

MAT 090
ACCELERATED ALGEBRA

COURSE DESCRIPTION:

Prerequisites: MAT 060 or satisfactory score on placement test and permission of the instructor or math discipline chair.

Corequisites: RED 080

This course covers algebraic concepts with emphasis on applications. Topics include those covered in MAT 070 and MAT 080. Upon completion, students should be able to apply the above concepts 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 algebraic techniques to simplify expressions, solve equations and inequalities, and examine functions both analytically and with the use of technology. Students will display proficiency by demonstrating the following competencies:
 - a. Solve linear equations.
 - b. Solve formulas for a specified variable.
 - c. Identify a function, use $f(x)$ notation, find the domain and range of a function, and use the vertical line test.
 - d. Solve systems of linear equations in two or three variables by graphing, substitution, and elimination.
 - e. Use properties of exponents to simplify expressions.
 - f. Express numbers in scientific notation and use scientific notation in calculations.
 - g. Add, subtract, multiply and divide polynomials.
 - h. Completely factor algebraic expressions.
 - i. Solve quadratic equations by factoring.
 - j. Simplify, add, subtract, multiply and divide rational expressions.
 - k. Simplify complex fractions.
 - l. Solve equations and formulas with rational expressions.
 - m. Find the roots of numbers.
 - n. Simplify, add, subtract, multiply and divide radical expressions.
 - o. Solve equations with radicals.
 - p. Perform arithmetic operations with complex numbers.
 - q. Solve quadratic equations by the square root property, by completing the square, and by using the quadratic formula.
 - r. Solve equations quadratic in form.
 - s. Solve quadratic and rational inequalities.

2. Students will be able to use algebraic techniques to graph linear and quadratic equations, inequalities, and functions by hand, and verify the results using a graphing utility. Students will display proficiency by demonstrating the following competencies:
 - a. Solve and graph linear inequalities in one variable.
 - b. Graph linear equations.
 - c. Find the slope of a line.
 - d. Write the equation of a line.
 - e. Solve linear inequalities in two variables by graphing.
 - f. Graph radical functions.
 - g. Graph quadratic functions.

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 applied problems using ratio, proportion, and percent.
 - c. Solve applied problems using linear systems of equations.
 - d. Solve applied problems using quadratic equations.
 - e. Solve applied problems using rational expressions.
 - f. Solve problems using variation.
 - g. Solve formulas and applied problems involving quadratic equations.

OUTLINE OF INSTRUCTION

- I. Equations, inequalities, and applications
 - A. The addition property of equality
 - B. The multiplication property of equality
 - C. Solving linear equations
 - D. Applications of linear equations
 - E. Formulas and applications from geometry
 - F. Ratio, proportion and percent
 - G. Solving linear inequalities

- II. Graphs of linear equations and inequalities; functions
 - A. Linear equations in two variables
 - B. Graphing linear equations in two variables
 - C. Slope of a line
 - D. Equations of lines
 - E. Graphing linear inequalities in two variables
 - F. Introduction to functions

- III. Systems of linear equations and inequalities
 - A. Solving systems of linear equations by graphing
 - B. Solving systems of linear equations by substitution
 - C. Solving systems of linear equations by elimination
 - D. Solving systems of linear equations in three variables
 - E. Applications of linear systems

- IV. Exponents and polynomials
 - A. Integer exponents
 - B. Scientific notation
 - C. Addition and subtraction of polynomials
 - D. Multiplication of polynomials
 - E. Division of polynomials

- V. Factoring and applications
 - A. Greatest common factor
 - B. Factoring trinomials
 - C. Special factorizations
 - D. Solving quadratic equations by factoring
 - E. Applications of quadratic equations

- VI. Rational expressions and functions
 - A. Simplification of rational expressions
 - B. Multiplication and division of rational expressions
 - C. Addition and subtraction of rational expressions
 - D. Complex fractions
 - E. Equations involving rational expressions
 - F. Graphs of rational expressions
 - G. Applications of rational expressions
 - H. Variation

- VII. Roots, radicals, and root functions
 - A. Radical expressions and graphs
 - B. Rational exponents
 - C. Simplifying radical expressions
 - D. Addition and subtraction of radical expressions
 - E. Multiplication and division of radical expressions
 - F. Solving equations with radicals
 - G. Complex numbers

- VIII. Quadratic equations, inequalities, and functions
 - A. Solving quadratic equations by the square root property
 - B. Solving quadratic equations by completing the square
 - C. Solving quadratic equations by the quadratic formula
 - D. Equations quadratic in form
 - E. Formulas and applications involving quadratic equations

- F. Graphs of quadratic functions
- G. More about parabolas
- H. Polynomial and rational inequalities

REQUIRED TEXTBOOK:

Lial, Margaret L., John Hornsby, and Terry McGinnis. Introductory and Intermediate Algebra. 4th Ed. Addison Wesley, 2010.

CALCULATOR:

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 536-7207 x 1413 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1309.