

Florida Department of Education

COURSE DESCRIPTION - GRADES 9-12, ADULT

Subject Area: Mathematics
Course Number: 1205510
Course Title: Explorations in Mathematics II
Credit: 1.0

Will meet graduation requirement 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 provide experiences in problem solving, communication, reasoning, and connections in mathematics.

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

- number and operation sense
- estimation
- mental mathematics
- algebraic relationships
- patterns and functions
- ratio and proportion
- geometric relationships
- measurement
- spatial relationships
- statistics and probability
- appropriate use of calculators and other technology

- counting principles
- trigonometric relationships

This course shall integrate Goal 3 Student Performance Standards of the Florida System of School Improvement and Accountability as appropriate for 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. The benchmarks printed in regular type are required for this course. **The portions printed in *italic type* are not required for this course.**

After successfully completing this course, the student will:

1. Use the power of numbers to analyze, solve, and verify solutions to real-world problems.

- MA.A.1.4.1 associate verbal names, written word names, and standard numerals with integers, rational numbers, irrational numbers, real numbers, *and complex numbers*.
- MA.A.1.4.2 understand the relative size of integers, rational numbers, irrational numbers, and real numbers.
- MA.A.1.4.3 understand concrete and symbolic representations of real *and complex* numbers in real-world 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*.
- MA.A.2.4.2 understand and use the real number system.
- 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.A.3.4.2 select and justify alternative strategies, such as using properties of numbers, including inverse, identity, distributive, associative, and transitive, that allow operational shortcuts for computational procedures in real-world or mathematical problems.
- MA.A.3.4.3 add, subtract, multiply, and divide real numbers, including square roots and exponents, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.
- MA.A.4.4.1 use estimation strategies *in complex situations* to predict results and to check the reasonableness of results.
- MA.A.5.4.1 apply special number relationships such as sequences *and series* to real-world problems.

2. Apply measurement processes to analyze, describe relationships, and solve real-world 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.1.4.2 use concrete and graphic models to derive formulas for finding rate, distance, time, angle measures, *and arc lengths*.
- MA.B.1.4.3 relate the concepts of measurement to similarity and proportionality in real-world situations.
- 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.3.4.1 solve real-world and mathematical problems involving estimates of measurements, including length, time, weight/mass, temperature, money, perimeter, area, and volume and estimate the effects of measurement errors on calculations.
- MA.B.4.4.2 select and use appropriate instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation.
- 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.

3. **Use quantitative tools to analyze, draw inferences, and make decisions based on real-world data.**
 - MA.E.1.4.1 interpret data that has been collected, organized, and displayed in charts, tables, and plots.
 - MA.E.1.4.2 calculate measures of central tendency (mean, median, and mode) and dispersion (range, *standard deviation*, and *variance*) for complex sets of data and determine the most meaningful measure to describe the data.
 - MA.E.1.4.3 analyze real-world data and make predictions of larger populations *by applying formulas to calculate measures of central tendency and dispersion* using the sample population data and using appropriate technology, including calculators and computers.
 - MA.E.2.4.1 determine probabilities using counting procedures, tables, tree diagrams, *and formulas for permutations and combinations*.
 - MA.E.2.4.2 determine the probability for simple *and compound* events *as well as independent and dependent events*.
 - MA.E.3.4.1 design and perform real-world statistical *experiments that involve more than one variable*, then analyze results and report findings.
 - MA.E.3.4.2 explain the limitations of using statistical techniques and data in making inferences and valid arguments.

4. **Apply the process of mathematical modeling to solve real-world problems and verify solutions.**
 - MA.A.5.4.1 apply special number relationships such as sequences *and series* to real-world 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.1.4.2 use concrete and graphic models to derive formulas for finding rate, distance, time, angle measures, *and arc lengths*.
 - 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*.
 - 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.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*.
- 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*.