

COURSE SYLLABUS

Algebra II A/B

Last Modified: April 2015

Course Description: In this year-long Algebra II course, students will cover topics over a two semester period (as designated by “A” and “B” sections). Students review the algebra tools that they obtained in Algebra 1: functions, equations, graphs, linear systems, and quadratics. They also cover new topics such as matrices, polynomials and polynomial functions, and study many of the Algebra 1 concepts more in depth. Students cover radical functions, rational exponents, exponential and logarithmic functions, rational functions, quadratic relations, sequences and series, as well as probability and statistics. In second semester students learn trigonometric functions, equations, and identities.

Learning Targets:

Concepts and Procedures	<ul style="list-style-type: none"> • Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.
Problem Solving	<ul style="list-style-type: none"> • Students can frame and solve a range of complex problems in pure and applied mathematics.
Communication and Reasoning	<ul style="list-style-type: none"> • Students can clearly and precisely construct viable arguments to support their own reasoning and critique the reasoning of others.
Data Analysis and Modeling	<ul style="list-style-type: none"> • Students can analyze complex, real-world scenarios and can use mathematical models to interpret and solve problems.

Semester A	Semester B
<p>Chapter 1</p> <ul style="list-style-type: none"> • Patterns and Expressions • Properties of Real Numbers • Algebraic Expressions • Solving Equations • Solving Inequalities • Absolute Value Equations and Inequalities • Relations and Functions • Direct Variation 	<p>Chapter 7</p> <ul style="list-style-type: none"> • Inverse Variation • The Reciprocal Function Family • Rational Functions and Their Graphs • Rational Expressions • Adding and Subtracting Rational Expressions • Solving Rational Equations • Mathematical Patterns • Arithmetic Sequences • Geometric Sequences

<ul style="list-style-type: none"> • Linear Functions and Slope-Intercept Form • More About Linear Equations • Using Linear Models • Families of Functions • Absolute Value Functions and Graphs • Two-Variable Inequalities • Solving Systems Using Tables and Graphs • Solving Systems Algebraically • Systems of Inequalities • Linear Programming • Systems with Three Variables • Solving Systems Using Matrices • Quadratic Functions and Transformations • Standard Form of a Quadratic Function • Modeling with Quadratic Functions • Factoring Quadratic Expressions • Quadratic Equations • Completing the Square • The Quadratic Formula • Complex Numbers • Quadratic Systems • Polynomial Functions • Polynomials, Linear Factors, and Zeros • Solving Polynomial Equations • Dividing Polynomials • Theorems about Roots of Polynomial Equations • The Fundamental Theorem of Algebra • The Binomial Theorem • Polynomial Models in the Real World • Transforming Polynomial Functions • Roots and Radical Expressions • Multiplying and Dividing Radical Expressions • Binomial Radical Expressions • Rational Exponents • Solving Square Root and Other Radical Equations • Function Operations • Inverse Relations and Functions • Graphing Radical Functions • Exploring Exponential Models 	<ul style="list-style-type: none"> • Arithmetic Series • Geometric Series • Exploring Conic Sections • Parabolas • Circles • Ellipses • Hyperbolas • Translating Conic Sections • Permutations and Combinations • Probability • Probability of Multiple Events • Conditional Probability • Analyzing Data • Standard Deviation • Samples and Surveys • Binomial Distributions • Normal Distributions • Adding and Subtracting Matrices • Matrix Multiplication • Determinants and Inverses • Inverse Matrices and Systems • Geometric Transformations • Vectors • Exploring Periodic Data • Angles and the Unit Circle • Radian Measure • The Sine Function • The Cosine Function • The Tangent Function • Translating Sine and Cosine Functions • Reciprocal Trigonometric Identities and Equations • Trigonometric Identities • Solving Trigonometric Equations Using Inverses • Right Triangles and Trigonometric Ratios • Area and the Law of Sines • The Law of Cosines • Angle Identities • Double-Angle and Half-Angle Identities
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<ul style="list-style-type: none"> • Properties of Exponential Functions • Logarithmic Functions as Inverses • Properties of Logarithms • Exponential and Logarithmic Equations • Natural Logarithms 	
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Required Materials: Graphing Calculator

Note: This course contains an embedded softcopy textbook.

Content Standards: This course was written to Common Core State Standards as adopted by California within the Smarter Balance Consortium.

Pre-Requisites: Algebra I and Geometry

Grade Scale:

Letter	Range (%)
A	95.0+
A-	90.0 – 94.9
B+	87.0 – 89.9
B	84.0 – 86.9
B-	80.0 – 83.9
C+	77.0 – 79.9
C	74.0 – 76.9
C-	70.0 – 73.9
D+	67.0 – 69.9
D	64.0 – 66.9
D-	60.0 – 63.9
F	0.00 – 59.9

Course Methodology: This is an inquiry-based course. Students will generate knowledge through online readings, asynchronous discussions with students and their instructor, interactions with online tutorials, and online and hands-on simulations. A semester project developed by each student will be used to demonstrate knowledge and understanding of the material in the course.

The instructor will act as a guide, a facilitator, an events planner, and a resource advisor. He/she will always be available through e-mail. The student must actively construct and acquire knowledge by being intrinsically motivated to succeed. To succeed, students must participate and complete all readings and activities. This course requires the student's active participation. Both formal and informal assessment methods will be used in the course. Informal assessment will include an evaluation of the quality and timeliness of participation in class activities. Formal assessment may include multiple-choice



quizzes, tests, discussion board participation, and written assignments. A final exam will be given at the end of the course.

