

Course Description**MAT0057 | Developmental Mathematics (Modules 3.0) | 3.00 credits**

Students will learn to strengthen arithmetic, geometry, and algebra skills. This course does not satisfy the college level mathematics requirements. Prerequisite: Non-demonstration of readiness through placement testing or alternate methods or departmental permission.

Course Competencies:

Competency 1: The student will demonstrate knowledge of place value by:

1. Identifying place value
2. Writing numbers using word notation, standard notation, and expanded notation
3. Rounding whole numbers

Competency 2: The student will demonstrate knowledge of whole numbers by:

1. Performing operations with addition, subtraction, multiplication, and division with whole numbers
2. Solving applications involving operations with whole numbers, including area and perimeter
3. Performing order of operations, including absolute value
4. Simplifying numerical expressions involving positive integer exponents on whole numbers
5. Identifying and applying properties of real numbers using whole numbers

Competency 3: The student will demonstrate knowledge of integers by:

1. Performing operations with integers, including applications
2. Simplifying numerical expressions involving positive integer exponents on integers
3. Evaluating absolute value expressions involving integers

Competency 4: The student will demonstrate knowledge of fractions by:

1. Identifying and defining reciprocals of whole numbers and of fractions
2. Performing operations with addition, subtraction, multiplication, and division with fractions
3. Distinguishing between proper fractions, improper fractions, and mixed numerals
4. Performing operations with addition, subtraction, multiplication, and division with mixed numerals
5. Converting units of measurement across measurement systems using unit factors
6. Solving applications involving operations with fractions

Competency 5: The student will demonstrate knowledge of decimals by:

1. Performing operations with addition, subtraction, multiplication, and division with decimals
2. Rounding decimals
3. Solving applications involving operations with decimals

Competency 6: The student will demonstrate knowledge of percent by:

1. Using percent notation, fractional notation, and decimal notation interchangeably
2. Solving applications involving percentages

Competency 7: The student will demonstrate knowledge of basic geometric figures by:

1. Solving application problems, including finding the polygons' perimeter and the circles' circumference
2. Finding the area of a triangle, parallelogram, and circle
3. Converting units of measurement within the same measurement system

Competency 8: The student will demonstrate knowledge of real numbers by:

1. Classifying sets of numbers
2. Comparing the magnitude of real numbers
3. Identifying and applying the properties of real numbers
4. Performing operations with addition, subtraction, multiplication, and division with real numbers

5. Applying the order of operations rule to simplify numerical expressions, including those involving absolute value.
6. Comparing real numbers using $<$, $>$, \geq , \leq , \neq , or $=$
7. Determining the absolute values of signed numbers
8. Simplifying bare square roots and cube roots
9. Simplifying numerical expressions involving integer exponents, including negative integer exponents and zero exponents
10. Converting numbers to scientific notation and changing from scientific notation to decimal form

Competency 9: The student will demonstrate knowledge of Pre-Algebra by:

1. Setting up and solving ratios and proportions with simple algebraic expressions
2. Solving linear equations involving the addition and multiplication properties of equality
3. Defining variables and writing an expression to represent a quantity in a problem
4. Combining like terms in one variable (e.g., $2x + 5x$)
5. Evaluating algebraic expressions (e.g., find the value of $3x$ when $x = 2$)
6. Solving formulas with given values, including temperature conversion formulas
7. Graphing an inequality on a number line

Competency 10: The student will demonstrate knowledge of equations by:

1. Solving linear equations in one variable involving integers
2. Solving linear equations involving fractions and decimals
3. Solving literal equations for a given variable with applications
4. Solving applications involving linear equations in one variable (including number problems, geometry problems and proportion problems)

Competency 11: The student will demonstrate knowledge of linear inequalities by:

1. Solving linear inequalities in one variable
2. Graphing solutions of linear inequalities on a number line

Competency 12: The student will demonstrate knowledge of algebraic expressions by:

1. Evaluating expressions, given specific values of the variable
2. Identifying and combining like terms
3. Simplifying expressions by applying the order of operations
4. Solving application problems involving geometry, including perimeter and area, with algebraic expressions
5. Solving application problems involving right triangles and the Pythagorean Theorem

Competency 13: The student will demonstrate knowledge of polynomials by:

1. Performing operations with addition, subtraction, multiplication, and division with polynomials
2. Applying the rules of exponents to perform operations with polynomials

Competency 14: The student will demonstrate knowledge of factoring by:

1. Factoring out the most significant common factor
2. Factoring by grouping
3. Factoring trinomials
4. Factoring the difference of two squares
5. Solving quadratic equations in one variable by factoring

Competency 15: The student will demonstrate knowledge of linear equations in two variables by:

1. Graphing linear equations in two variables
2. Determining the slope of a line (from slope formula, graph and equations)
3. Determining the x- and y-intercepts of a line given the graph of the line or its equation

Competency 16: The student will demonstrate knowledge of rational expressions by:

1. Simplifying a rational expression by factoring

2. Solving problems involving rates and ratios
3. Simplifying, multiplying, and dividing rational expressions
4. Adding and subtracting rational expressions with monomial denominators

Competency 17: The student will demonstrate knowledge of radical expressions by:

1. Simplifying radical expressions using the product rule
2. Adding, subtracting, and multiplying radicals
3. Rationalizing the denominator (monomials only)

Learning Outcomes:

- Use quantitative analytical skills to evaluate and process numerical data