

9a. Grading Option: Standard Grade

9b. Catalog Description:

Exponents, radicals, complex numbers, factoring, linear and quadratic equations and inequalities; linear, quadratic, exponential and logarithmic functions; graphing, and systems of equations.

Course Outline Information

10. Student Performance Objectives: (Performance objectives for all credit courses must indicate that students will learn critical thinking and will be able to apply concepts at college level. Performance objectives must be related to items listed in Section 11.)

1. Solve equations including linear, quadratic, polynomial, rational and absolute value types, exponential, logarithmic, or radical types, and their associated applied problems.
2. Solve inequalities including linear, quadratic, polynomial, rational and absolute value.
3. Graph and perform transformations on the following: linear, quadratic, exponential, logarithmic, absolute value, cubic, and square root functions.
4. Find the equation of a line given sufficient information about the line.
5. Utilize function notation, perform operations on functions, determine if a function is invertible, and find the inverse of functions.
6. Simplify and perform computations with scientific notation.
7. Simplify and perform operations on complex numbers and solve equations with non-real solutions.
8. Simplify and perform operations on algebraic expressions including polynomials, rational expressions, complex fractions, radicals, rational and integral exponents, and logarithms.
9. Analyze polynomial expressions to determine the best approach to factoring and complete factorization using that technique.
10. Solve linear systems of equations and inequalities with two variables and applied problems associated with such systems.
11. Solve linear systems of equations with three variables and applied problems associated with such systems.
12. Analyze and determine the domain for polynomial, radical, rational, logarithmic and exponential functions.

11. Course Content Outline: (Provides a comprehensive, sequential outline of the course content, including all major subject matter and the specific body of knowledge covered.)

1. Introduction

- A. Sets of real numbers
- B. Simplify algebraic expressions
- C. Order of operations
- D. Properties of integral exponents
- E. Multiply and divide with scientific notation

2. Linear Equations in 1 variable

- A. Solving linear equations
- B. Solving applied problems
- C. Solving literal equations

3. Functions

- A. Define relations and functions
- B. Find domain and range
- C. Interval notation
- D. Operations on functions
- E. Graphing and vertical line test
- F. Function notation
- G. Composite and inverse functions

4. Linear Equations in 2 variables

- A. Slope of a line
- B. Parallel and perpendicular
- C. Equations of lines (point slope, slope intercept and standard form)
- D. Graph linear equations
- E. Graph linear inequalities
- F. Solve applied problems

5. Systems of equations

- A. Solve systems of linear equations in 2 variables
- B. Solve systems of linear equations in 3 variables
- C. Solve systems of non-linear equations
- D. Solve applied problems

6. Inequalities

- A. Solve linear inequalities including interval notation
- B. Solve compound inequalities
- C. Solve systems of linear inequalities in 2 variables

7. Absolute Value

- A. Solve absolute value equations
- B. Solve absolute value inequalities
- C. Graph and perform transformations of absolute value functions

8. Polynomials

- A. Add, subtract and multiply polynomials
- B. Divide polynomials by monomials and binomials
- C. Calculate degree of polynomials in several variables
- D. Solve polynomial equations
- E. Solve applied problems

9. Factor polynomials completely

- A. Greatest common factor
- B. Difference of squares, sum and difference of cubes
- C. Trinomial
- D. Grouping

10. Rational expressions, functions and equations

- A. Simplify using four basic operations
- B. Simplify complex rational expressions
- C. Solve rational equations
- D. Find domain of rational functions
- E. Solve applied problems

11. Radicals, radical functions and rational exponents

- A. Simplify radical expressions
- B. Add, subtract and multiply radical expressions
- C. Rationalize denominators
- D. Solve radical equations
- E. Find domain of radical functions
- F. Simplify expressions containing rational exponents
- G. Graph and perform transformations of square root functions
- H. Perform 4 basic operations on complex numbers

12. Quadratic functions

- A. Solve equations with real and non-real solutions using quadratic formula, completing the square, factoring and the square root methods
- B. Solve equations quadratic in form
- C. Graph and perform transformations of square root functions
- D. Solve applied problems

13. Inequalities

- A. Solve polynomial inequalities
- B. Solve rational inequalities

14. Exponential and Logarithmic Functions

- A. Properties of exponential and logarithmic functions
- B. Find domain of exponential and logarithmic functions
- C. Graph and perform transformations of exponential and logarithmic functions
- D. Know the relationship between exponential and logarithmic functions
- E. Solve exponential and logarithmic equations
- F. Solve applied problems

12. Typical Out-of-Class Assignments: (Credit courses **require** two hours of independent work outside of class for each lecture hour, less lab/activity classes. List type of assignments including library assignments.)

a. Reading Assignments: (Submit at least 2 examples.)

1. Find and read an article about the Richter scale. Note how it relates to the logarithms that we have studied in class.
2. Find and read an article that discusses very large or very small numbers in an applied setting. Note how these numbers are more easily represented in scientific notation versus decimal notation.

b. Writing, Problem Solving or Performance: (Submit at least 2 examples)

1. Solve applied mathematical problems that use exponential models. Example: Assume that on the day you were born your uncle put \$8000 into an account that grew at a rate of 3.7% annual interest compounded continuously. How much money would you have in the account on your 21st birthday?

