



**I. GENERAL COURSE INFORMATION**

**Subject and Number:** Mathematics 40  
**Descriptive Title:** Elementary Algebra  
**Course Disciplines:** Mathematics  
**Division:** Mathematical Sciences

**Catalog Description:**

This course in elementary algebra includes the study of real number solutions and applications of linear equations, quadratic equations, linear inequalities, and systems of linear equations. Other topics include coordinate graphing or linear equations, factoring techniques, and simplification of rational and radical expressions.

*Note: Mathematics 40 is equivalent to one year of high school algebra.*

**Conditions of Enrollment:**

**Recommended Preparation:** Mathematics 23 or Mathematics 37 or qualification by appropriate assessment.

<b>Course Length:</b>	<b>X Full Term</b>	<b>Other (Specify number of weeks):</b>
<b>Hours Lecture:</b>	<b>4.00 hours per week</b>	<b>TBA</b>
<b>Hours Laboratory:</b>	<b>0 hours per week</b>	<b>TBA</b>
<b>Course Units:</b>	<b>4.00</b>	

**Grading Method:** Letter  
**Credit Status:** Associate Degree Credit

**Transfer CSU:** No  
**Transfer UC:** No

**General Education:**  
**El Camino College:**

**CSU GE:**

**IGETC:**

## II. OUTCOMES AND OBJECTIVES

### A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

#### **SLO #1 Application Problems**

Students will be able to recognize linear and quadratic equations in a given context, and use mathematical reasoning and problem solving skills to solve authentic, real world application problems.

#### **SLO #2 Solving Equations and Manipulating Expressions**

Students will be able to use numerical and symbolic representations of mathematical ideas to simplify or solve linear, quadratic, rational, and radical expressions or equations.

#### **SLO #3 Visual and Graphical Methods**

Students will be able to use graphical methods to represent linear and quadratic relations as well as systems of linear relations and to find solutions to linear and quadratic equations, as well as solve systems of linear equations.

#### **SLO #4 Articulating Mathematical Reasoning**

Students will be able to articulate the mathematical reasoning used in a variety of problems, orally or in writing.

### B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below.)

1. Use the properties of the real numbers to evaluate, simplify, and factor algebraic expressions, including expressions with fractions and radicals.
2. Solve linear equations and inequalities, systems of two linear equations with two variables, and quadratic equations.
3. Set up and solve application problems using linear equations and inequalities, systems of two linear equations with two variables, and quadratic equations.
4. Graph linear equations and systems of linear equations by plotting points or by using intercepts and the slope.
5. Starting with a linear model in tabular, graphical or symbolic form, translate the model into the other two forms.

**III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)**

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lecture	24	I	<p><b>BASIC OPERATIONS AND MANIPULATIONS WITH ALGEBRAIC EXPRESSIONS</b></p> <ul style="list-style-type: none"> <li>A. Simplify and evaluate algebraic expressions using order of operations. Use the Distributive Property appropriately.</li> <li>B. In an algebraic expression, identify constants, variables, terms, variable terms, the degree of variable term, the coefficient of a variable term. Identify monomials, binomials and trinomials.</li> <li>C. Perform arithmetic operations on polynomials including long division and use of integer exponents. Use the Commutative, Associative, and Distributive Properties appropriately.</li> <li>D. Factor polynomials (including those with common monomial factors, the difference of squares and perfect square trinomials). Factor by grouping in simple and general trinomials.</li> <li>E. Perform operations on rational expressions.</li> <li>F. Perform arithmetic operations on radical expressions.</li> </ul>
Lecture	22	II	<p><b>EQUATIONS AND INEQUALITIES</b></p> <ul style="list-style-type: none"> <li>A. Identify and simplify linear expressions. Solve linear equations and inequalities.</li> <li>B. Using the properties of equality, identify equivalent equations, solve linear equations and inequalities.</li> <li>C. Solve 2-by-2 linear systems of equations using substitution or linear combinations (also known as elimination or addition).</li> <li>D. Solve for a specified variable in an equation containing more than one variable.</li> <li>E. Solve quadratic equations using factoring, the square root property, completing the square, or the quadratic formula.</li> </ul>
Lecture	11	III	<p><b>APPLICATIONS</b></p> <ul style="list-style-type: none"> <li>A. Translate a given English expression or a word problem into a mathematical expression, equation, or inequality.</li> <li>B. Set up and solve geometric problems using formulas for perimeter, area, volume, and the Pythagorean Theorem.</li> <li>C. Set up and solve a variety of application problems including those involving percentage relationships and ratio and proportions. Examples should include "work," "distance," and "mixture" problems.</li> </ul>
Lecture	15	IV	<p><b>GRAPHING</b></p> <ul style="list-style-type: none"> <li>A. Graph ordered pairs on a coordinate plane.</li> <li>B. Graph the solution of a linear inequality in one variable on a number line.</li> </ul>

