

Florida Department of Education

COURSE DESCRIPTION - GRADES 9-12, ADULT

Subject Area: Mathematics

Course Number: 1202340

Course Title: Pre-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 concepts and skills in advanced algebra, analytic geometry, and trigonometry.

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

- trigonometric functions and their inverses
- trigonometric identities and equations
- vectors and parametric equations
- structure and properties of the complex number system
- polar coordinate system
- sequences and series
- concept of limits
- conic sections

- polynomial, rational, exponential, and logarithmic functions
- matrix algebra

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.** Credit in this course precludes credit in 1202350 - Pacesetter Mathematics IV. A student who receives credit for both 1211300 - Trigonometry and 1206330 - Analytic Geometry shall not receive credit for 1202340 - Pre-Calculus.
- 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 of the cited benchmarks are prerequisite to the course requirement.

After successfully completing this course, the student will:

- 1. Demonstrate understanding of trigonometric functions and their inverses, trigonometric identities and equations, and their applications to problem-solving situations.**
 - MA.A.3.4.1 understand and explain the effects of addition, subtraction, multiplication, and division on real numbers, including square roots, exponents, and appropriate inverse relationships.
 - MA.B.1.4.2 use concrete and graphic models to derive formulas for finding rate, distance, time, angle measures, and arc lengths.

- MA.C.3.4.1 represent and apply geometric properties and relationships to solve real-world and mathematical problems including ratio, proportion, and properties of right triangle trigonometry.
- 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.

2. Demonstrate understanding of the application of graphing techniques to trigonometric functions and their inverses.

- MA.A.4.4.1 use estimation strategies in complex situations to predict results and to check the reasonableness of results.
- 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.

3. Demonstrate use of vectors and parametric equations to solve problems.

- MA.B.2.4.2 solve real-world problems involving rated measures (miles per hour, feet per second).
- MA.C.3.4.2 using a rectangular coordinate system (graph), apply and algebraically verify properties of two- and three-dimensional figures, including distance, midpoint, slope, parallelism, and perpendicularity.

4. Demonstrate understanding of the connections between trigonometric functions, polar coordinates, and complex numbers.

- MA.A.1.4.3 understand concrete and symbolic representations of real and complex numbers in real-world situations.
- MA.A.2.4.3 understand the structure of the complex number system.

5. **Demonstrate understanding of the concept of limits; arithmetic and geometric sequences and series; and their applications, including definition of the derivative.**
 - MA.A.2.4.1 understand and use the basic concepts of limits and infinity.
 - MA.A.5.4.1 apply special number relationships such as sequences and series to real-world problems.

6. **Demonstrate understanding of conic sections and loci.**
 - MA.C.2.4.2 analyze and apply geometric relationships involving planar cross-sections (the intersection of a plane and a three-dimensional figure).

7. **Demonstrate understanding of polynomial and rational functions, their graphs, and their applications to problem-solving situations.**
 - MA.D.2.4.1 represent real-world problem situations using finite graphs, matrices, sequences, series, and recursive relations.

8. **Demonstrate understanding of the relationship between exponential and logarithmic functions and their application to problem-solving situations.**
 - MA.A.1.4.4 understand that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, absolute value, and logarithms.

9. **Solve complex systems of equations and inequalities, including use of matrix algebra.**
 - MA.D.2.4.2 use systems of equations and inequalities to solve real-world problems graphically, algebraically, and with matrices.