COURSE OUTLINE

Course Number: MAT 042
Course Title: Foundation Math for Non-STEM
Credits: 3

Hours: lecture/Lab/Other 0/6 lab
Pre-requisite: None
Implementation: sem/year Fall 2019

Catalog description: Foundation mathematics course designed for students with experience in algebra but who need to strengthen their mastery of the fundamentals. Topics include linear equations, linear inequalities, absolute value equations, absolute value inequalities, exponents, polynomials, factoring, and quadratic equations. Those who complete this course may register for MAT115, MAT120, MAT125, or MAT140. [This course does not fulfill mathematics elective requirements.]

Is course New, Revised, or Modified? Modified

Required texts/other materials:
1. ALEKS Software
2. Scientific calculator

Revision date: Spring 2020
Course coordinator: Jamie 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 during lab periods and 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-specific Institutional Learning Goals (ILGs)/General Education Goals.

General Education Knowledge Goals
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.

Course Competencies/Goals:

The student will be able to:
1. Develop a strategy for solving linear equations and inequalities in one variable. (ILG2, ILG11)
2. Develop a strategy for solving absolute value equations and inequalities in one variable. (ILG2, ILG11)
3. Synthesize the rules of exponents and polynomial operations to simplify algebraic expressions to a standard form. (ILG2, ILG11)
4. Distinguish polynomials in order to apply correct techniques of factoring. (ILG2, ILG11)
5. Develop a strategy for solving quadratic equations. (ILG2, ILG11)

Units of study in detail.

Unit I  Linear Equations and Inequalities

Learning Objectives
The student will be able to...

- Solve two-step linear equations by combining like terms involving integers, fractions and decimals. (CG I)
- Apply the operations of addition, subtraction, multiplication, and division to solve two-step linear equations. (CG1)
- Apply the properties of real numbers to calculate a solution to a linear equation with a variable in the denominator. (CG1)
- Recognize and apply the distributive property to solve linear equations. (CG1,2)
- Determine and apply the properties needed to solve linear equations with variables on both sides of the equation. (CG1)
- Apply the operations of addition, subtraction, multiplication, and division to solve literal equations. (CG1)
- Translate written English phrases into algebraic expressions. (CG1)
- Solve application problems involving linear equations and inequalities. (CG1)
- Define, solve, and graph solutions to simple and compound linear inequalities, as well as compound linear inequalities using "and" & “or” terminology. Express the solution in interval notation. (CG1)
- Apply appropriate methods to solve application problems involving inequalities. (CG1)
Unit II Absolute Value Equations and Inequalities

**Learning Objectives**

The student will be able to...

- Solve absolute value equations algebraically. (G2)
- Apply the operations of addition, subtraction, multiplication, and division to solve two-step absolute value equations. (CG2)
- Determine and apply the properties needed to solve absolute value equations with variables on both sides of the equation. (CG2)
- Define, solve, and graph solutions to absolute value inequalities. Express the solution in interval notation. (CG2)

Unit III Exponents and Polynomials

**Learning Objectives**

The student will be able to...

- Classify and evaluate polynomials. (CG3)
- Apply the mathematical operations of addition and subtraction to polynomials. (CG3)
- Apply the product rule to simplify expressions involving exponents. (CG3)
- Apply the quotient rule to simplify expressions involving exponents. (CG3)
- Apply the power to a power rule to simplify expressions involving exponents. (CG3)
- Apply the rules of exponents to simplify expressions involving negative exponents. (CG3)
- Apply rules for integer exponents to scientific notation. (CG3)
- Solve application problems involving polynomials and scientific notation. (CG3)
- Perform addition and subtraction of polynomials and simplify the answers. (CG3)
- Apply the rules of exponents and order of operations to simplify expressions, multiply polynomials, and divide polynomials. (CG3)

Unit IV Factoring

**Learning Objectives**

The student will be able to...

- Identify the greatest common factor and use it to factor a polynomial. (CG4)
- Factor by grouping. (CG4)
- Factor quadratic expressions, $ax^2 + bx + c$ when $a = 1$ and when $a \neq 1$. (CG4)
- Factor trinomials of higher order by removing a GCF first, then factoring the remaining quadratic expression. (CG4)
- Factoring special products such as difference of two squares, perfect square trinomials, and the sum/difference of two cubes. (CG4)

Unit V Quadratic Equations

**Learning Objectives**

The student will be able to...

- Solve quadratic equations by applying the Zero Factor Property. (CG5)
- Solve quadratic equations using the quadratic formula to find real solutions. (CG5)
- Solve quadratic equations by applying the completing the square technique. (CG5)
- Identify and solve an equation that is quadratic in form. (CG5)
- Determine a quadratic equation when given its roots and leading coefficient. (CG5)

As this is a mathematics course, by nature all the learning objectives support the General Education Goal 2. However, this is a foundations level course and as such it is not expected that the students would use this course as a general education course.
**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 1-8).
- A comprehensive final examination to demonstrate a student's ability to retain and apply course objectives (CG 1-8).

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 MAT125, MAT 115, or MAT 120.

**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. For a single violation the faculty member will determine the course of action. This may include, assigning a lower grade on the assignment, lowering the course grade, failing the student, or another penalty that is appropriate to the violation. The student will be reported to the Academic Integrity Committee, who may impose other penalties for a second (or later) violation. The student has right to a hearing and also to appeal any decisions. These rights are outlined in the student handbook.