

AACLC Course Description

A. COVER PAGE

1. Course Title Algebra II	9. Subject Area <input type="checkbox"/> History/Social Science <input type="checkbox"/> English <input checked="" type="checkbox"/> Mathematics <input type="checkbox"/> Laboratory Science <input type="checkbox"/> Language other than English <input type="checkbox"/> Visual & Performing Arts (for 2003) <input type="checkbox"/> College Prep Elective
2. Transcript Title / Abbreviation	
3. Transcript Course Code / Number	
4. School Arthur Anderson Community Learning Center	
5. District Alameda Unified School District	
6. City Alameda, CA	10. Grade Level(s) 9 or 10
7. School / District Web Site http://www.alameda.k12.ca.us/	11. Seeking "Honors" Distinction? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
8. School Contact Name: Alison Gray Title/Position: Counselor Phone: 510-521-7123 Fax: 510-521-7350 E-mail: agray@alameda.k12.ca.us	12. Unit Value <input type="checkbox"/> 0.5 (half year or semester equivalent) <input checked="" type="checkbox"/> 1.0 (one year equivalent) <input type="checkbox"/> 2.0 (two year equivalent) <input type="checkbox"/> Other: _____
	13. Date of School Board Approval N/A
14. Was this course previously approved by UC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If so, year removed from list? _____ Under what course title? _____	
15. Is this course modeled after an UC-approved course from another school? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If so, which school(s)? Encinal High School, Alameda and B.A.S.E., Alameda	
16. Pre-Requisites Algebra I, Geometry	
17. Co-Requisites None	
18. Brief Course Description This is a course that expands on the basic algebraic concepts involved in solving equations and inequalities, factoring polynomials, graphs, exponents, and solving quadratic equations. In addition, it examines quadratic, logarithmic, and exponential functions, the application of functions to real world problems, conic sections, probability, trigonometric functions, and complex numbers.	

B. COURSE CONTENT

19. Course Goals and/or Major Student Outcomes

Coursework will include a thorough understanding and application of the following topics:

- ... Students solve equations and inequalities involving absolute value
- ... Students solve systems of linear equations and inequalities (in two or three variables) simultaneously, by substitution, graphically, or with matrices.
- ... Students are adept at operations on polynomials, including long division.
- ... Students factor polynomials representing the difference of squares, perfect square trinomials, and the sum and difference of two cubes.
- ... Students demonstrate knowledge of how real and complex numbers are related both arithmetically and graphically and can plot complex numbers as points in the plane.
- ... Students add, subtract, multiply, and divide complex numbers.
- ... Students add, subtract, multiply, and divide reduce and evaluate rational expressions with monomial and polynomial denominators, and simplify complicated fractions including fractions with negative exponents in the complex number system.
- ... Students demonstrate and explain the effect changing a coefficient has on the graph of quadratic functions.
- ... Students graph quadratic functions and determine the maxima, minima, and zeros of the function
- ... Students prove simple logarithms including understanding the inverse relationship between exponents and logarithms, and judging the validity of an argument based on whether the properties of real numbers, exponents, and logarithms have been applied correctly at each step.
- ... Students know the laws of exponents, understand exponential functions, and use these functions in problems involving exponential growth and decay.
- ... Students use the definition of logarithms and the product formula for logs to translate between logarithms in any bases.
- ... Students understand and use the properties of logarithms to simplify logarithmic numeric expressions and identify their approximate values.
- ... Students determine if a specific algebraic statement involving rational expressions, radical expressions, logarithmic or exponential functions, is sometimes true, always true, or never true.
- ... Students demonstrate and explain how geometry of the graph of a conic section depends on the coefficients of the quadratic equation representing it.
- ... Given a quadratic equation, students can use the method of completing the square to put the equation into standard form and can recognize whether its graph is a circle, ellipse, parabola, or hyperbola. Students can then graph the equation.
- ... Students use fundamental counting principles to compute combinations and permutations.
- ... Students use combinations and permutations to compute probabilities.
- ... Students know the Binomial Theorem and use it to expand binomial expressions that are raised to positive integer powers.
- ... Students apply the method of mathematical induction to prove general statements about the positive integers.
- ... Students find the general term and the sums of arithmetic series and both finite and infinite geometric series.
- ... Students solve problems involving functional concepts such as composition, inverse, and arithmetic operations on functions.
- ... Students use properties from number systems to justify steps in combining and simplifying functions.

20. Course Objectives

After completing this course, students will have expanded their ability to solve equations and inequalities, factoring polynomials, graphs, and exponents, and solving quadratic equations. Students will further develop the ability to perform quadratic, logarithmic, and exponential functions. Finally, students will understand the real-world applications of algebra and its concepts.

21. Course Outline

- ... Unit 1: Linear Equations and Inequalities:
 - Absolute value
 - Two or three variables, solved
 - Word problems: equations and inequalities in two and three variables and

- two linear equations in two variables.
- ... Unit 2: Polynomials:
 - All operations, including long division
 - Difference of squares, perfect square trinomials
 - Sum and difference of two cubes
 - Polynomial denominators, including those with negative exponents
- ... Unit 3: Quadratic Equations:
 - Solve by factoring, completing the square, or using the quadratic formula
 - Quadratic equations in the complex number system
 - Graphing: determining the maxima, minima, and zeros of the function
 - Effects of changing coefficients in a quadratic equation
 - Recognize and graph equations of circle, ellipse, parabola, or hyperbola
 - Word problems
- ... Unit 4: Complex Numbers
 - Relationship between real and complex numbers, arithmetically & graphically
 - Plotting as points in a plane
- ... Unit 5: Logarithms:
 - Prove simple laws of logarithms
 - Simplify logarithmic numeric expressions and identify their approximate values.
- ... Unit 6: Conic Functions
- ... Unit 7: Probability:
 - Combinations and permutations
 - Finite and infinite geometric series
- ... Unit 8: Word Problems:
 - Rate Problems, work problems, percent mixture problems.

22. Texts & Supplemental Instructional Materials

Algebra and Trigonometry, Graphs and Models, Second Edition by Marvin L. Bittinger, Judith A. Beecher, David Ellenbogen, Judith A. Penna; Addison Wesley

23. Key Assignments

In addition to unit by unit problem sets, tests, and applied projects and research, students will design and implement and applied algebra project that will demonstrate a practical use of algebra in the world. The project will include an oral presentation, a written report of research and relevance, and a visual exhibition.

24. Instructional Methods and/or Strategies

Instructional Methods include:

- Direct Instruction: lecture, reading, in class research, problem sets, presentations, and guest speakers
- Instructional Materials: textbook; primary and secondary materials, and electronic media
- Team Teaching
- Community based applied concept projects
- Self-directed, cooperative, and collaborative learning and laboratory projects
- Instruction adaptable to levels of learning
- Applied algebra investigations (lab)
- Student oral presentations of projects and findings

25. Assessment Methods and/or Tools

Evaluation of student performance is based on individual abilities, interests, and talents. Methods by which student progress is assessed will be through a variety and/or combination of methods. The methods available include but are not limited to the following:

- Regular review of work by teacher,
- Portfolios
- Teacher observation

- Student demonstrations
- Student work samples
- Written examination
- Applied algebra investigations (lab)
- Applied algebra project

C. HONORS COURSES ONLY

26. Indicate how this honors course is different from the standard course. N/A

D. OPTIONAL BACKGROUND INFORMATION

27. Context for Course (optional)

28. History of Course Development (optional)