

Sacred Heart High School  
Course Syllabus for **Intermediate College Algebra** (Dual Credit)

**Brief description:**

Intermediate College Algebra is for those students who may state a desire to continue in math, science, technology, or business-related fields. Topics discussed in this course include rational exponents and radicals, first and second-degree equations and inequalities, systems of equations, and functional relationship.

**Prerequisite:**

Before being enrolled in this course, a student must be able to demonstrate successful completion of the College Algebra I, Geometry, and College Algebra II course or equivalents. Students must also complete the Cumberland County College placement test, required for the course credit.

**Competency-Based Objectives with Exit Criteria:**

Upon successful completion of this course, the student should be able to demonstrate competency in the following areas:

- Understand and work with the properties of Real and Complex numbers.
- Perform operations with exponents, polynomials, and radicals.
- Demonstrate and understanding of factoring.
- Use algebraic techniques to simplify rational expressions.
- Solve linear equations and inequalities, absolute value equations and inequalities, application problems, and literal equations.
- Work with functional notation and draw graphs.
- Solve Quadratic Equations and systems of equations.
- Demonstrate TI-83/84 graphing calculator competency with basic calculator functions, exponents, squaring, square roots, cube roots, reciprocal functions, reducing fractions, switching between fractions and decimals, storing and retrieving values, and entering and editing lists.

**Topical Outline:**

- I. Review of Basic Algebraic Concepts
- II. Linear Equations in Two and Three Variables
  - a. Linear Equations in Two Variables
  - b. Slope of a Line
  - c. Equations of a Line
  - d. Applications of Linear Equations and Graphing
  - e. Systems of Linear Equations in Two Variables
  - f. Applications of Systems of Linear Equations in Two Variables
- III. Introduction to Relations and Functions
  - a. Introduction to Relations
  - b. Introduction to Functions
  - c. Graphs of Basic Functions
  - d. Additional Topics on Functions
  - e. Variation

- IV. Polynomials
  - a. Properties of Integer Exponents and Scientific Notation
  - b. Polynomial Functions and Applications
  - c. Addition and Subtraction of Polynomials
  - d. Multiplication of Polynomials
  - e. Division of Polynomials
  - f. Synthetic Division
- V. Radicals and Complex Numbers
  - a. Definition of an nth-root
  - b. Rational Exponents
  - c. Properties of Radicals
  - d. Addition and Subtraction of Radicals
  - e. Multiplication and Division of Radicals
  - f. Rationalization
  - g. Radical Equations
  - h. Complex Numbers
- VI. Factoring and Quadratic Functions
  - a. Greatest Common Factor and Factor by Grouping
  - b. Factoring Trinomials
  - c. Factoring Binomials
  - d. Zero Product Rule
  - e. Completing the Square and the Square Root Property
  - f. Quadratic Formula
  - g. Equations in Quadratic Form
- VII. Rational Expressions
  - a. Introduction to Rational Functions
  - b. Multiplication and Division of Rational Expressions
  - c. Addition and Subtraction of Rational Expressions
  - d. Complex Fractions
  - e. Rational Equations
  - f. Application of Rational Equations and Proportions
- VIII. More Equations and Inequalities
  - a. Compound Inequalities
  - b. Polynomial and Rational Inequalities
  - c. Absolute Value Equation
  - d. Absolute Value Inequalities
  - e. Linear Inequalities in Two Variables

**Instructional Methodologies:**

Learning activities will be provided through lecture, homework/test solution reviews, problem solving, and group work. Students will be expected to work with appropriate technology (Virtual White Board and scientific calculators), work collaboratively, apply the problem solving method, and communicate both orally and in writing.

**Textbook:**

Miller, J., O'Neill, M., & Hyde, N. (2008). Intermediate Algebra (2<sup>nd</sup> Ed.) New York: McGraw-Hill.