

## Algebra II

### COURSE DESCRIPTION:

In this course students will use their prior knowledge from previous courses to learn and apply Algebra II skills. This course will include topics such as functions, radical functions, rational functions, exponential and logarithmic functions, trigonometry, geometry, conic sections, systems of equations, probability, and statistics. Students will apply the skills that they learn in this course to real world situations.

### COURSE OBJECTIVES:

After completing this course students will be able to:

- Understand the major topics in Algebra II
- Identify how the major topics in Algebra II relate to real world situations
- Apply the topics in Algebra II to various problems
- Explain how the topics in Algebra II relate to the greater context of mathematics

**PREREQUISITES:** Algebra I

**COURSE LENGTH:** Two Semesters

**REQUIRED TEXT:** None

Note: Java is needed for the embedded graphing calculator applet (GCalc). A free download is available at <http://www.java.com/en/download/>.

### COURSE OUTLINE:

#### Semester One

##### UNIT I: Linear and Quadratic Functions

Section 1 - Functions and Relations

Section 2 - Solving Linear Equations and Inequalities

Section 3 - Writing and Graphing Linear Equations and Inequalities

Section 4 - Graphing Quadratic Functions

Section 5 - Solving Quadratic Equations and Inequalities

Section 6 - Graphing Zeros and Min/Max Values

Section 7 - Determining a Quadratic Function

##### UNIT II: Radical Functions

Section 1 - Roots and Properties of Exponents

Section 2 - Graphing Radical Functions and Domain and Range

Section 3 - Solving Radical Equations

##### UNIT III: Rational Functions

Section 1 - Direct and Inverse Variation

Section 2 - Graphing Rational Functions and Domain and Range

Section 3 - Solving Rational Equations

## Algebra II (continued)

### COURSE OUTLINE (continued):

#### Semester One

##### **UNIT IV: Exponential and Logarithmic Functions**

- Section 1 - Comparing Exponential and Logarithmic Functions
- Section 2 - Graphing Exponential Functions and Domain and Range
- Section 3 - Exponential Growth and Decay
- Section 4 - Graphing Logarithmic Functions and Domain and Range
- Section 5 - Solving Exponential and Logarithmic Equations

##### **UNIT V: Trigonometric Functions**

- Section 1 - Right Triangle Trigonometry
- Section 2 - Basic Angles and Radian Measure
- Section 3 - Trigonometric Values in all Four Quadrants
- Section 4 - Inverse Trigonometric Values
- Section 5 - Graphing Trigonometric Functions

#### Semester Two

##### **UNIT VI: Systems of Equations and Inequalities**

- Section 1 - Matrices and Determinants
- Section 2 - Systems of Equations
- Section 3 - Systems of Inequalities
- Section 4 - Systems of Equations with Three Variables

##### **UNIT VII: Geometry**

- Section 1 - Constructing and Transforming Geometric Shapes
- Section 2 - Geometry of Quadrilaterals
- Section 3 - Geometry of Triangles
- Section 4 - Geometry of Circles

##### **UNIT VIII: Conic Sections**

- Section 1 - Introduction to Conic Sections
- Section 2 - Parabolas
- Section 3 - Circles
- Section 4 - Ellipses
- Section 5 - Hyperbolas

##### **UNIT IX: Probability and Statistics**

- Section 1 - Determining Probability
- Section 2 - Permutations and Combinations
- Section 3 - Binomial Theorem
- Section 4 - Scatterplots and Lines of Best Fit
- Section 5 - Scatterplots and Curves of Best Fit
- Section 6 - Sampling Methods and Experimental Designs
- Section 7 - The Normal Curve

##### **UNIT X: Patterns and Sequences, Logic and Reasoning**

- Section 1 - Arithmetic Sequences and Series
- Section 2 - Geometric Sequences and Series
- Section 3 - Logic