I. **OVERVIEW**

The following information will appear in the 2009 - 2010 catalog

**MATH 70**  
Elementary Algebra  
5 Units

Equivalent to a first-year high school algebra course. Topics include: simplifying algebraic expressions, solving linear and quadratic equations, factoring, graphing lines and parabolas, solving systems of equations, rational expressions, and radicals, with application problems incorporated into each topic.

**Prerequisite:** Satisfactory completion of MATH 20. or equivalent placement by MJC assessment process

Field trips are not required.  

**Units/Hours:** 5.00 Units: Lecture - 90.00 hours  

**Grading:** A-F or P/NP - Student choice

II. **LEARNING CONTEXT**

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goals specified in Section III, Desired Learning:

A. **COURSE CONTENT**

1. **Required Content:**

   a. Review of the Real Numbers
      i. Properties
      ii. Arithmetic Operations
      iii. Order of Operations

   b. Linear Equations and Inequalities in One Variable
      i. Simplifying Expressions
      ii. Addition and Multiplication Properties of Equality
      iii. Solving Linear Equations in One Variable
      iv. Applications
      v. Inequalities
         a. Solving Linear Inequalities in One Variable
         b. Graphing Linear Inequalities on the Number Line
         c. Expressing Answers Using Interval Notation

   c. Linear Equations and Inequalities in Two Variables
Graphing Linear Equations in Two Variables
Slope of a Line
Graphing Linear Inequalities in Two Variables
Introduction to Functions

Linear Systems
Solving by Graphing
Solving by Substitution
Solving by Elimination by Addition
Dependent and Inconsistent Systems
Graphing Systems of Linear Inequalities
Applications

Polynomials
Degree and Number of Terms Classification
Addition, Subtraction, Multiplication, Division, and Powers of Polynomials
Special Products of Binomials
Factoring Polynomials
Solving Equations by Factoring
Applications

Rational Expressions
Simplifying Rational Expressions and Finding Values of Rational Expression where the Rational Expression is Undefined
Multiplying and Dividing Rational Expressions
Least Common Denominator
Adding and Subtraction Rational Expressions
With Linear Denominators
with Simple Quadratic Denominators
Complex Fractions
Solving Equations
Applications

Exponents and Radicals
Rules of Exponents
ii. Scientific Notation
iii. Evaluating Radicals
iv. Simplifying Radical Expressions
v. Using Rational Exponents
vi. Solving Equations Involving Radicals
vii. Rationalizing the Denominator

h. Quadratic Equations and Graphing Parabolas
   i. Solving by Square Root Method
   ii. Solving by Completing the Square
   iii. Solving by Quadratic Formula
   iv. Introduction to Complex Numbers
   v. Graphing Simple Parabolas

2. **Recommended Content:**

   a. Variation

B. **ENROLLMENT RESTRICTIONS**

1. **Prerequisites**
   Satisfactory completion of MATH 20 or equivalent placement by MJC assessment process.

2. **Requisite Skills**
   *Before entering the course, the student will be able to:*
   
   a. Use mathematical vocabulary correctly
   b. Compare two numbers using an inequality
   c. Demonstrate the ability to add, subtract, multiply, and divide with whole numbers, integers, fractions, mixed numbers, and decimals
   d. Demonstrate the ability to convert fractions to decimals and decimals to fractions
   e. Demonstrate the ability to convert fractions and decimals to percents and vice versa
   f. Solve applied problems involving percent
   g. Add and subtract polynomials with integer, fraction, or decimal coefficients
h. Multiply polynomials by monomials
i. Determine the product of two binomials
j. Find the quotient of a polynomial and a monomial
k. Solve linear equations
l. Evaluate expressions and formulas for given values
m. State and use appropriate formulas to calculate the area or volume of common objects, using both the English and metric systems of measurement
n. Translate simple verbal expressions to algebraic expressions
o. Evaluate absolute value expressions
p. Use the Pythagorean Theorem to find the length of a missing side in a right triangle
q. Plot points on a Rectangular Coordinate System
r. Find solutions of a linear equation in two variables
s. Graph a line

