COURSE OUTLINE

Course Number  Course Title  Credits
MAT 044  Foundation Math for STEM  3

Hours:   Pre-requisite  Implementation
lecture/Lab/Other  No High School Algebra  sem/year
0/6  OR 1 year High School Algebra  Fall 2019

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.]

Is course New, Revised, or Modified? New

Required texts/other materials:
1. ALEKS software
2. 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.

Revision date: Course coordinator:
Spring 2020  Jamie Beth Fleischner  609.570.3807  fleischj@mccc.edu

Information resources: The Mercer County Community College Library has a wide assortment of reference books that students may use. Tutors are available at the West Windsor and James Kerney Learning Center.

As this is a foundations level mathematics course, the objective of the course is to prepare students to take a college-level mathematics course. Crucial to success in a mathematics course is the ability to think "algebraically"; that is, to be able to demonstrate an ability to move beyond following prescribed algorithms into abstract reasoning.

A minimum grade of "C" is required for movement from one developmental course to another and for the completion of developmental requirements to qualify for credit-bearing mathematics courses.
**Course Competencies/Goals:**

Students will be able to demonstrate through tests, quizzes, and assignments the ability to:

1. Solve and graph both linear and quadratic equations. (GE2, Core B)
2. Solve a system of two linear equations. (GE2, Core B)
3. Perform operations and solve equations involving rational expressions. (GE2, Core B)
4. Perform operations and solve equations involving radical expressions and rational exponents. (GE2, Core B)
5. Recognize and work with functions and function notation. (GE2, Core B)
6. Analyze graphs of polynomial functions. (GE2, Core B)
7. Solve quadratic inequalities. (GE2, Core B)

**Course-specific General Education Knowledge Goals and Core Skills:**

**General Education Knowledge Goals**

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

**MCCC Core Skills**

**Goal B. Critical Thinking and Problem-solving.** Students will use critical thinking and problem-solving skills in analyzing information.

In the following outline of the units of study, **CG** matches each objective with its course goal and the associated general education and MCCC core skills, and **GE** refers to General Education Knowledge Goals and **Core** refers to MCCC Core Skills.

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**Units of study in detail:**

**Unit I Graphing Linear Equations in Two Variables**

The student will be able to:

- Read, interpret, and explain trends in graphs which model applications. (CG1, GE 2, Core B)
- Determine the relationship between slope and horizontal, vertical, parallel, and perpendicular lines. (CG1, GE 2, Core B)
- Define and graph linear equations in two variables. (CG1, GE 2, Core B)
- Express and graph linear equations in slope-intercept form. (CG1, GE 2, Core B)
- Use linear modeling to find the equation of a line through two given points, or a slope and y-intercept. (CG1, GE 2, Core B)
- Find equations of lines that are horizontal, vertical, and parallel/perpendicular to given lines. (CG1, GE 2, Core B)
Unit II  
**Systems of Two Linear Equations**

The student will be able to:
- Solve systems of two linear equations having real number solutions, using a variety of methods, such as graphing and algebraic solving. (CG2, GE 2, Core B)
- Identify systems of two linear equations as consistent and inconsistent. (CG2, GE 2, Core B)
- Solve application problems that involve systems of two linear equations. (CG2, GE 2, Core B)

Unit III  
**Rational Expressions and Equations**

The student will be able to:
- Define rational expressions and identify where they are undefined. (CG3, GE 2, Core B)
- Simplify rational expressions. (CG3, GE 2, Core B)
- Multiply and divide rational expressions. (CG3, GE 2, Core B)
- Find the LCD (Least Common Denominator) for given rational expressions. (CG3, GE 2, Core B)
- Add and subtract rational expressions. (CG3, GE 2, Core B)
- Simplify complex fractions. (CG3, GE 2, Core B)
- Solve rational equations. (CG3, GE 2, Core B)

Unit IV  
**Radicals and Rational Exponents**

The student will be able to:
- Define and calculate square, cube, and $n$th root of a number. (CG4, GE 2, Core B)
- Calculate and/or simplify expressions with radicals or rational exponents. (CG4, GE 2, Core B)
- Add and subtract radical expressions. (CG4, GE 2, Core B)
- Multiply and divide radical expressions. (CG4, GE 2, Core B)
- Divide radical expressions. (CG4, GE 2, Core B)
- Solve radical equations. (CG4, GE 2, Core B)
- Define the imaginary number $i$ and complex number $a + bi$. (CG4, GE 2, Core B)
- Add, subtract, multiply, and divide complex numbers. (CG4, GE 2, Core B)
- Define and solve quadratic equations with all solution types using a variety of solving methods. (CG4, GE 2, Core B)

Unit V  
**Functions: Linear and Quadratic**

The student will be able to:
- Use the discriminant to find the number of real and complex solutions to a quadratic equation. (CG5, CG6, GE 2, Core B)
- Graph quadratic equations, identifying the vertex, axis of symmetry, and the maximum/minimum value attained by the function. (CG5, CG6, GE 2, Core B)
- Identify the domain and range of a quadratic function. (CG5, CG6, GE 2, Core B)
- Identify the domain and range of several types of functions. (CG5, CG5, GE 2, Core B)
- Solve quadratic inequalities. (CG5, CG7, GE 2, Core B)
**Evaluation of student learning:**

Achievement of the course objectives will be evaluated through the following methods:
- Assessments covering all course objectives throughout the course (CG 1-7).
- A comprehensive final examination to demonstrate a student’s ability to retain and apply course objectives (CG 1-7).

A recommended grading scheme follows.
- The grade earned on the final exam is the grade earned for the course. Minimum passing grade is a grade of C.

Other course policies:
- Students must pass the comprehensive final exam to pass the class.
- Students who cannot complete the course in one semester can re-register and continue where s/he left off. There is no need to repeat modules already completed unless the curriculum has not been retained.
- Upon successful completion, students may register for MAT 146

**Academic Integrity Statement:**

Mercer County Community College is committed to academic integrity – the honest, fair and continuing pursuit of knowledge, free from fraud or deception.

Students should never:
- knowingly represent the work of others as their own
- knowingly represent previously completed academic work as current
- fabricate data to support academic work
- use or obtain unauthorized assistance in the execution of any academic work
- give fraudulent assistance to other students
- unethically use technological means to gain academic advantages

Violators of the above actions will be penalized. The student will be reported to the Academic Integrity Committee. The student has right to a hearing and to appeal any decisions. These rights are outlined in the student handbook.