

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

**ACADEMIC AFFAIRS**

Course Number: ALGB 099 Department: Mathematics

Course Title: Elements of Mathematics Semester: Spring Year: 1997

**Objectives/Competencies**

<b>Course Objective</b>	<b>Competencies</b>
<p>I. Pre-Algebra Series (MM 071, MM 072, MM 073): This course includes the four basic operations applied to the non-negative real numbers, solving applied problems, and study metrics with their applications.</p> <p>1. Understand the basic operations of whole numbers.</p> <p>2. Understand that meaning fractions and the operations of multiplication and division of fractions.</p>	<p>1. Put in order number in the place-value chart.</p> <p>2. Perform the four basic operations of arithmetic (addition, subtraction, multiplication, and division).</p> <p>3. Solving simple equations with whole numbers.</p> <p>4. Convert from expanded notation to standard notation.</p> <p>5. Founding and estimating whole number (order).</p> <p>1. Find the factors of a number.</p> <p>2. Find the prime factorization of a composite number.</p> <p>3. Identify the numerator and denominator of a fraction.</p> <p>4. Multiple using fractional notations.</p> <p>5. Solve problems involving multiplication of fractions.</p> <p>6. Simplify fractional notations.</p>

Course Objective	Competencies
<p>3. Understand the concept of addition and subtraction of fractions.</p>	<p>7. Find the reciprocal of number or fractions.            8. Divide and simplify using fractional notation.            9. Evaluate problems involving division of fractions.</p> <p>1. Find least common denominator.            2. Be able to identify mixed numerals.            3. Do addition of fractional notation.            4. Do subtraction of fractional notation.            5. Do order of operation.</p>
<p>4. Consider the meaning of decimal notation.</p>	<p>1. Write a word name, and write a word name for an amount of money.            2. Be able to identify decimals in the place-value chart.            3. Convert from decimal notation to fractional notation.            4. Convert from fractional notation.            5. Perform rounding and order of decimals.            6. Do addition and subtraction of decimals.            7. Solve word problems.</p>
<p>5. Understand multiplication and division of decimals.</p>	<p>1. Do multiplication with decimal notation.            2. Do division with decimal notation.            3. Estimating.            4. Solve word problems.</p>
<p>6. Understand and apply ratio and proportion.</p>	<p>1. Describe ratios.            2. Interpret ratios.            3. Describe proportions.</p>

Course Objective	Competencies
<p>7. Introduction to percent notation.</p>	<p>4. Perform proportion problems. 5. Recognize similar triangles.</p> <p>1. Describe percent notation. 2. Solve percent problems using equations. 3. Solve percent problems using proportions. 4. Apply percent. 5. Consumer applications: Sales tax. 6. Consumer applications: Commission and discount. 7. Consumer applications: Interest.</p>
<p>8. Understand Statistics and its applications.</p>	<p>1. Define averages, medians, and modes. 2. Interpret tables and pictograph. 3. Interpret bar graphs and line graphs. 4. Interpret circle graphs.</p>
<p>9. Understand geometry and measures: Length and area.</p>	<p>1. Describe linear measures (American units). 2. Describe linear measures (Metric system). 3. Convert between American units and Metric system. 4. Interpret perimeter. 5. Interpret areas. 6. Interpret circles.</p>
<p>10. Understand measures: Volume, capacity, mass, time, and temperature.</p>	<p>1. Interpret volume and capacity. 2. Find volume of cylinders. 3. Find weight, mass, and time. 4. Interpret temperatures (both Fahrenheit and Celsius).</p>

Course Objective	Competencies
<p>II. Algebra I Series: (MM 081, MM 082, MM 083). Developmental algebra which covers the topics of sets, the arithmetic of real numbers, variables, exponents, integers, equation solving, simplifying rational expressions, solving rational equations.</p>	<ol style="list-style-type: none"><li>1. Perform operations with whole numbers.</li><li>2. Use grouping symbols in evaluating numerical expressions.</li><li>3. Recognize and use signs of equality and inequality between numbers.</li><li>4. Recognize that division by zero is not defined.</li><li>5. Recognize and apply the distributive property of multiplication over addition.</li><li>6. Use variable expressions as mathematical models for word statements.</li><li>7. Classify equations as identities or as conditionals.</li><li>8. Solve simple equations by inspection.</li><li>9. Recognize and use the transformation properties of substitution, addition, and multiplication.</li><li>10. Understand the use of whole numbers as exponents.</li><li>11. Identify the base and the exponent in an exponential expression.</li><li>12. Rewrite certain products in exponential form.</li><li>13. Use the following properties of exponents:<ol style="list-style-type: none"><li>a. <math>x^0 = 1</math></li><li>b. <math>x^m x^n = x^{m+n}</math></li><li>c. <math>\frac{x^m}{x^n} = x^{m-n}</math></li><li>d. <math>(x^m)^n = x^{mn}</math></li><li>e. <math>(xy)^m = x^m y^m</math></li></ol></li></ol>

