

## Course Outline

Course Title: Corequisite College Algebra

Common Course Title: MAC1105C

Effective Term: Fall 2021 ( Aug 9, 2021 )

Credit Hours: 5 Units

Next Review : Aug 8, 2026

Contact Hour Breakdown: *(Per 16 week Term)*

Total: 80

Lecture:

Lab:

Clinic:

Other:

## Requirements

This course does not have any required pre-requisites or co-requisites.

## Course Description:

This course meets the needs of students with myriad levels of mathematical experience by providing support for learning prerequisite skills. This course is delivered as a combination of lecture along with structured activities intended to give students the experience of doing mathematics on their own or in groups with instructor guidance. The algebra objectives of the course include factoring polynomials; simplifying radicals; operations on rational expressions; writing equations of lines and circles; solving and graphing the solutions of linear and quadratic inequalities; solving systems of linear equations; solving quadratic, absolute value, radical, rational, exponential, and logarithmic equations; and properties and analysis of relations, functions and their graphs. Applications appear throughout the course.

## Course Outline

### **Alignment of General Education Competencies with General Outcomes of this Course (for general education assessment purposes)**

1. Critical Thinking

- 1.0, 2.0, 3.0, 4.0, 6.0, 7.0, 9.0

2. Effective Communication

- 1.0, 6.0, 7.0, 9.0, 10.0

3. Ethical Reasoning

4. Global Awareness

5. Information Literacy

6. Mathematical and Scientific Reasoning

- 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0

## **UNITS**

*Items designated "(C)" are learning outcomes corequisite to the MAC1105 learning outcomes.*

### **Unit 1: Linear Inequalities and Set Notation**

General Outcome

1.0 The student shall be able to solve linear inequalities, find unions and intersections of sets, and write interval notation.

Specific Learning Outcomes

1.1 Determine the union and intersection of sets.

1.2 Solve single and compound (and & or) linear inequalities in one variable.

1.3 Present solutions to linear inequalities in one variable in inequality notation, interval notation, and graphically on a number line.

**Unit 2: Factoring Polynomials**

General Outcome

2.0 The student shall be able to factor polynomial expressions using a variety of methods.

Specific Learning Outcomes

2.1 Factor out the greatest common factor of polynomials. (C)

2.2 Factor a univariate difference of squares of degree 2. (C)

2.3 Factor univariate trinomials of degree 2, including perfect square trinomials. (C)

2.4 Determine whether polynomial expressions are prime or factorable. (C)

**Unit 3: Radicals**

General Outcome

3.0 The student shall be able to simplify radical expressions.

Specific Learning Outcomes

3.1 Simplify radical expressions of any index with numerical radicands. (C)

3.2 Convert between radical and rational exponent notation for expressions with numerical radicands or bases. (C)

**Unit 4: More Equations and Inequalities**

General Outcome

4.0 The student shall be able to solve absolute value, quadratic, and radical equations; and quadratic inequalities.

Specific Learning Outcomes

4.1 Solve absolute value equations.

4.2 Solve quadratic equations having real solutions by factoring. (C)

4.3 Solve quadratic equations having real solutions by using the square root property. (C)

4.4 Solve quadratic equations having real solutions by completing the square. (C)

- 4.5 Solve quadratic equations having real solutions by using the quadratic formula. (C)
- 4.6 Solve radical equations that do not require double squaring.
- 4.7 Solve quadratic inequalities in one variable.

## **Unit 5: Rational Expressions and Equations**

### General Outcome

- 5.0 The student shall be able perform operations with rational expressions and solve rational equations.

### Specific Learning Outcomes

- 5.1 Determine value(s) of the variable for which rational expressions are undefined. (C)
- 5.2 Simplify rational expressions. (C)
- 5.3 Multiply and divide rational expressions with monomial and binomial denominators. (C)
- 5.4 Determine the least common denominator of rational expressions with monomial and binomial denominators. (C)
- 5.5 Add and subtract rational expressions with the same and with different monomial and binomial denominators. (C)
- 5.6** Solve equations equating two rational expressions. (C)
- 5.7 Determine whether or not a solution to a rational equation is extraneous. (C)

## **Unit 6: Equations and Their Graphs**

### General Outcome

- 6.0 The student shall be able to write and graph equations of circles and lines.

