Miami Dade College

Course Description
MAC1105 | College Algebra | 3.00 credits

In this course, students will develop problem solving skills, critical thinking, computational proficiency, and contextual fluency through the study of equations, functions, and their graphs. Emphasis will be placed on quadratic, exponential, and logarithmic functions. Topics will include solving equations and inequalities, definition and properties of a function, domain and range, transformations of graphs, operations on functions, composite and inverse functions, basic polynomial and rational functions, exponential and logarithmic functions, and applications. Computational course.

Course Competencies:
Competency 1: The student will demonstrate knowledge of absolute value equations and inequalities by:
1. Solving absolute value equations.
2. Solving absolute value inequalities.

Learning Outcomes

1. Critical thinking
2. Information Literacy
3. Numbers / Data

Competency 2: The student will demonstrate knowledge of complex numbers by:
1. Simplifying radicals with negative radicands by using the definition of i.
2. Simplifying powers of i.
3. Adding, subtracting, multiplying, and dividing complex numbers.

Learning Outcomes

1. Critical thinking
2. Information Literacy
3. Numbers / Data

Competency 3: The student will demonstrate knowledge of functions from a numerical, graphical, verbal, and analytic perspective by:
1. Distinguishing if a given relation is a function.
2. Evaluating and using functional notation.
3. Using the vertical line test to determine if a graph represents a function.
4. Identifying and finding the domain and range of relations and functions.
5. Performing operations on functions.
6. Forming function compositions.
7. Finding the inverse of a function.
8. Graphing functions, including absolute value, radical, and power functions with and without transformations.
9. Graphing the inverse of a function.
10. Analyzing and classifying the symmetry of functions.
11. Defining, evaluating and graphing basic piecewise-defined functions.

Learning Outcomes:

1. Communication
2. Critical thinking
3. Information Literacy
4. Numbers / Data
5. Social Responsibility

Competency 4: The student will demonstrate knowledge of quadratic equations and functions by:
1. Solving quadratic equations and equations quadratic in form using any available method.
2. Using quadratic equations and their solutions to answer modeling questions.
3. Using the discriminant to identify the types of solutions for quadratic equations.
4. Graphing quadratic functions and identifying the vertex, x-intercept, y-intercept, and the axis of symmetry of the graph.
5. Finding the maximum or minimum value of a quadratic function in applications.

Learning Outcomes:

1. Communication
2. Critical thinking
3. Information Literacy
4. Numbers / Data
5. Social Responsibility

Competency 5:
The student will demonstrate knowledge of systems of linear equations and inequalities by:

1. Solving systems of linear equations into variables using Substitution and Addition (also known as Elimination) methods.
2. Solving systems of linear equations in three variables.
3. Solving systems of linear inequalities.
4. Solving applications and modeling using systems of linear equations and inequalities.

Learning Outcomes:

1. Communication
2. Critical thinking
3. Information Literacy
4. Numbers / Data
5. Social Responsibility

Competency 6: The student will demonstrate knowledge of exponential and logarithmic functions by:
1. Graphing exponential and logarithmic functions with and without transformations.
2. Identifying the domain and range of an exponential or logarithmic function.
3. Applying properties of logarithms to expand and condense logarithmic expressions.
4. Solving exponential and logarithmic equations.
5. Applying modeling techniques to solve problems of exponential growth and decay.

Learning Outcomes:

1. Communication
2. Critical thinking
3. Information Literacy
4. Numbers / Data
5. Social Responsibility

Competency 7: The student will demonstrate knowledge of polynomial and rational functions and inequalities by:
1. Graphing polynomial functions.
2. Graphing rational functions.
3. Determining the domain of rational functions.
4. Solving polynomial and rational inequalities and graphing their solution set.

Learning Outcomes:

1. Critical thinking
2. Information Literacy
3. Numbers / Data

Competency 8: The student will demonstrate knowledge of equations in two variables by:
1. Recognizing and graphing equations that represent circles.
2. Writing the equation of the circle given the center and radius.
3. Determining the distance between two points and midpoint coordinates.

Learning Outcomes:

1. Critical thinking
2. Information Literacy
3. Numbers / Data