COURSE OUTLINE

Course Number	Course Title	Credits
MAT 033	**Pre-Algebra**	**4**
Hours: Lecture/Lab/Other	**Co- or Pre-requisite**	**Implementation Semester & Year**
4/0/0	**None**	**Spring 2022**

Catalog description:
Developmental mathematics course designed for students needing a review of basic arithmetic, including an introduction to algebra. Topics include operations with whole numbers, decimals, fractions, percents, ratio and proportion, signed numbers, and an introduction to algebraic equations. [Foundation course does not fulfill mathematics elective requirement.]

General Education Category:
Not GenEd

Course coordinator:
Betty Peterson, petersob@mccc.edu, 609-570-3421

Required texts & Other materials:
Text: Pre-Algebra – An Integrated Approached by Lial and Hestwood (Pearson Education, Inc)
OR
Any other textbook selected by the instructor covering the curriculum.

Course Student Learning Outcomes (SLO):
As this is a foundations level mathematics course, the objective of the course is to begin to prepare students to take the mathematics course required for their program of study. Crucial to success in a mathematics course is an ability to think "algebraically", that is to be able to demonstrate an ability to move beyond arithmetic algorithms into abstract reasoning.

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

1. Recognize equivalent forms of rational numbers and write rational numbers in an equivalent form. (Supports ILGs 2, 4)
2. Use proportional reasoning to solve application problems. (Supports ILGs 2, 11)
3. Apply order of operations, recognizing various methods to indicate multiplication in algebra. (Supports ILGs 2, 4, 11)
4. Understand the relative size of both integers and rational numbers, and be able to make comparisons. (Supports ILGs 2, 4, 11)
5. Translate written English to the language of mathematics and understand the concept of a variable with its role in a formula. (Supports ILGs 2, 11)
6. Perform basic arithmetic properties and the operations of addition, subtraction, multiplication, division, exponents and rounding. (Supports ILGs 2, 4, 11)
7. Recognize and interpret information given in graphs and tables. (Supports ILGs 2, 11)

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 Whole Numbers [SLOs 4, 5, 6, 7]

The student will be able to…

- Compare whole numbers using inequality symbols.
- Read and write numbers with words and digits and understand how to express numbers both ways.
- Round whole numbers to specified place values and use rounded numbers for estimation.
- Perform the operations of addition, subtraction, multiplication, and division, by hand as well as by using a calculator.
- Recognize the associative and commutative property for both addition and multiplication and understand that commutative property does not hold for subtraction nor division.
- Be able to read and interpret tables and graphs.
- Use exponential notation and apply the multiplication rule for numbers given in exponential notation.
- Evaluate arithmetic expressions and apply order of operations.
- Factor whole numbers, listing all factors as well as recognizing prime and composite numbers.

Unit II Ratios, Proportions Variables and Problem Solving [SLOs 1, 2, 5, 6]

The student will be able to…

- Write fraction notation for ratios.
- Determine whether two pairs of numbers are proportional.
- Solve a proportion using cross products.
- Solve applications using proportions.
- Recognize and understand the concept of a variable in context and symbolically.
- Translate a written statement into a statement involving variables.
- Evaluate variable expressions.
- Apply formulas to solve contextual problems.
- Apply fundamental principles of algebra to solve equations of the form $x + a = b$, $x - a = b$ and $ax = b$

Unit III Rational Numbers: Integers [SLOs 3, 4, 5, 6]

The student will be able to…

- Identify integers.
- Represent quantities in real-world situations using integers.
- Compare integers using inequality symbols.
- Calculate the absolute value of integers.
- Perform the mathematical operations of addition, subtraction, multiplication and division on integers, both by hand and by using a calculator.
- Apply exponents to integers.
- Use order of operations with expressions involving integers.
- Evaluate formulas involving integers.

Unit IV **Rational Numbers: Fractions and Decimals [SLOs 1, 3, 4, 6]**

The student will be able to…

- Write equivalent fractions with both larger and smaller denominators.
- Convert mixed numbers to improper fractions and improper fractions to mixed numbers.
- Compare fractions and recognize which fraction of a pair is larger, or whether they are equivalent.
- Perform the mathematical operations of addition and subtraction of fractions and mixed numbers with both common and different denominators both by hand and with a calculator.
- Perform the mathematical operations of multiplication and division on fractions and mixed numbers.
- Identify place values of numbers written in decimal form and round to a given place.
- Convert between decimal and fraction or mixed number and recognize that they are equivalent numbers.
- Compare decimal numbers and fractions to determine relative size.
- Perform the mathematical operations of addition, subtraction, multiplication and division on decimal numbers.
- Use the order of operations to evaluate expressions involving decimals.

Unit V **Rational Numbers: Proportions and Percents [SLOs 1, 2, 4, 5]**

The student will be able to…

- Understand the distinction between absolute and relative measure.
- Write a ratio in its fraction, decimal and percent formats.
- Use proportions to solve for an unknown if given a known relationship.
- Solve application problems involving percentage increases and percentage decreases.
- Calculate an additional percentage off and recognize that 20% off an item already reduced by 20% is not the same as 40% off the original.
- Use proportions to solve problems that involve rates.
- Apply unit or dimensional analysis to solve application problems.

Evaluation of student learning:

Grade based on the following recommended percentages:
30% for Tests (2)
20% for In-class assignments/quizzes/projects
20% for Midterm
30% for Final

Questions on graded assignments selected to assess the comprehension of both the course and unit learning outcomes listed above. The instructor needs to define the activities encompassing the in-class portion of the grade on the syllabus.

The final is comprehensive and passing the final is required to pass the class.