

**MAT 080**  
**INTERMEDIATE ALGEBRA**

**COURSE DESCRIPTION:**

Prerequisites: MAT 070 or satisfactory score on placement test

Corequisites: RED 080

This course continues the study of algebraic concepts with emphasis on applications. Topics include factoring; rational expressions; rational exponents; rational, radical, and quadratic equations; systems of equations; inequalities; graphing; functions; variations; complex numbers; and elements of geometry. Upon completion, students should be able to apply the concepts learned in problem solving using appropriate technology. Course Hours Per Week: Class, 3. Lab, 2. Semester Hours Credit, 4.

**LEARNING OUTCOMES:**

1. Students will be able to use techniques of algebra and algebraic formulas to simplify expressions and to manipulate and solve equations and inequalities both analytically and with the use of technology. Students will display proficiency by demonstrating the following competencies.
  - a. Solve linear equations and inequalities in one variable.
  - b. Solve formulas for a specified variable.
  - c. Write the equation of a line.
  - d. Identify a function, use  $f(x)$  notation, find the domain and range of a function, and use the vertical line test.
  - e. Solve linear systems of equations in two or three variables.
  - f. Use properties of exponents to simplify expressions.
  - g. Add, subtract, multiply and divide polynomials.
  - h. Completely factor algebraic expressions.
  - i. Solve equations by factoring.
  - j. Simplify, multiply, divide, add and subtract rational expressions.
  - k. Simplify complex fractions.
  - l. Solve equations and formulas with rational expressions.
  - m. Find roots of numbers.
  - n. Use the rules of exponents with rational exponents.
  - o. Simplify, add, subtract, multiply and divide radical expressions.
  - p. Solve equations with radicals.
  - q. Perform operations with complex numbers.
  - r. Solve quadratic equations by the square root property, by completing the square, and by using the quadratic formula.
  - s. Solve equations quadratic in form.
  - t. Solve quadratic and rational inequalities

2. Students will be able to explain the relationship between algebra and geometry by recognizing and analyzing the graph of a function from its equation, graphing the function by hand, and verifying the results using a graphing utility. Students will display proficiency by demonstrating the following competencies.
  - a. Graph linear equations.
  - b. Find the slope of a line.
  - c. Solve linear inequalities by graphing.
  - d. Graph rational functions.
  - e. Graph radical functions.
  - f. Graph parabolas.
  
3. Students will be able to solve practical problems by choosing an appropriate model for the problem and using the model to analyze the situation and make predictions. Students will display proficiency by demonstrating the following competencies.
  - a. Use linear equations to solve applied problems.
  - b. Solve problems using variation.
  - c. Use linear systems to solve applied problems.
  - d. Solve applied problems involving rational expressions.
  - e. Use quadratic equations to solve applied problems.

#### **OUTLINE OF INSTRUCTION:**

- I. Linear equations and inequalities
  - A. Linear equations in one variable
  - B. Formulas
  - C. Applications of linear equations
  - D. Linear inequalities in one variable
  
- II. Graphs, linear equations, and functions
  - A. The rectangular coordinate system
  - B. The slope of a line
  - C. Linear equations in two variables
  - D. Linear inequalities in two variables
  - E. Introduction to functions
  - F. Variation
  
- III. Systems of linear equations
  - A. Systems of linear equations in two variables
  - B. Systems of linear equations in three variables
  - C. Applications of systems of linear equations
  
- IV. Exponents, polynomials, and polynomial functions
  - A. Integer exponents
  - B. Addition and subtraction of polynomials
  - C. Multiplication of polynomials
  - D. Division of polynomials

- E. Factoring
  - F. Solving equations by factoring
- V. Rational expressions and functions
- A. Multiplication and division of rational expressions
  - B. Addition and subtraction of rational expressions
  - C. Complex fractions
  - D. Graphs and equations with rational expressions
  - E. Applications involving rational expressions
- VI. Roots, radicals, and root functions
- A. Radical expressions and graphs
  - B. Rational exponents
  - C. Simplification of radical expressions
  - D. Addition and subtraction of radical expressions
  - E. Multiplication and division of radical expressions
  - F. Equations with radicals
  - G. Complex numbers
- VII. Quadratic equations, inequalities, and functions
- A. The square root property and completing the square
  - B. The quadratic formula
  - C. Equations quadratic in form
  - D. Formulas and applications involving quadratic equations
  - E. Graphs of quadratic functions
  - F. More about parabolas
  - G. Quadratic and rational inequalities

**REQUIRED TEXTBOOK:**

Lial, Margaret L., John Hornsby, and Terry McGinnis. Intermediate Algebra. 8<sup>th</sup> ed. Addison Wesley, 2006.

TI-83/84 Graphing Calculator

**STATEMENT OF DISABILITIES ACCOMMODATION:**

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class. Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 686-3652 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1309.