

GEORGIA PERIMETER COLLEGE
DIVISION OF MATHEMATICS
COMMON COURSE OUTLINE

COURSE ABBREVIATION MATH 2432
CREDIT HOURS 4 semester hours
COURSE TITLE Calculus II
PREREQUISITES Math 2431 or Math 204 with a grade of C or better

CATALOG DESCRIPTION

This course includes the study of techniques of integration, applications of the definite integral, an introduction to differential equations, polar graphs, and power series.

EXPECTED EDUCATIONAL RESULTS

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

1. Evaluate integrals using techniques of integration.
2. Use integrals to solve application problems.
3. Solve separable differential equations and apply to elementary applications.
4. Investigate the convergence of series and apply series to approximate functions and definite integrals.
5. Apply polar representations including graphs, derivatives, and areas.

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 using the definite integral to solve application problems.

B. Students must be able to solve applied problems that can be modeled by differential equations.

C. Students must use power series techniques to approximate function values to a specified degree of accuracy.

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. Approximate definite integrals using Simpson's rule or a built-in integration feature.

B. Approximate points of intersection of curves for use in determining approximate limits of integration in application problems.

C. Investigate series representations of functions, their graphs, and the convergence or divergence of series.

D. Approximate values of functions and definite integrals using Taylor series.

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. Techniques of Integration
2. Applications of the Definite Integral
3. Differential Equations
4. Series
5. Polar representations

ENTRY LEVEL COMPETENCIES

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

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, 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 approximate definite integrals using Riemann sums.
5. State and apply the Fundamental Theorem of Calculus.
6. Graph and use parametric equations.

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