Course Objective	Competencies
	<p>14. Recognize and use the concept of opposite and additive inverse.</p> <p>15. Recognize and use absolute value.</p> <p>16. Add and multiply signed numbers.</p> <p>17. Remove grouping symbols involving signed numbers.</p> <p>18. Define the term equivalent equations.</p> <p>19. Solve first-degree equations and check the results</p> <p>20. Model applied problems with first-degree equations.</p> <p>21. Represent rational numbers as terminating or repeating decimals.</p> <p>22. Recognize that each non-zero real number, <math>x</math>, has a multiplicative inverse, <math>1/x</math>.</p> <p>23. Recognize and use the cancellation property: <math>\frac{ax}{ay} = \frac{x}{y}</math></p> <p>24. Recognize that <math>a/b = c/d</math> if and only if <math>ad = bc</math> and <math>bd</math> does not equal 0.</p> <p>25. Classify natural numbers as either prime or composite.</p> <p>26. Find the lowest common denominator of fractions and rational expressions.</p> <p>27. Add and subtract fractions and rational expressions.</p> <p>28. Recognize a polynomial.</p> <p>29. Find: The product of a monomial and a polynomial and the product of two binomials. Find: The product of a sum and a difference and the square of a binomial.</p> <p>30. Divide: a monomial by a monomial and a polynomial by a monomial.</p> <p>31. Factor: A common monomial factor from a polynomial</p>

Course Objective	Competencies
<p>III. Algebra II Series: (MM 091, MM 092, MM 093). Developmental Algebra which covers the topics of operations with polynomial expressions, absolute values and inequalities, exponents and radicals, graphing of relations and functions in two variables.</p>	<p>expression; the largest common monomial factor from a polynomial expression; the difference of two squares; and a trinomial into the product of two binomials.</p> <ol style="list-style-type: none"><li>1. Solve quadratic equations by factoring.</li><li>2. Solve applied modeled by quadratic equations.</li><li>3. Work with rational expressions and:<ol style="list-style-type: none"><li>a. Expand them.</li><li>b. Reduce them to lowest terms.</li><li>c. Multiply them.</li><li>d. Divide one by another.</li><li>e. Add them.</li><li>f. Subtract one from another.</li><li>g. Simplify complex rational expressions.</li></ol></li><li>4. Solve equations with:<ol style="list-style-type: none"><li>a. Rational expressions.</li><li>b. Absolute values.</li></ol></li><li>5. Solve inequalities in one-dimension.</li><li>6. Negative exponents.</li><li>7. Scientific notation.</li><li>8. Introduction to radicals:<ol style="list-style-type: none"><li>a. Square roots.</li><li>b. Cube roots.</li><li>c. Fourth roots.</li><li>d. Converting between radicals and fractional exponents.</li><li>e. Finding roots on a calculator.</li></ol></li></ol>

Course Objective	Competencies
	<ul style="list-style-type: none"><li>f. Simplifying radical expressions.</li><li>g. Adding and subtracting radical expressions.</li><li>h. Multiplying radical expressions.</li><li>i. Rationalizing denominators.</li></ul> <p>9. Use the quadratic formula to solve quadratic equations.</p> <p>10. Graph linear equations in two variables.</p> <p>11. Graph quadratic equations in two variables.</p> <p>12. Solve systems of linear equations by:</p> <ul style="list-style-type: none"><li>a. Graphing.</li><li>b. Substitution.</li><li>c. Elimination.</li></ul> <p>13. Solve applied problems modeled by quadratic equations.</p> <p>14. Graph linear inequalities in two variables.</p>

<b>Course Objective</b>	<b>Competencies</b>