C. **HOURS AND UNITS**

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<th>INST METHOD</th>
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D. **METHODS OF INSTRUCTION (TYPICAL)**

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Discussion
3. Demonstration of mathematical techniques
4. Guided practice
5. Homework assignments
6. Discussion of concepts with instructor and other students in class

E. **ASSIGNMENTS (TYPICAL)**

1. **EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS**

   *Time spent on coursework in addition to hours of instruction (lecture hours)*

   a. Daily homework assignments requiring on the average two hours per class hour
   b. Daily review of class notes
c. Ongoing review of flashcards or study sheets
d. Preparation of examinations, several times during the term
e. Preparation for final examination

2. **EVIDENCE OF CRITICAL THINKING**
   *Assignments require the appropriate level of critical thinking*

   How many gallons of a 10% alcohol solution must be mixed with 8 gallons of a 20% solution to get a 12% solution?

   George and Laura are each driving their own cars as they leave Crawford at the same time. George drives east towards Houston at 45 miles per hour, while Laura drives north towards Dallas at 60 miles per hour. How far apart will they be after 2 hours?

F. **TEXTS AND OTHER READINGS (TYPICAL)**


III. **DESIRED LEARNING**

A. **COURSE GOAL**
   *As a result of satisfactory completion of this course, the student should be prepared to:*

   perform a wide variety of algebraic skills, starting from the concept of a variable and continuing through the solving of quadratic equations. In addition to the standard mechanical algebraic manipulations, the student will emphasize skills such as graphing and modeling. This will take place in an environment that consistently encourages students to not only improve their ability to calculate mentally, but also to use their new found skills to solve real world problems.

B. **STUDENT LEARNING GOALS**
   *Mastery of the following learning goals will enable the student to achieve the overall course goal.***

1. **Required Learning Goals**
   *Upon satisfactory completion of this course, the student will be able to:*

   a. Demonstrate continuing mastery of all prerequisite skills
   b. Simplify arithmetic expressions using the correct order of operations
   c. Simplify algebraic expressions by combining like terms
   d. Solve linear equations in one variable
   e. Solve and graph linear inequalities in one variable
   f. Determine the slope of a line from either the graph or the equation and explain its meaning
   g. Graph linear equations and inequalities in two variables
   h. Write the equation of a line describing the relationship between two variables
i. Solve systems of linear equations in two variables by the graphing method, the substitution method, or the elimination-by-addition method

j. Solve systems of linear inequalities by graphing and shading

k. Add, subtract, multiply, and divide polynomials

l. Factor polynomials, by factoring out the greatest common factor (GCF), factoring by grouping, special factorizations, and guess and check

m. Solve quadratic equations by factoring, completing the square, or using the quadratic formula

n. Multiply and divide rational expressions

o. Add and subtract rational expressions with linear or simple quadratic denominators

p. Simplify complex fractions

q. Solve equations involving rational expressions by clearing fractions

r. Simplify algebraic expressions by correctly applying the rules of exponents

s. Simplify radicals and expressions involving radicals, including fractional exponents

t. Solve equations involving radical expressions

u. Sketch the graph of simple parabolas from their equations

v. Create mathematical models of applications described in words, including those involving linear, quadratic, rational and radical expressions

w. Convert numbers to and from scientific notation and apply rules of exponents to these numbers

2. **Recommended Learning Goals**

   Upon satisfactory completion of the course (when the related recommended content is covered) the student will be able to:

   a. Solve direct and inverse variation problems

IV. **METHODS OF ASSESSMENT (TYPICAL)**

A. **FORMATIVE ASSESSMENT**

1. Midterm exams (excluding the following formats: multiple choice, open book, take home)

2. Quizzes

3. Homework assignments

4. Participation

B. **SUMMATIVE ASSESSMENT**

1. Comprehensive 2 to 3 hour Final Exam (excluding the following formats: multiple choice, open book, take home)