Course Title: College Preparatory Mathematics I
Prerequisite: Placement with a score below 20 on ACT, below 450 on SAT, or assessing into Basic Applied Mathematics or Basic Algebra using Accuplacer, ASSET or Compass.
Course Description: To provide the opportunity for students to master math skills that they need to have to be successful in their chosen academic/career goals.

A student needing to master competencies included in any Module 1 – 12 will register for College Preparatory Mathematics I (CPM1). The student is expected to complete a minimum of 4 modules in order to earn a passing grade in this course except if the student needs less than 4 modules.

If a student successfully completes CPM1 and still has modules that need to be completed, they will register for College Preparatory Mathematics II (CPM2), a three-credit hour course. Upon successful completion of CPM2 and the student has modules that need to be completed, the student enrolls in College Preparatory Mathematics III (CPM3), a three-credit hour course. If a student successfully completes CPM1 or CPM2 and only has one or two modules to complete, the student registers for College Preparatory Mathematics IV (CPM4), a variable credit course of 1 or 2 hours. If the student has only two modules to complete, they enroll in CPM4 for 2 credit hours. If the student has only one module to be completed, they enroll in CPM4 for 1 credit hour.

Module 1: Whole Numbers
Topics include adding, subtracting, multiplying and dividing whole numbers, place value, ordering, estimating, exponents and order of operations.

Module 2: Fractions
Topics include least common multiple among a set of whole numbers, reducing, multiplying, dividing, adding and subtracting fractions, divisibility tests, mixed numbers, and improper fractions.

Module 3: Decimals and Percent
Topics include ordering, adding, subtracting, multiplying and dividing with decimals, converting between fractions, decimals and percent, rounding, ratios, proportions, and percent increase/decrease.

Module 4: Real Numbers and Introduction to Algebra
Topics include adding, subtracting, multiplying and dividing signed numbers, absolute value, order of operations, sets and subsets of real numbers, the properties of real numbers such as commutative, associative, inverse, identity and distributive properties, combining like terms and evaluating expressions.

Module 5: Equations and Inequalities in One Variable
Topics include solving linear equations, graphing solution sets of linear inequalities on a number line, solving linear inequalities, and solving absolute value equations and inequalities. The equations could contain fractional or decimal coefficients. The solution set could contain no solution or an infinite number of solutions.

Module 6: Linear Equations in Two Variables
Topics include graphing a linear equation in two variables by generating points and using intercepts, function notation, domain and range of a function, vertical line test, calculating slope, graphing lines using a point and slope, parallel and perpendicular lines, vertical and horizontal lines, and writing the equation of a line.

Module 7: Systems of Equations in Two Variables
Topics include graphing, substitution and elimination methods for solving systems, and develop a system of equations to find solutions to an application problem.

Module 8: Polynomial Operations
Topics include exponent simplification rules, adding, subtracting, multiplying and dividing polynomials.

Module 9: Factoring
Topics include factoring polynomials by a variety of methods including GCF, grouping, difference of two squares, sum or difference of cubes and general factoring.

Module 10: Rational Expressions and Equations
Topics include reducing, multiplying, dividing, adding, subtracting rational expressions, simplifying complex fractions and solving rational equations.

Module 11: Radical Expressions and Equations
Topics include rational exponents, simplifying, multiplying, dividing, adding, subtracting radical expressions, complex numbers, and solving radical equations.

Module 12: Quadratic Equations and Functions
Topics include solving quadratic equations by factoring, square root method, completing the square and the Quadratic Formula, sketching graphs of quadratic functions, and intercepts and vertex for a quadratic function.

When a student completes all twelve modules, they can enroll in MATH 1828 College Algebra

<u>Core Competencies</u>
The course content is organized into twelve modules. Each student will be given individualized learning plans providing particular paths to reach the necessary learning outcomes based on the student's academic/career goals.

Below are the competencies within each module.

Module 1: Whole Numbers
1. Find place value
2. Add and subtract whole numbers
3. Solve application problems involving adding/subtracting whole numbers
4. Round, estimate whole numbers
5. Multiply and divide whole numbers
6. Solve applications involving multiplying/dividing whole numbers
7. Use the distributive property and other properties of whole numbers
8. Identify the base and the exponent in an exponential expression
9. Find the square root of a whole number
10. Use the order of operations with whole numbers

Module 2: Fractions
1. Write a mixed numeral as an improper fraction and an improper fraction as a mixed number
2. Find prime factorization of a whole number
3. Apply divisibility test to whole numbers
4. Simplify/reduce a fraction
5. Determine whether two fractions are equivalent
6. Multiply fractions
7. Find the reciprocal of a fraction
8. Divide fractions
9. Solve applications involving multiplying/dividing fractions
10. Add or subtract fractions that have the same denominator
11. Find the Least Common Multiple of two or more whole numbers
12. Find a fraction that is equivalent to a fraction with a given denominator
13. Find the LCD of two or more fractions
14. Add or subtract fractions that have different denominators
15. Use the properties of fractions and the order of operations to add, subtract, multiply and divide fractions

Module 3: Decimals and Percent
1. Find the place value of digits in a decimal number
2. Read and write decimal numbers
3. Compare and order decimal numbers
4. Round decimal numbers
5. Add and subtract decimal numbers
6. Multiply and divide with decimals
7. Multiply and divide by powers of ten
8. Use the order of operations to add, subtract, multiply and divide decimal numbers
9. Express a number as a decimal and fraction.

