Algebra II

5 credits – Level I
Grades: 10-11, Level: I
Prerequisite: Minimum grade of 70 in Geometry Level I (or a minimum grade of 90 in Geometry Topics)

Units of study include: equations and inequalities, linear equations and functions, systems of linear equations and inequalities, matrices and determinants, quadratic functions, polynomials and polynomial functions, powers, roots, and radicals, rational equations and functions, sequence and series, and probability and statistics.

PROFICIENCIES

INEQUALITIES
-Solve inequalities
-Solve combined inequalities
-Use inequality models to solve problems
-Solve absolute values in open sentences
-Solve absolute value sentences graphically

LINEAR EQUATION FUNCTIONS
-Solve open sentences in two variables
-Graph linear equations in two variables
-Find the slope of the line
-Write the equation of a line
-Solve systems of linear equations in two variables
-Apply systems of equations to solve real word problems
-Solve linear inequalities in two variables
-Find values of functions and graphs
-Find equations of linear functions and apply properties of linear functions
-Graph relations and determine when relations are functions

PRODUCTS AND FACTORS OF POLYNOMIALS
-Simplify, add and subtract polynomials
-Use laws of exponents to multiply a polynomial by a monomial
-Calculate the product of two or more polynomials
-Demonstrate factoring
-Solve polynomial equations and inequalities
-Apply polynomial equations to solve real world problems

RATIONAL EQUATIONS
-Simplify quotients using laws of exponents
-Simplify expressions involving the exponent zero and negative integral exponents
-Use scientific notation and significant digits
-Simplify rational algebraic expressions
-Simplify rational expressions by addition, subtraction, multiplication or division
-Simplify complex fractions
-Solve equations and inequalities that have fractional coefficients
-Solve and use fractional equations

IRRATIONAL AND COMPLEX NUMBERS
-Find roots of real numbers
-Simplify expressions involving
-Simplify expressions involving sums of radicals
-Simplify products and quotients of binomials that contain radicals
-Solve equations containing radicals
-Find and use decimal representations of real numbers
-Use the number *i* to simplify square roots of negative numbers
-Perform operations on complex numbers

QUADRATIC EQUATIONS AND FUNCTIONS
-Solve quadratic equations by completing the square
-Solve quadratic equations by using the quadratic formula
-Determine the nature of the roots of a quadratic equation using the discriminant
-Identify and solve equations in quadratic form
-Graph parabolas
-Identify the vertex, axes of symmetry, maximum or minimum value, and roots of a parabola
-Determine the relationship between the roots and coefficients of a quadratic equation

VARIATION AND POLYNOMIAL EQUATIONS
-Solve problems involving direct, inverse and joint variation
-Divide polynomials using long division and synthetic division
-Solve polynomial equations
-Write a polynomial equation given the roots

ANALYTIC GEOMETRY
-Find the distance between any two points and the midpoint of the line segment joining them
-Relate the center and the radius to the equation of a circle
-Identify the vertex, axes of symmetry, maximum or minimum value, and roots of a parabola
-Use algebraic methods to find exact solutions of quadratic systems
-Solve systems of linear equations in three variables

EXPONENTIAL FUNCTIONS
-Expand the meaning of exponents to include rational numbers and irrational numbers and define exponential functions
-Find the composite of two given functions and find the inverse of a given function

SEQUENCES AND SERIES
-Determine whether a sequence is arithmetic, geometric or neither, and supply missing terms of a sequence
-Find a formula for the nth term of an arithmetic or geometric sequence and find specified terms of arithmetic or geometric sequences
-Identify a series and use sigma notation
-Find sums of finite arithmetic and geometric series
-Find sums of an infinite geometric series