COURSE OUTLINE

Mathematics 141
Elementary Algebra

Catalog Statement

MATH 141 is an accelerated course in the fundamental operations of algebra. The course focuses on solutions of linear and quadratic equations, algebraic operations, factoring, rational expressions, exponents and radicals, systems of linear equations and graphing linear and quadratic equations. This course is the equivalent of the traditional first year of algebra in secondary school and is designed for students to review their algebra.

Total Lecture Units: 3.5
Total Laboratory Units: 0.5
Total Course Units: 4.0

Total Lecture Hours: 56.0
Total Laboratory Hours: 24.0
Total Laboratory Hours To Be Arranged: 0.0
Total Faculty Contact Hours: 80.0

Prerequisite: Placement is based on a composite of test scores and academic background or satisfactory completion of MATH 145 or MATH 245B.

Note: Students with two unsuccessful attempts in MATH 141 (with a grade of W, D, F, or NP) who plan to complete Elementary Algebra will be required to take the MATH 145/245 and 146/246 sequence. This course may not be taken for credit by students who have completed MATH 146, or 246B. A maximum of 4 units will be granted for MATH 141, 145, 146, 245A, 245B, 246A, and 246B. A maximum of 8 units will be granted for Math 141 and 144.

Course Entry Expectations

Prior to enrolling in this course, the student should be able to:

- add, subtract, multiply and divide real numbers;
- solve percent problems;
- use correct order of operations;
- evaluate expressions;
- find area and perimeter of squares, rectangles, triangles, and circles;
- solve linear equations;
- use laws of exponents;
- add, subtract, and multiply polynomials;
- graph linear equations;
- use algebra to solve linear applications.

Course Exit Standards

Upon successful completion of the required coursework, the student will be able to:

- add, subtract, multiply and divide real numbers;
- solve linear equations and inequalities;
- solve absolute value equations and inequalities;
- simplify exponential expressions;
- add, subtract, multiply and divide polynomials;
- graph linear equations and inequalities;
- find the equation of the line passing through 2 points;
- solve linear systems using 3 different methods;
- use algebra to solve applied problems;
- use function notation;
- factor polynomials;
- add, subtract, multiply and divide algebraic fractions;
- solve rational equations;
- use algebra to solve applied problems;
- use the properties of radicals to simplify radicals;
- add, subtract, multiply and divide radicals;
- solve radical equations;
- solve quadratic equations by factoring, completing the square, and using the quadratic formula;
- graph quadratic functions and circles;
- use the distance formula to find the distance between two points.

Course Content **Total Faculty Contact Hours = 80.0**

Review of Real Numbers **(3 lecture hours, 1 lab hour lab)**
- Notation and symbols
- Adding and subtracting real numbers
- Properties of real numbers
- Multiplying and dividing real numbers
- Subsets of the real numbers
- Addition and subtraction with fractions

Linear Equations and Inequalities **(7 lecture hours, 3 lab hours)**
- Simplifying expressions
- Addition property of equality
- Multiplication property of equality
- Solving linear equations
- Formulas
- Applications
- Linear and compound inequalities
- Absolute value equations and inequalities

Linear Equations and Inequalities in Two Variables **(6 lecture hours, 3 lab hours)**
- Graphing ordered pairs

- Solutions to linear equations in two variables
- Graphing linear equations in two variables
- Graphing using intercepts
- The slope of a line
- Finding the equation of a line
- Linear inequalities in two variables

Systems of Linear Equations **(6 lecture hours, 2 lab hours)**

- Solving systems of equations by graphing
- Solving systems of equations by elimination
- Solving systems of equations by substitution
- Applications of systems of equations
- Solving systems of three equations in three variables

Exponents and Polynomials **(8 lecture hours, 4 lab hours)**

- Multiplication with exponents
- Division with exponents
- Operations with monomials
- Addition and subtractions of polynomials
- Multiplication with polynomials
- Binomial squares and other special products
- Dividing polynomials
- Functions and function notation

Factoring **(7 lecture hours, 3 lab hours)**

- The greatest common factor
- Factoring by grouping
- Factoring trinomials
- The difference of two squares
- Solving equations by factoring
- Applications
- Factoring cubes

Rational Expressions **(8 lecture hours, 4 lab hours)**

- Reducing rational expressions to lowest terms
- Multiplication and division of rational expressions
- Addition and subtraction of rational expressions
- Equations involving rational expressions
- Applications
- Complex fractions
- Proportions and variation

Roots and Radicals **(5 lecture hours, 2 lab hours)**

- Definitions and common roots
- Properties of radicals
- Simplified form for radicals
- Addition and subtraction of radical expressions
- Multiplication and division of radicals
- Equations involving radicals

More Quadratic Equations **(6 lecture hours, 2 lab hours)**

- Solving using the square root method

Solving by completing the square
The quadratic formula
Complex numbers
Complex solutions to quadratic equations
Graphing parabolas
Distance formula and graphing circles

Methods of Instruction

The following methods of instruction may be used in this course:

- classroom lecture and discussion;
- group work and discussion;
- online video lectures.

Out of Class Assignments

The following out of class assignments may be used in this course:

- homework (e.g. problem sets related to course content);
- reading assignments (e.g. study skills related to mathematics).

Methods of Evaluation

The following methods of evaluation may be used in this course:

- quizzes;
- five to eight chapter exams are required;
- a comprehensive final exam is required.

Textbooks

Tussy, Alan and R. David Gustafson. *Elementary Algebra:* Glendale Community College. 5th ed. Boston: Cengage Learning, 2016. Print.
8th Grade Textbook Reading Level. ISBN: 978-1-111-56766-8

Student Learning Outcomes

Upon successful completion of the required coursework, the student will be able to:

- simplify polynomial, rational, and radical expressions;
- solve linear, absolute value, rational, radical, and quadratic equations, solve linear and absolute value inequalities, and solve systems of equations;
- graph lines, parabolas, and circles;
- use mathematical models including linear, quadratic, rational, and radical equations, and systems of equations to solve application problems;
- factor polynomials.