

Prepared by the Department of Mathematics

Date of Departmental Approval: April 6, 2015

Date approved by Curriculum and Programs: September 28, 2015

Effective: Spring 2016

1. **Course Number:** MAT045
Course Title: Intermediate Algebra for STEM
2. **Description:** This developmental course prepares students for College Algebra, which is essential to the Natural Sciences, Technology, Engineering, and Mathematics curriculum. Topics include: graphing, polynomials, factoring, rational expressions, rational exponents, quadratic equations, variation, conic sections, functions, and logarithms. Development of problem solving skills is emphasized throughout the course. (5 contact hours)
3. **Student Learning Outcomes** (instructional objectives, intellectual skills):
Upon successful completion of this course, students are able to do the following.
 - Add, subtract, multiply, divide, and factor polynomials.
 - Solve polynomial equations by factoring.
 - Add, subtract, multiply, divide, and simplify both rational and radical expressions.
 - Solve both rational and radical equations.
 - Operate with rational exponents including scientific notations.
 - Solve simple exponential equations.
 - Add, subtract, multiply, and divide complex numbers.
 - Solve quadratic equations by completing the square.
 - Compute the discriminant and apply the quadratic formula.
 - State the domain and the range of a function.
 - Operate with functions.
 - Graph quadratic functions and locate its vertex.
 - Graph simple rational, absolute value, radical, and exponential functions.
 - Solve simple logarithmic equations.
 - Recognize the equation of a circle, an ellipse, a hyperbola, and a parabola.
 - Solve a system of two equations by means of graphing, substitution, and elimination.
 - Solve an absolute value equation and express its solution both graphically as well as in set notation.
 - Solve an absolute value inequality and express its solution both graphically as well as in interval notation.
4. **Credits:** 3 non-degree credits
5. **Satisfies General Education Requirement:** No
6. **Prerequisite:** MAT041 (Elementary Algebra for STEM) or satisfactory basic skills assessment score
7. **Semesters Offered:** Fall, Spring, Summer
8. **Suggested General Guidelines for Evaluation:** Assessments include departmental final examination, quizzes, tests, and homework. Grading yields a Pass/Fail/Retake or letter grade of C- or higher.
9. **General Topical Outline:**
 - I. Review on Linear Equations, Inequalities, Absolute Value, and Systems of Equations
 - A. Linear equations with one variable and applications
 - B. Interval notations and linear inequalities
 - C. Absolute value equations and inequalities
 - D. Linear equations and inequalities in two variables
 - E. Systems of linear equations with two variables
 - II. Functions
 - A. Relations and functions
 - B. Domain and range
 - C. Function notations
 - D. Basic operations and composition of functions
 - E. Linear functions and modeling

- III. Exponents and Polynomials
 - A. Adding and subtracting polynomials
 - B. Rules of exponents and scientific notations
 - C. Multiplying and dividing polynomials
- IV. Factoring
 - A. GCF and factor by grouping
 - B. Factoring trinomials
 - C. Special factoring
 - D. Solving quadratic equations by factoring
 - E. Applications of quadratic equations
- V. Rational Expressions
 - A. Fundamental property of rational expressions
 - B. Multiplication and division
 - C. Addition and subtraction
 - D. Complex fractions
 - E. Solving equations with rational expressions
 - F. Applications of rational expressions
 - G. Variations
- VI. Roots and Radicals
 - A. Radical expressions and rational exponents
 - B. Multiplication and division of radical expressions
 - C. Addition and subtractions of radical expressions
 - D. Rationalizing the denominator
 - E. Simplifying radical expressions
 - F. Solving equations with radicals
 - G. Complex numbers
- VII. Quadratic Equations and Inequalities
 - A. The square root property
 - B. Completing the square
 - C. The quadratic formula
 - D. Equations in quadratic form
 - E. Formulas and further applications involving quadratic equations
 - F. Nonlinear and fractional inequalities
- VIII. Transcendental Functions
 - A. Exponential functions and their graphs
 - B. Logarithmic functions and their graphs
 - C. Solving simple exponential and logarithmic equations
- IX. Conic Sections and Nonlinear Systems
 - A. Parabolas
 - B. Circles
 - C. Ellipses
 - D. Hyperbolas
 - E. Solving nonlinear systems of equations