### Specific Learning Outcomes

- 6.1 Determine x- and y-intercepts.
- 6.2 Determine any symmetry of the graph of an equation graphically and algebraically.
- 6.3 Apply the midpoint and distance formulas.
- 6.4 Determine the center and radius of a circle given an equation in standard form or general form, and sketch its graph.
- 6.5 Write the equation of a circle.
- 6.6 Determine if a given ordered pair is a solution to a linear equation in two variables. (C)
- 6.7 Determine the slopes of horizontal, vertical, and slanted lines given the graph, two points, or the equation of the line. (C)
- 6.8 Sketch graphs of horizontal, vertical, and slanted lines given the equation.(C)
- 6.9 Write the equations of horizontal, vertical, and slanted lines, given the graph, the slope and a point, or two points.

## **Unit 7: Functions**

### General Outcome

- 7.0 The student shall be able to perform operations on, evaluate, analyze, and graph functions.

### Specific Learning Outcomes

- 7.1 Determine if a given relation is a function graphically, algebraically, from a given set of points, and from a mapping.
- 7.2 Evaluate a given function using function notation for both numerical and variable arguments using function rules and graphs.
- 7.3 Evaluate the difference quotient.
- 7.4 Determine the domain and range of a relation or function represented graphically, algebraically, as a given set of points, or as a mapping.
- 7.5 Add, subtract, multiply, and divide two functions; and determine the domain.
- 7.6 Compose two functions and determine the domain.
- 7.7 Determine if a function is one-to-one.
- 7.8 Determine the inverse of a one-to-one function.
- 7.9 Graph a function and its inverse.
- 7.10 Graph quadratic, absolute value, square root, cubic, and cube root functions using shifting, stretching, compressing, and/or reflecting.
- 7.11 Determine graphically and algebraically if a function is even, odd, or neither.
- 7.12 Evaluate and graph piecewise-defined functions.

## **Unit 8: Quadratic Functions**

### General Outcome

- 8.0 The student shall be able to analyze and graph quadratic functions.

### Specific Learning Outcomes

- 8.1 Determine the vertex, axis of symmetry, and intercepts of quadratic functions and sketch their graphs.
- 8.2 Read and solve applications involving quadratic functions including maximum/minimum problems.

## **Unit 9: Exponential and Logarithmic Functions**

### General Outcome

- 9.0 The student shall be able to solve exponential and logarithmic equations, and graph exponential and logarithmic functions.

### Specific Learning Outcomes

- 9.1 Define exponential and logarithmic functions.
- 9.2 Find the domain of a logarithmic function.
- 9.3 Convert between exponential form and logarithmic form.
- 9.4 Simplify and evaluate expressions using the properties of logarithms.
- 9.5 Use the change of base formula.
- 9.6 Solve exponential equations by finding common bases, and by using logarithms.
- 9.7 Graph exponential and logarithmic functions using transformations.
- 9.8 Solve logarithmic equations containing a single logarithm, logarithms on both sides, and more than two logarithmic terms.
- 9.9 Read and solve applications involving exponential and logarithmic functions including compound interest and exponential growth and decay.

## **Unit 10: Systems of Two Linear Equations in Two Variables**

### General Outcome

10.0 The student shall be able to solve systems of linear equations graphically and algebraically, and solve applications.

### Specific Learning Outcomes

10.1 Explain what it means to be a solution to a system of linear equations.

10.2 Determine if a given ordered pair is a solution to a system of linear equations.

10.3 Solve systems of linear equations by graphing.

10.4 Solve systems of linear equations using substitution.

10.5 Solve systems of linear equations using elimination by addition.

10.6 Classify a system of linear equations as consistent or inconsistent. If the system is consistent, determine whether the equations are dependent or independent.

10.7 Read and solve applications using systems of linear equations.