Algebra 2

I. Course Description:

This one year course continues to review the concepts taught in Algebra I while progressing toward more advanced algebraic and geometric concepts in Advanced Mathematics. The course will cover more advanced terms, procedures & formulas such as Quadratic equations, Logarithms, Antilogarithms, Pythagorean Theorem, and proofs.

II. Instructional Materials:

A. Algebra 2: An Incremental Development, Second Edition, Saxon Publishers, Inc. 1997.

B. D.I.V.E. (Digital Interactive Video Education) Algebra 2 CD, (use with Saxon Algebra 2, 2"d Edition Text), by David E. Shormann Ph. D. Genesis Science, Inc. 2004.

III. Course Goals and Objectives:

A. Students will:

1. Review geometric terms and formulas for finding area, perimeter and volume, degrees of angles, etc.
2. Review concepts outlined in Algebra I
3. Understand how to use signed numbers
4. Solve algebraic expressions
5. Solve a variety of word problems
6. Solve and graph linear equations
7. Use Quadratic Formula in Equations
8. Use a scientific and/or graphing calculator to solve some problems
9. Prove and use the Pythagorean theorem
10. Work with polynomials in a variety of operations
11. Solve uniform motion problems
12. Use sine, cosine, and tangent
13. Solve Logarithmic equations
14. Be equipped to meet the college-level entrance requirement for algebra and geometry, as well as to be able to solve everyday practical problems.

IV. Course Outline:

A. First Semester:

1. Geometry review, Angles, Review of absolute value, Properties and definitions
2. Perimeter, Area, Volume, Surface area, Sectors of circles
3. Polygons, Triangles, Transversals, Proportional segments
4. Negative exponents, Product and power theorems for exponents, Circle relationships

5. Evaluation of expressions, Adding like terms
6. Distributive property, Solution of equations, Change sides/change signs
7. Word problems, Fractional parts of a number
8. Equations with decimal numbers, Consecutive integer word problems
9. Percent, Equations from geometry
10. Polynomials, Graphing linear equations, Intercept-slope method
11. Percent word problems
12. Pythagorean theorem
13. Addition of fractions, Inscribed angles
14. Equation of a line
15. Substitution, Area of an isosceles triangle
16. Equation of a line through two points, Equation of a line with a given slope
17. Elimination
18. Multiplication of polynomials, Division of polynomials
19. Subscripted variables, Angle relationships
20. Ratio word problems, similar triangles
21. Value word problems, AA means AAA
22. Simplification of radicals, Line parallel to a given line
23. Scientific notation, Two statements of equality
24. Uniform motion problems - equal distanced, Similar triangles and proportions
25. Graphical solutions
26. Fractional equations, overlapping triangles
27. Monomial factoring, Cancellation, Parallel lines
28. Trinomial factoring, Overlapping right triangles
29. Rational expressions
30. Complex fractions, Rationalizing the denominator
31. Uniform motion problems
32. Deductive reasoning, Euclid, Vertical angles are equal, Corresponding interior and exterior angles, 180 degrees in a triangle
33. Negative reciprocals, Perpendicular lines, Remote interior angles
34. Quotient theorem for square roots, Congruency, Congruent triangles
35. Major rules of algebra, Complex fractions
36. Angles in polygons, Inscribed quadrilaterals, Fractional exponents
37. Contrived problems, Multiplication of rational expressions, Division of rational expressions
38. Chemical compounds, Parallelograms
39. Powers of sums, Solving by factoring, Only zero equals zero
40. Difference of two squares, Parallelogram proof, Rhombus
41. Abstract fractional equations

42. Units, Unit multipliers
43. Estimating with scientific notation
44. Sine, cosine, and tangent, Inverse functions
45. Solving right triangles
46. Difference of two squares theorem
47. More on radical expressions, Radicals to fractional exponents
48. Rate unit conversions, more on fractional exponents
49. Radical equations
50. Linear intercepts, Transversals
51. Quadratic equations, Completing the square
52. Imaginary numbers, Product of square roots theorem, Euler's notation, Complex numbers
53. Chemical mixture problems
54. Metric unit conversions, English units to metric units, Weight combination by percent
55. Polar coordinates, Similar triangles
56. Advanced abstract equation, Word problems and quadratic equations
57. Angles in circles, Proofs
58. Ideal gas laws
59. Lead coefficients, More on completing the square
60. Experimental data, Simultaneous equations with fractions and decimals, Rectangular form to polar form
61. Direct and Inverse variation
62. Chemical mixture problems, type B
63. Complex roots of quadratic equations
64. Addition of vectors
65. Complex fractions, Complex numbers
66. Advanced substitution

B. Second Semester

1. Signs of fractions, 30-60-90 triangles
2. Radical denominators
3. Scientific calculator, Scientific notation, Powers and roots
4. Gas law problems
5. Advanced abstract equations
6. Quadratic formula
7. Lines from experimental data, Negative angles
8. More on radical denominators
9. Uniform motion with both distances given
10. Factorable denominators and sign changes
11. Using both substitution and elimination, Negative vectors
12. Advanced radical equations, Multiple radicals
13. Force vectors at a point
14. Metric volume, 45-45-90 triangles

15. Direct and inverse variation as ratios
16: Complex numbers
17. Algebraic simplifications
18. Variable exponents
19. Solutions of equations
20. Systems of nonlinear equations
21. Greater than, Trichotomy and transitive axioms, Irrational roots
22. Slope formula
23. The distance formula, the relationship PV=nRT
24. Conjunctions, Disjunctions, Products of chords and secants
25. Systems of three equations
26. Linear inequalities, Greater than or equal to;less than or equal to, Systems of linear inequalities
27. Boat in the river problems
28. The discriminant
29. Dependent and independent variables, Functions, Functional notation
30. More nonlinear systems
31. Joint and combined variation, More on irrational roots
32. Advanced substitution
33. Relationships of numbers
34. Absolute value inequalities, Negative numbers and absolute value
35. Graphs of parabolas
36. Percent markups
37. Sums of functions, Products of functions
38. Advanced polynomial division
39. Complex numbers, rational numbers, and decimal numerals
40. Advanced factoring More on systems of three equations
41. Numbers, numerals, and value, Number word problems
42. Sum and difference of two cubes
43. More on fractional exponents
44. Quadratic inequalities (greater than, less than)
45. Three statements of equality
46. Logarithms, Antilogarithms
47. Nonlinear inequalities
48. Exponential equations, Exponential functions, Compound interest
49. Fundamental counting principle and permutations, Probability, Independent events
50. Letter symbols for sets, Set-builder notation
51. Logarithmic equations
52. Absolute value inequalities
53. Age word problems
54. Rational inequalities

55. Laws of logarithms, Intersection of sets, Union of sets, Venn diagrams
56. Locus, Basic construction
57. Conditions of congruence, proofs of congruence, Isosceles triangles
58. Distance defined, Equidistance, Circle proofs
59. Rectangles, Squares, Isosceles trapezoids, Chords and arcs
60. Lines and planes in space
61. Circumscribed and inscribes, Inscribed triangles, Inscribed circles, Proof of the Pythagorean theorem, Inscribed angles
62. Stem and leaf plots, Measures of central tendency, The normal curve, Standard deviation

V. Teaching Methods:

A. Reading and Discussion of concepts and the process of solving problems
B. Visual Demonstration on Computer Disk
C. Verbal questioning students as to "why" they solved the problem the way they did
D. Daily written practice and weekly tests

VI. Evaluation

A. Daily Homework
B. Unit Tests
C. Final Exam

VII. Grading Scale:

100-90=A
89-80=B
79 - 70 = C
69-60=D
59 and below = F