to approximate zeros, critical values,
      and potential points of inflection of functions.
   C. approximate local extrema and approximate where a function is
      increasing, decreasing, concave upward, and concave downward.
   D. approximate the value of the derivative at a point.
   E. approximate Riemann sums.
   F. approximate definite integrals using Simpson's rule or a built-in
      integration feature.

V. This course addresses the general education outcome of using scientific
inquiry by using techniques of Calculus including integration or
differentiation to apply scientific inquiry to problem solving.

COURSE CONTENT
1. The Derivative
2. Techniques for Finding Derivatives
3. Applications of the Derivative
4. The Definite Integral

ENTRY LEVEL COMPETENCIES
   Students should have successfully completed Math 1113 or an
   equivalent course prior to enrolling in Math 2431.

ASSESSMENT OF EXPECTED EDUCATIONAL RESULTS
I. COURSE GRADE
   The course grade will be determined by the individual instructor
   using a variety of evaluation methods such as tests, quizzes, projects,
   homework, and writing assignments. These methods will include the appropriate
   use of graphing calculators or PC software as required in the course. A
   comprehensive final examination is required which must count at least one-
   fourth and no more than one-third of the course grade. The final examination
   will include items that require the student to demonstrate ability in problem
   solving and critical thinking as evidenced by detailed, worked-out solutions.

II. COLLEGE WIDE ASSESSMENT
This course will be assessed according to the college wide/mathematics department schedule. The assessment instrument will include a set of appropriate questions to be a portion of the final exam for all students taking the course. An out of class project may be an assessment instrument as well.

III. USE OF ASSESSMENT FINDINGS
The Calculus Committee or a special assessment committee appointed by the Chair of the Math, Computer Science, and Engineering Executive Committee, will accumulate and analyze the results of the assessment and determine implications for curriculum changes. The committee will prepare a report for the Academic Group summarizing its finding.

Approved Date: April 2003
Effective Date: May 2003
Reviewed by Committee: December 2005