			<p>C. Determine the slope of a line given its graph or given two points on the line.</p> <p>D. Graph linear equations in standard, slope-intercept and point slope form. Write the equation of a line given: a) a point and its slope, b) its slope and y-intercept, or c) two points on the line.</p> <p>E. Solve a 2-by-2 linear system of equations by graphing.</p>
Total Lecture Hours	72		
Total Laboratory Hours	0		
Total Hours	72		

#### IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

##### A. PRIMARY METHOD OF EVALUATION:

Problem solving demonstrations (computational or non-computational)

##### B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:

A 13-foot ladder is placed against a building so that the distance from the top of the ladder to the ground is 7 feet more than the distance from the bottom of the ladder to the building. Set up and solve a quadratic equation to determine both the distance from the bottom of the ladder to the base of the building and the distance from the top of the ladder to the ground.

##### C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

1. Selling Vehicles: A firm sells cars and trucks. There is room on its lot for 260 vehicles. They know that profits are greatest if there are 90 more cars than trucks on the lot. How many of each vehicle should the firm have on the lot for the greatest profit? Show enough work to support your answer.
2. Octane Ratings: The octane rating of a gasoline is a percent measure of the amount of iso-octane in the gas. How much 87-octane gas and 93-octane gas should be blended in order to make 12 gallons of 91-octane gas? Show enough work to support your answer.

##### D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

Objective Exams  
 Quizzes  
 Homework Problems

#### V. INSTRUCTIONAL METHODS

Lecture

**Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.**

#### VI. WORK OUTSIDE OF CLASS

Study  
 Required reading  
 Problem solving activities

**Estimated Independent Study Hours per Week: 8**

**VII. TEXTS AND MATERIALS**

**A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS**

Bittinger and Ellenbogen. Elementary Algebra: Concepts and Applications. 10th ed. Pearson, 2018.

**B. ALTERNATIVE TEXTBOOKS**

**C. REQUIRED SUPPLEMENTARY READINGS**

**D. OTHER REQUIRED MATERIALS**

Scientific or graphing calculator

**VIII. CONDITIONS OF ENROLLMENT**

**A. Requisites (Course and Non-Course Prerequisites and Corequisites)**

Requisites	Category and Justification
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**B. Requisite Skills**

Requisite Skills
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**C. Recommended Preparations (Course and Non-Course)**

Recommended Preparation	Category and Justification
Non-Course	Qualification by appropriate assessment.
Math 23 or Math 37	Sequential
	<p><b>Perform various operations (addition, subtraction, multiplication, division, and exponentiation) on different sets of numbers (whole, integer, and rational) and recognize equivalence when it occurs, particularly with fractions, decimals, and percents. Use order of operations appropriately. Use the commutative, associative and distributive properties appropriately.</b></p> <p>MATH 23 -Perform various operations (addition, subtraction, multiplication, division, and exponentiation) on different sets of numbers (whole, integer, and rational) and recognize equivalence when it occurs, particularly with fractions, decimals and percents.</p> <p>MATH 37 - Perform basic operations (addition, subtraction, multiplication, division, and exponentiation) on real numbers, including reducing fractions to lowest terms.</p> <p><b>Estimate to determine the reasonableness of results.</b></p> <p>MATH 23 -Estimate to determine the reasonableness of results</p> <p>MATH 37 -Use rounding techniques to estimate results of operations on real numbers and determine the reasonableness of results.</p> <p><b>Recognize and apply the concepts of variable, expression, and equation.</b></p> <p>MATH 23 -Recognize and apply the concepts of variable, expression, and equation.</p> <p>MATH 37 -Use the order of operations to evaluate expressions that combine the addition, subtraction, multiplication, division and exponentiation of real numbers.</p> <p>MATH 37 -Formulate mathematical representations of real-world applications including the recognition of proportional relationships.</p>

	<p><b>Solve simple one step linear equations.</b>  MATH 23 -Solve linear equations.  MATH 37 -Set up, graph, and solve linear equations, systems of linear equations, and linear inequalities using a variety of techniques.</p>
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**D. Recommended Skills**

<b>Recommended Skills</b>
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**E. Enrollment Limitations**

Enrollment Limitations and Category	Enrollment Limitations Impact
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Course created by Dwann Veroda on 02/04/2015.

BOARD APPROVAL DATE:

LAST BOARD APPROVAL DATE: 12/18/2017

Last Reviewed and/or Revised by: Alice Martinez

Date: 10/13/2020

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