



MERCER
COUNTY COMMUNITY COLLEGE

COURSE OUTLINE

Course Number
MAT 140

Course Title
Applied College Algebra

Credits
4

Hours:
Lecture/Lab/Other
4 Lecture

Co- or Pre-requisite
MAT 037 or MAT 042 or Multiple
Measures Placement

Implementation
Semester & Year
Spring 2022

Catalog description:

Designed for students majoring in disciplines involving less intensive math, for which a more conceptual understanding of college algebra is appropriate. Employing extensive examples from a variety of fields, topics include the study of linear, exponential, logarithmic, polynomial, and rational functions. Not intended as preparation for Pre-Calculus or Calculus.

General Education

Category:

Goal 2: Mathematics

Course coordinator:

Alison Becker-Moses, 609-570-3808, beckera@mccc.edu

Required texts & Other materials:

- Materials will be supplied through Blackboard and selected sections will be chosen from Libre Texts Algebra Bookshelf. <https://math.libretexts.org/Bookshelves/Algebra>
- Calc 84 – a free graphing app
- Handheld Calculator - scientific or graphing calculator (check with instructor before buying)

Course Student Learning Outcomes (SLO):

Upon successful completion of this course the student will be able to:

1. Recognize a function given by tables, by graphs, by formulas and by words. [Supports ILG #2, 11]
2. Describe the mathematical characteristics of linear, exponential, logarithmic, power, polynomial, and rational functions. [Supports ILG #2, 11]
3. Solve equations using graphs, formulas, and tables. [Supports ILG #2, 11]
4. Translate verbal descriptions of functions to mathematical models. [Supports ILG #2, 11]
5. Apply mathematical methods to solve practical application problems. [Supports ILG #11]
6. Demonstrate ability to utilize a graphing tool or software. [Supports ILG #4]

Course-specific Institutional Learning Goals (ILG):

Institutional Learning Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Units of study in detail – Unit Student Learning Outcomes:

Unit I Introduction to Functions [Supports Course SLOs #1, 2, 3, 4, 5]

Learning Objectives

The student will be able to:

- Evaluate functions expressed in function notation.
- Describe the meaning of functions expressed in function notation, tables, or graphs.
- Calculate average rates of change for functions expressed in a table or graph.
- Create a formula or graph for a function that is described in words.
- State the values of domain and range of functions.
- Identify common functions from the characteristics of their graphs.
- Evaluate piecewise functions.
- Find a linear model from a set of data in a table.
- Solve a literal equation for one variable in terms of the other variables.
- Determine the maximum and minimum values of a function.
- Interpret application problems from a variety of disciplines.

Unit II Linear Functions [Supports Course SLO #1, 2, 3, 4, 5, 6]

Learning Objectives

The student will be able to:

- Find the slope of a line from function notation, tables, or graphs.
- Describe whether two lines are parallel, perpendicular or neither.
- Calculate the rate of change in application problems.
- Graph a linear function given the slope and one data point.
- Identify and find a linear function from a table or graph.
- Create a linear regression model for data on a graphing utility.
- Create models of systems of two equations with two unknowns from application problems.
- Solve systems of two equations with two unknowns.
- Interpret application problems from a variety of disciplines.

Unit III Exponential and Logarithmic Functions [Supports Course SLO #1, 2, 3, 4, 5, 6]

Learning Objectives

The student will be able to:

- Identify an exponential function from its formula or verbal description.
- Solve various exponential growth and decay problems.
- Find an exponential model for a function that is expressed in a table or graph.
- Create an exponential regression model for a set of data.
- Solve various real-world problems with exponential growth or decay functions.
- Identify logarithmic functions as the inverse of an exponential function.
- Graph the data from a logarithmic function expressed in a formula.
- Utilize the properties and laws of logarithms to expand or condense logarithmic statements.
- Interpret application problems from a variety of disciplines.

Unit IV **Power, Polynomial and Rational Functions [Supports Course SLO #1, 2, 3, 4, 5, 6]**

Learning Objectives

The student will be able to:

- Evaluate power functions for given input.
- Create and graph a quadratic regression model for data that is expressed in a table.
- Apply the concept of composing functions to real-world applications.
- Determine vertex, maximum and minimum values of a quadratic function.
- Solve quadratic models of real-world applications.
- Solve quadratic equations by factoring, square-root, quadratic formula or completing the square.
- Solve rational functions using graphical analysis.
- Evaluate rational functions for given input.
- Interpret application problems from a variety of disciplines

Evaluation of student learning:

All course student learning outcomes will be assessed by the following activities. Test and quiz questions will be selected to evenly assess all expected outcomes.

Grades will be assigned as detailed below:

Tests (3)	75%
Projects (2)	10%
Quizzes	15%