

Course Outline

Course Title: College Algebra

Common Course Title: MAC1105

Effective Term: Fall 2021 (Aug 9, 2021)

Credit Hours: 3 Units

Next Review : Aug 8, 2026

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

Total: 48

Lecture:

Lab:

Clinic:

Other:

Requirements

Pre-requisite with minimum grade required

MAT1033 (C)

Course Description:

This course includes topics such as: solving linear and quadratic inequalities; solving systems of linear equations; solving quadratic, absolute value, radical, exponential, and logarithmic equations; and properties and analysis of 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, 5.0, 6.0, 7.0

2. Effective Communication

- 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0

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

UNITS

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: More Equations and Inequalities

General Outcome

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

Specific Learning Outcomes

- 2.1 Solve absolute value equations.
- 2.2 Solve radical equations that do not require double squaring.
- 2.3 Solve quadratic inequalities in one variable.

Unit 3: Equations and Their Graphs

General Outcome

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

Specific Learning Outcomes

- 3.1 Determine x- and y-intercepts.
- 3.2 Determine any symmetry of the graph of an equation graphically and algebraically.
- 3.3 Apply the midpoint and distance formula.
- 3.4 Determine the center and radius of a circle given an equation in standard form or general form, and sketch its graph.
- 3.5 Write the equation of a circle.
- 3.6 Write the equations of horizontal, vertical, and slanted lines, given the graph, the slope and a point, or two points.

Unit 4: Functions

General Outcome

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

Specific Learning Outcomes

- 4.1 Determine if a given relation is a function graphically, algebraically, from a given set of points, and from a mapping.
- 4.2 Evaluate a given function using function notation for both numerical and variable arguments using function rules and graphs.
- 4.3 Evaluate the difference quotient.
- 4.4 Determine the domain and range of a relation or function represented graphically, algebraically, as a given set of points, or as a mapping.

- 4.5 Add, subtract, multiply, divide two functions, and determine the domain.
- 4.6 Compose two functions and determine the domain.
- 4.7 Determine if a function is one-to-one.
- 4.8 Determine the inverse of a one-to-one function.
- 4.9 Graph a function and its inverse.
- 4.10 Graph quadratic, absolute value, square root, cubic and cube root functions using, shifting, stretching, compressing, and/or reflecting.
- 4.11 Determine if a function is even or odd graphically and algebraically.
- 4.12 Evaluate and graph piecewise-defined functions.

Unit 5: Quadratic Functions

General Outcome

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

Specific Learning Outcomes

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

Unit 6: Exponential and Logarithmic Functions

General Outcome

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

Specific Learning Outcomes

- 6.1 Define exponential and logarithmic functions.
- 6.2 Find the domain of a logarithmic function.
- 6.3 Convert between exponential form and logarithmic form.
- 6.4 Simplify and evaluate expressions using the properties of logarithms.
- 6.5 Use the change of base formula.
- 6.6 Solve exponential equations by finding common bases, and by using logarithms.
- 6.7 Graph exponential and logarithmic functions using transformations.
- 6.8 Solve logarithmic equations involving a single logarithm, logarithms on both sides, and more than two logarithmic terms.
- 6.9 Read and solve applications involving exponential and logarithmic functions including compound interest and exponential growth and decay.

Unit 7: Systems of Two Linear Equations in Two Variables

General Outcome

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

Specific Learning Outcomes

- 7.1 Explain what it means to be a solution to a system of linear equations.
- 7.2 Determine if a given ordered pair is a solution to a system of linear equations.
- 7.3 Solve systems of linear equations by graphing.
- 7.4 Solve systems of linear equations using substitution.
- 7.5 Solve systems of linear equations using elimination by addition.
- 7.6 Classify a system of linear equations as consistent or inconsistent. If the system is consistent, determine whether the equations are dependent or independent.
- 7.7 Read and solve applications using systems of linear equations.