Course Expectations: Students are expected to conduct themselves in a responsible manner that reflects sound ethics, honor, and good citizenship. It is the student's responsibility to maintain academic honesty and integrity and to manifest their commitment to the goals of NUVHS through their conduct and behavior. Students are expected to abide by all NUVHS policies and regulations. Any form of academic dishonesty, or inappropriate conduct by students or applicants may result in penalties ranging from warning to dismissal, as deemed appropriate by NUVHS.

Communication: Throughout this course students will need to be in close contact with their instructor and fellow students. Students are expected to communicate via email and electronic discussion boards. Therefore, students should plan on checking email at least three to five times a week and participate in the discussion boards during the weeks they are live.

Instructors strongly encourage and welcome open communication. Clear, consistent, and proactive communication will ensure a successful experience in this course. It is the student's responsibility to notify the instructor immediately if and when a personal situation occurs that affects his/her performance in this class. Being proactive with communication will result in a quick solution to any problems that may occur.

Support: At NUVHS you will have access to multiple support teams. Who you contact will depend on the questions you have. Always start by contacting your teacher through the Message Center in the course. Your teacher should be able to answer your question, but if they can't, then they will direct you to another support team. If you have questions about any of the course content, your grades, or course policies, you should contact your instructor.

For questions about your enrollment, transcripts, or general school-wide policies, you can contact NUVHS Student Services at info@nuvhs.org or by phone at 866.366.8847. For example, if you would like to withdraw from your course, you should contact Student Services. Please note that a refund for your course can only be obtained if you drop within the first seven days of enrolling in the course.

For help with login/password issues, or other technical issues specific to the Blackboard website, you can contact the team at [National University Blackboard Learn](#). They can also be reached by phone at (888) 892-9095.

Course Outline: Semester A

Unit	Topic	Activity
1	Expressions, Equations, and Inequalities	<ul style="list-style-type: none"> • Diagnostic Exam • Lessons: 1.1 to 1.6 • Homework: 1.1 to 1.6 • Class Discussion • Chapter 1 Quiz • Chapter 1 Test
2	Functions, Equations, and Graphs	<ul style="list-style-type: none"> • Lessons: 2.1 to 2.8 • Homework: 2.1 to 2.8 • Class Discussion • Chapter 2 Quiz 1 • Chapter 2 Quiz 2 • Chapter 2 Test
3	Linear Systems	<ul style="list-style-type: none"> • Lessons: 3.1 to 3.6 • Homework: 3.1 to 3.6 • Class Discussion • Chapter 3 Quiz • Chapter 3 Test
4	Quadratic Functions and Equations	<ul style="list-style-type: none"> • Lessons: 4.1 to 4.9 • Homework: 4.1 to 4.9 • Class Discussion • Chapter 4 Quiz 1 • Chapter 4 Quiz 2 • Chapter 4 Test • Midterm
5	Polynomials and Polynomial Functions	<ul style="list-style-type: none"> • Lessons: 5.1 to 5.9 • Homework: 5.1 to 5.9 • Class Discussion • Chapter 5 Quiz 1 • Chapter 5 Quiz 2 • Chapter 5 Test
6	Radical Functions and Rational Exponents	<ul style="list-style-type: none"> • Lessons: 6.1 to 6.8 • Homework: 6.1 to 6.8 • Class Discussion • Chapter 6 Quiz 1 • Chapter 6 Quiz 2 • Chapter 6 Test

7	Exponential and Logarithmic Functions	<ul style="list-style-type: none"> • Lessons: 7.1 to 7.6 • Homework: 7.1 to 7.6 • Class Discussion • Chapter 7 Quiz • Chapter 7 Test
8	Project and Final Exam	<ul style="list-style-type: none"> • Class Discussion • Class Project • Final Exam

Course Outline: Semester B

Unit	Topic	Activity
1	Rational Functions	<ul style="list-style-type: none"> • Diagnostic Exam • Lessons: 8.1 to 8.6 • Homework: 8.1 to 8.6 • Class Discussion • Chapter 8 Quiz • Chapter 8 Test
2	Sequences and Series	<ul style="list-style-type: none"> • Lessons: 9.1 to 9.5 • Homework: 9.1 to 9.5 • Class Discussion • Chapter 9 Quiz • Chapter 9 Test
3	Quadratic Relations and Conic Sections	<ul style="list-style-type: none"> • Lessons: 10.1 to 10.6 • Homework: 10.1 to 10.6 • Class Discussion • Chapter 10 Quiz • Chapter 10 Test
4	Probability and Statistics	<ul style="list-style-type: none"> • Lessons: 11.1 to 11.10 • Homework: 11.1 to 11.10 • Class Discussion • Chapter 11 Quiz 1 • Chapter 11 Quiz 2 • Chapter 11 Test • Midterm

5	Matrices	<ul style="list-style-type: none"> • Lessons: 12.1 to 12.6 • Homework: 12.1 to 12.6 • Class Discussion • Chapter 12 Quiz • Chapter 12 Test
6	Periodic Functions and Trigonometry	<ul style="list-style-type: none"> • Lessons: 13.1 to 13.8 • Homework: 13.1 to 13.8 • Class Discussion • Chapter 13 Quiz 1 • Chapter 13 Quiz 2 • Chapter 13 Test
7	Trigonometric Identities and Equations	<ul style="list-style-type: none"> • Lessons: 14.1 to 14.7 • Homework: 14.1 to 14.7 • Class Discussion • Chapter 14 Quiz 1 • Chapter 14 Quiz 2 • Chapter 14 Test
8	Project and Final Exam	<ul style="list-style-type: none"> • Class Discussion • Course Project • Final Exam