

## Florida Department of Education

## COURSE DESCRIPTION - GRADES 9-12, ADULT

**Subject Area:** Mathematics

**Course Number:** 1202300

**Course Title:** Calculus

**Credit:** 1.0

**Will meet graduation requirements for Mathematics**

**Basic Assumptions for Mathematics Education:**

- All students have access to calculators and computers.
- Classroom activities are student-centered, emphasizing concrete experiences and active/experiential learning.
- All courses have increased emphasis on problem solving, estimation, and real-world applications.
- Evaluation includes alternative methods of assessment.
- All strands addressed in the Sunshine State Standards are developed across the PreK-12 curriculum.

- A. Major Concepts/Content.** The purpose of this course is to enable students to develop knowledge and skills in calculus concepts while strengthening and extending concepts learned in previous mathematics courses.

The content should include, but not be limited to, the following:

- functions
- limits and continuity
- derivatives and their applications
- antiderivatives
- definite integrals and their applications

This course shall integrate the Goal 3 Student Performance Standards of the Florida System of School Improvement and Accountability as appropriate to the content and processes of the subject matter.

Course student performance standards must be adopted by the district, and they must reflect appropriate Sunshine State Standards benchmarks.

**B. Special Note.** None

**C. Course Requirements.** These requirements include, but are not limited to, the benchmarks from the Sunshine State Standards that are most relevant to this course. Benchmarks correlated with a specific course requirement may also be addressed by other course requirements as appropriate. Some requirements in this advanced mathematics course are not addressed in the Sunshine State Standards, and some of the cited benchmarks are prerequisite to the course requirement.

**After successfully completing this course, the student will:**

- 1. Work with functions graphically, numerically, and analytically; and demonstrate understanding of the connections among these multiple representations.**
  - MA.D.1.4.1 describe, analyze, and generalize relationships, patterns, and functions using words, symbols, variables, tables, and graphs.
  - MA.D.1.4.2 determine the impact when changing parameters of given functions.
  - MA.D.2.4.1 represent real-world problem situations using finite graphs, matrices, sequences, series, and recursive relations.
  
- 2. Apply the theory of limits and continuity to solve problems.**
  - MA.A.2.4.1 understand and use the basic concepts of limits and infinity.
  
- 3. Demonstrate understanding of the meaning of derivatives, apply rules of differentiation, and use derivatives to solve varied problems.**
  - MA.B.2.4.1 select and use direct (measured) and indirect (not measured) methods of measurement as appropriate.
  - MA.B.2.4.2 solve real-world problems involving rated measures (miles per hour, feet per second).

- MA.B.4.4.1 determine the level of accuracy and precision, including absolute and relative errors or tolerance, required in real-world measurement situations.
- MA.C.2.4.1 understand geometric concepts such as perpendicularity, parallelism, tangency, congruency, similarity, reflections, symmetry, and transformations including flips, slides, turns, enlargements, rotations, and fractals.

**4. Find the general antiderivative of a function.**

**5. Demonstrate understanding of definite integrals and use integrals to solve varied problems.**

- MA.B.1.4.1 use concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two- and three-dimensional shapes, including rectangular solids, cylinders, cones, and pyramids.
- MA.B.4.4.1 determine the level of accuracy and precision, including absolute and relative errors or tolerance, required in real-world measurement situations.
- MA.C.2.4.2 analyze and apply geometric relationships involving planar cross-sections (the intersection of a plane and a three-dimensional figure).