Modesto Junior College  
Course Outline of Record  

MATH 72

I.  **OVERVIEW**  
The following information will appear in the 2009 - 2010 catalog

MATH 72  **Elementary Algebra 2**  3 Units  
Second half of MATH 70- Elementary Algebra. Topics include: simplifying algebraic expressions, factoring, solving quadratic equations, graphing parabolas, rational expressions, and radicals, with application problems incorporated into each topic.  
**Prerequisite:** Satisfactory completion of MATH 71.  
Field trips are not required.  
**Units/Hours:** 3.00 Units: Lecture - 54.00 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.  Polynomials

      i.  Factoring Polynomials

      ii. Solving Equations by Factoring

      iii. Applications

   b.  Rational Expressions

      i.  Simplifying Rational Expressions and Finding Values of Rational Expressions where the Rational Expression is Undefined

      ii. Multiplying and Dividing Rational Expressions

      iii. Least Common Denominator

      iv. Adding and Subtracting Rational Expressions

         a. With Linear Denominators

         b. With Simple Quadratic Denominators

      v.  Complex Fractions

      vi.  Solving Equations

      vii. Applications

   c.  Exponents and Radicals

      i. 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

d. 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 71.

2. **Requisite Skills**

   *Before entering the 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. Write the equation of a line describing the relationship between two variables
   h. Solve systems of linear equations in two variables by the graphing method, the substitution method, or the elimination-by-addition method
   i. Solve systems of linear inequalities by graphing and shading
   j. Create mathematical models of applications described in words, including those involving linear equations and systems of linear equations
k. Convert numbers to and from scientific notation and apply rules of exponents to these numbers

C. HOURS AND UNITS

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<tr>
<th>INST METHOD</th>
<th>TERM HOURS</th>
<th>UNITS</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.
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

   a. 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?

   b. An inlet pipe can fill a swimming pool in 9 hours and an outlet pipe can empty the pool in 12 hours. Through an error, both pipes are left open.

      i. How long will it take to fill the pool?

      ii. Assume the error was discovered after both pipes have been running for 3 hours and the outlet pipe was then closed. How much more time would then be required to fill the pool?
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 factoring and continuing through the
   solving of quadratic equations. In addition to standard mechanical algebraic manipulations, students 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. Factor polynomials, by factoring out the greatest common factor (GCF), factoring by grouping,
         special factorizations, and guess and check
      b. Solve quadratic equations by factoring, completing the square, or using the quadratic formula
      c. Multiply and divide rational expressions
      d. Add and subtract rational expressions with linear or simple quadratic denominators
      e. Simplify complex fractions
      f. Solve equations involving rational expressions by clearing fractions
      g. Simplify algebraic expressions by correctly applying the rules of exponents
      h. Simplify radicals and expressions involving radicals, including fractional exponents
      i. Solve equations involving radical expressions
      j. Sketch the graph of simple parabolas from their equations
      k. Create mathematical models of applications described in words, including those involving linear,
         quadratic, rational and radical expressions

   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 application problems involving direct and inverse variation

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)