



MERCER
COUNTY COMMUNITY COLLEGE

COURSE OUTLINE

Course Number	Course Title	Credits
MAT 038	Intermediate Algebra for STEM	4
Hours: Lecture/Lab/Other	Co- or Pre-requisite	Implementation Semester & Year
4 lecture	MAT 037 or MAT 042 or Multiple Measures Placement	Spring 2022

Catalog description: Developmental mathematics course designed for students needing an introduction to Intermediate Algebra. Topics include: Graphing linear equations in two variables, systems of two linear equations, rational expressions and equations, radicals and rational exponents, and linear and quadratic functions. Those who complete this course with a grade of C or better may register for MAT 146. [This course does not fulfill mathematics elective requirements.]

General Education Category:
Not GenEd

Course coordinator:
Elizabeth Carr, (609) 570-3409, carre@mccc.edu

Required texts & Other materials:

- Intermediate Algebra 2nd ed., Marecek, Lynn, OpenStax.org
<https://openstax.org/details/books/intermediate-algebra-2e>
Hardcover: ISBN-13: 978-1-975076-49-8
Paperback: ISBN-13: 978-1-975076-48-1
Digital: ISBN-13: 978-1-951693-24-4
- Calculator: Students must have at least a scientific calculator. A graphing calculator is recommended for students who need to take additional mathematics courses but is not required. No calculator with a symbolic manipulator is allowed.

Course Student Learning Outcomes (SLO):

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

1. solve compound, quadratic, absolute value and rational inequalities. (ILG #2, 11)
2. solve absolute value, linear and quadratic equations. (ILG #2, 11)
3. factor a second-degree polynomial and some special higher degree polynomials. (ILG #2)
4. recognize and work with functions and function notation. (ILG #2)
5. perform operations and solve equations involving polynomial, radical and rational expressions. (ILG #2, 11)
6. solve a system of two linear equations. (ILG #2, 11)
7. analyze and graph linear and quadratic equations. (ILG #2)

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 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: Linear Modeling: Equations, Inequalities, Slopes, Graphs, Functions and Systems of Equations (Supports Course SLO #1, 2, 4, 6, 7)

Learning Objectives

The student will be able to:

- Solve a formula for a specific variable.
- Solve, and graph solutions to compound linear inequalities, as well as compound linear inequalities using “and” & “or” terminology.
- Solve absolute value inequalities algebraically and graphically.
- Determine relationship between slope and horizontal, vertical, parallel, and perpendicular lines.
- Graph linear equations in two variables and determine the equation given the graph of a line.
- Express and graph linear equations in slope-intercept form.
- Use linear modeling to find the equation of a line through two given points, or a slope and y -intercept.
- Find equations of lines that are horizontal, vertical, and parallel/perpendicular to given lines.
- Recognize relations and functions.
- Use function notation to evaluate outputs for given inputs.
- Identify the domain and range of a function.
- Solve linear systems of equations.
- Analyze and solve application problems using linear equations.

Unit II: Polynomials, Special Factoring, Rational Expressions & Equations (Supports Course SLO #3,5)

Learning Objectives

The student will be able to:

- Factor various trinomials.
- Factor the difference of two squares, and the sum/difference of two cubes.
- Solve quadratic equations by the zero product property.
- Analyze and solve application problems using quadratic equations.
- Determine where rational expressions are undefined.
- Simplify rational expressions.
- Multiply and divide rational expressions.
- Find the LCD (least common denominator) for given rational expressions.
- Add and subtract rational expressions.
- Simplify complex fractions.
- Divide polynomials.
- Solve rational equations
- Analyze and solve application problems using rational expressions.

Unit III: Radical Expressions and Rational Exponents, Operations on Radical Expressions, Solving Radical Equations (Supports Course SLO # 5)

Learning Objectives

The student will be able to:

- Simplify and calculate square, cube, and n th root of a number.
- Calculate and/or simplify expressions with radicals or rational exponents.
- Add and subtract radical expressions.
- Multiply and divide radical expressions.
- Divide radical expressions.
- Determine the domain of a radical function
- Solve radical equations

Unit IV: Complex Numbers, Quadratic Equations (Supports Course SLO # 1, 2, 7)

Learning Objectives

The student will be able to:

- Recognize the imaginary number i and complex number $a + bi$.
- Add, subtract, multiply, and divide complex numbers.
- Solve quadratic equations by completing the square and/or the quadratic formula to get both real and complex solutions.
- Analyze and solve application problems using quadratic equations.
- Use the discriminant to find the number of real and complex solutions to a quadratic equation.
- Graph quadratic equations, identifying the vertex, axis of symmetry, and the maximum/minimum value attained by the function.
- Identify the domain and range of a quadratic function.
- Solve quadratic and rational inequalities.

Evaluation of student learning:

Students should receive regular feedback on their work through tests, quizzes, and homework. All learning outcomes are assessed through tests. Questions will be selected to evenly assess all expected outcomes.

Grades will be assigned as detailed below

Unit Tests (2)	30%
Quizzes and Homework	10%
Midterm Exam	25%
Final Exam	35%