10. Use a ratio to compare two quantities
11. Use a ratio to represent a rate
12. Set up and solve a proportion
13. Use proportions to solve application problems
14. Express a number as a percent, decimal and fraction.
15. Find percent of increase or decrease
16. Solve percent problems

Module 4: Real Numbers and Introduction to Algebra
1. Identify the subsets of the real number set like natural (or counting) numbers, whole numbers, integers, rational numbers and irrational numbers.
2. Order signed numbers on a number line
3. Find the absolute value of a number
4. Evaluate expressions and formulas for given values of the variables.
5. Use order of operations with signed numbers
6. Add and subtract signed numbers
7. Multiply and divide signed numbers
8. Solve applications involving signed numbers
9. Identify Commutative, Associative and Distributive Properties
10. Identify Inverses and Identities
11. Identify constants, variables, terms, and coefficients.
12. Combine like terms.

Supplemental Competencies
Module 5: Equations and Inequalities in One Variable
1. Solve a multistep linear equation.
2. Solve an equation with fractional coefficients.
3. Solve equations with no solutions or all real numbers solution sets.
4. Graph solutions of inequalities in one variable.
5. Solve a linear inequality.
6. Solve a compound inequality.
7. Solve absolute value equations
8. Solve absolute value inequalities

Module 6: Linear Equations in Two Variables
1. Plot points on a coordinate plane
2. Identify solutions of linear equations in two variables.
3. Solve formulas for a particular variable.
4. Recognize linear equations in two variables.
5. Graph a linear equation by plotting ordered pairs.
6. Determine the intercepts of a linear equation.
7. Graph a linear equation using the intercepts.
8. Graph horizontal and vertical lines and recognize their equations.
9. Use the geometric interpretation and the algebraic definition of rise and run.
10. Find the slope of a line given two points.
11. Define positive slope, negative slope, zero slope, and undefined slope.
12. Graph parallel and perpendicular lines and find their slopes.

13. Graph a line given a point and the slope.
14. Find the equation of a line given a point on the line and the slope.
15. Find the equation of the line given two points on the line.
16. Find the equations of horizontal or vertical lines.
17. Find the equation of a line parallel or perpendicular to a given line.
18. Distinguish between a relation and a function
19. Determine the domain and range of a function
20. Use the vertical line test to determine if a relation is a function
21. Find functional values given a function
22. Write ordered pairs in function form

Module 7: Systems of Equations in Two Variables
1. Solve systems of linear equations in two variables by graphing and algebraic methods
2. Solve systems of linear equations in two variables by substitution
3. Solve systems of linear equations in two variables by elimination (addition) method.
4. Translate words into algebraic expressions.
5. Develop and solve mathematical models including number, geometry, percent and mixture applications.

Module 8: Polynomial Operations
1. Apply the properties of exponents.
2. Use properties of negative exponents in simplifying expressions
3. Write numbers using scientific notation.
4. Identify monomials, binomials, and trinomials and polynomials.
5. Identify the degree of a term and a polynomial.
6. Evaluate a polynomial.
7. Write the terms of a polynomial in descending order.
8. Add and subtract polynomials
9. Multiply a polynomial by a monomial.
10. Multiply binomials by the "FOIL" method.
11. Divide a polynomial by a monomial
12. Divide using polynomial long division.

Module 9: Factoring
1. Find the Greatest Common Factor of two or more whole numbers
2. Factor a polynomial by finding the GCF when the GCF is a monomial.
3. Factor a polynomial by finding the GCF when the GCF is a binomial.
4. Factor a polynomial with four terms by grouping.
5. Factor trinomials with a leading coefficient of 1.
6. Factor trinomials that do not have a leading coefficient of one.
7. Factor a difference of two squares.
8. Recognize the factoring of a sum of two squares is prime.
9. Factor a sum and difference of two cubes.
10. Factor a polynomial completely using a combination of methods.

Module 10: Rational Expressions and Equations
1. Determine when a rational expression is undefined.
2. Write a rational expression in lowest terms.
3. Reduce a rational expression in the form $\frac{a-b}{b-a}$
4. Multiply and divide rational expressions
5. Add and subtract rational expressions with <u>like</u> denominators.
6. Add and subtract rational expressions with <u>different</u> denominators.
7. Solve equations with rational expressions.
8. Simplify a complex fraction using division.

Module 11: Radical Expressions and Equations
1. Compute the principal square root
2. Determine the nth root of a number
3. Simplify radical expressions
4. Add, subtract, multiply and divide radical expressions
5. Identify the conjugate of an expression
6. Solve radical equations
7. Convert between rational exponents and radicals
8. Use properties of rational exponents to simplify expressions
9. Add, subtract, multiply and divide complex numbers

Module 12: Quadratic Equations and Functions
1. Solve quadratic equations by factoring
2. Solve quadratic equations using the square root method
3. Solve quadratic equations by completing the square
4. Solve quadratic equations using the Quadratic Formula
5. Determine the intercepts for a quadratic function
6. Find the vertex of a quadratic function
7. Graph quadratic functions