2. Solve an applied mathematics problem using a system of equations. Example: A wine company needs to blend a California wine with a 5% alcohol content and a French wine with a 9% alcohol content to obtain 200 gallons of wine with 6.5% alcohol content. How many gallons of each kind of wine must be used?

c. Other (Term projects, research papers, portfolios, etc.)

13. Required Materials:

a. All textbooks, resources and other materials used in this course are college level?

- Yes
 No

b. Representative college-level textbooks (for degree applicable courses) or other print materials:

Book 1:

Author: Blitzer
Title: Intermediate Algebra for College Students
Publisher: Pearson
Date of Publication: 2012
Edition: 6th

c. Other materials and/or supplies required of students:

14. Check all instructional methods used to present course content:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Lecture | <input type="checkbox"/> Activity |
| <input checked="" type="checkbox"/> Discussion Seminar | <input checked="" type="checkbox"/> Distance Education (requires supplemental form) |
| <input type="checkbox"/> Lab | <input type="checkbox"/> Work Experience |
| <input checked="" type="checkbox"/> Directed Study | <input type="checkbox"/> Tutoring |

Other: Co-op learning

Give detailed examples of teaching methodology that relate to the course performance objectives:

1. In class small group collaborative learning activity - students will discuss the strategies for factoring different types of polynomial expressions and create a flow chart to help them determine the best approach. Given a list of polynomials, they will use their flow chart to determine the complete factorization. The instructor will circulate and ask clarifying questions as the students complete this task.

2. Interactive lecture format to develop the concept of what a function is, and analyze the properties of the different types of functions (linear, quadratic, radical, rational). To help students see the commonalities and differences between each type of function, instructor will incorporate algebraic analysis through equations, visual analysis through graphing, and numerical analysis through evaluation. Students will participate verbally and by working various examples.

15. Methods of Assessing Student Learning**15a. Methods of Evaluation:**

- | | |
|--|--|
| <input checked="" type="checkbox"/> Essay Exam | <input type="checkbox"/> Reports |
| <input checked="" type="checkbox"/> Objective Exam | <input checked="" type="checkbox"/> Problem Solving Exam |
| <input checked="" type="checkbox"/> Projects | <input type="checkbox"/> Skill Demonstration |
| <input checked="" type="checkbox"/> Class Discussion | <input type="checkbox"/> Other |

15b. (All courses must provide for measurement of student performance in terms of stated student performance objectives, Area 10, and culminate in a formal recorded grade based on uniform standards. Submit at least 2 examples.)

Example 1: Given a quadratic equation, determine which strategies could be used to solve it. Choose the most efficient method and solve the equation. This problem is graded based on the completeness and correctness of the strategy used and the solutions found.

Example 2: Given y as a function of x , determine whether or not the function has an inverse. If it does, find the inverse of the function. This question is graded based on the clarity, completeness, and correctness of the method used and of the solutions found.

SECTION C**1. Program Information:**

- In an approved program
- Part of a new program
- Not part of an approved program

2. TOP Code Information

Program Title: Mathematics, General 170100

3. Course SAM Code:

- A - Apprenticeship Course
- B - Advanced Occupational
- C - Clearly Occupational
- D - Possibly Occupational
- E - Non-Occupational

4. Faculty Minimum Qualifications/Degrees:

Mathematics

Comments:

SECTION D**General Education Information:****1. College Associate Degree GE Applicability:**

Math Competency

2. CSU/UC Applicability: Analytic Thinking**3. IGETC Applicability:****4. CAN :****5. LDTP:****SECTION E****1. Articulation Information: (Required for Transferable Courses Only)**

- CSU Transferable
- UC Transferable
- CSU/UC Major Requirement.

If CSU/UC major requirement, list campus and major. (Note: Must be lower division)

2. List at least one community college and its comparable course. If requesting CSU and/or UC transferability also list a CSU/UC campus and comparable lower division course

SECTION F

Planning and Resources: Please address the areas below:

1. Evidence of Need or Potential: recommendations of advisory committee, connection to existing or planned degrees/certificates, or regional/national developments, transfer university requirements.

Required as a prerequisite for any transferable mathematics course. Additionally, it meets the Mathematics requirement for achieving an Associate Degree.

2. Appropriateness to Mission: connection to basic skills, transfer, career technical education, or lifelong learning; relationship

Required as a prerequisite for any transferable mathematics course. Additionally, it meets the Mathematics requirement for achieving an Associate Degree.

3. Place in Program/Department: relationship to student learning outcomes identified by program, connection to general education, or articulation with other institutions.

Meets GE applicability for Mathematics Competency and Communication and Analytical Thinking. Course includes all four Math program SLO's (Equations and Expressions, Visual Models, Applied Problems, Communication).

4. Availability of Faculty and Facilities: minimum qualifications to teach course, special training for instructors, or long-term physical impact of course.

All math faculty members meet the minimum qualifications to teach this course. No special training is required.

5. Potential Impact on Resources: impact on library, computer support, transportation, equipment, or other needs

No additional resources are needed since we have the classroom space and technology already available.

SECTION G

1. Maximum Class Size (recommended): 35

2. If recommended class size is not standard, then provide rationale: