

**Southern Connecticut State University  
School of Arts and Sciences  
Department of Mathematics**

**OUTLINE FOR MAT 112  
Algebra for Business and the Sciences**

**I. Catalog Description.**

This is an advanced Intermediate Algebra course that includes concepts from Precalculus. Topics include multiple perspectives of functions (verbal, numerical, algebraic, and graphical) and the various notations used to represent functions. Polynomial, absolute value, rational, and radical families of functions will be covered.

**II. Purpose.**

The purpose of MAT 112 is to provide students with the algebraic skills and concepts needed for Precalculus and business math.

**III. Credit.**

MAT 112 carries 3 semester hours of university credit. This course does not satisfy the University requirement in Mathematics.

**IV. Prerequisites.**

The student must satisfy one of the following four prerequisites:

1. a grade of C- or better in MAT 100;
2. a grade of C- or better in MAT 100P;
3. a grade of C- or better in MAT 102;
4. an established placement level appropriate for the course.

**V. Format.**

MAT 112 is offered in the lecture-discussion format. Classes will meet for three contact hours per week.

**VI. Technology.**

Graphing will be technology-assisted in this course.

**VII. Course Objectives.**

1. Set up and use simple mathematical models. In particular, students should be able to translate “word problems” into corresponding mathematical problems, solve, and then interpret the results in terms of the conditions of the word problem.
2. Examine the formal definition of a function and the various notations used to represent functions. Examine linear inequalities in two variables.
3. Recognize and work with absolute value and quadratic functions.

4. Recognize and work with rational functions, square root functions, cube root functions and rational exponents. Students should be able to simplify and perform operations on rational and radical expressions.
5. Solve algebraic equations. Students should be able to solve quadratic equations, equations containing rational expressions, equations containing radical expressions, and equations containing absolute values.

### VIII. Outline.

Percentages are based on a 28-class semester with 5 classes reserved for testing and review.

#### **Functions** **(3.5 weeks - 30%)**

- Definition and Representations
- Piecewise defined functions
- Graphs of Absolute Value, Radical, and Rational Functions
- Transformations of Graphs
- Analyzing Graphs of Functions
- Combining Functions and Function Inverses
- Linear and Quadratic Curve Fitting from a set of Data

#### **Absolute Values and Systems of Linear Inequalities** **(1.5 week - 10%)**

- Solving Linear Inequalities both Simple and Compound
- Solving Equations with Absolute Values
- Solving Inequalities with Absolute Values
- Solving Systems of Linear Inequalities by Graphing

#### **Polynomials** **(3 weeks - 25%)**

- Special Products (squares and cubes)
- Division
- Factoring (GCF, trinomials, special cubic forms, grouping)
- Solving Quadratic Equations (factoring, completing the square, and quadratic formula including complex solutions)
- Applications of Quadratic Functions

#### **Rational Functions** **(2 weeks - 17.5%)**

- Adding, Subtracting, Multiplying and Dividing Rational Expressions
- Compound Rational Expressions
- Solving Equations Containing Rational Expressions

- Direct, Inverse, and Joint Variation

### **Radical Functions**

**(2 weeks - 17.5%)**

- Solving Equations Containing Radical Expressions
- Rational Exponents and Radicals
- Adding, Subtracting, Multiplying, and Dividing Radical Expressions
- Distance Formula

### **IX. Assessment**

Individual instructors may vary assessment modes, but typically grades will be based on a combination of homework assignments, quizzes, and exams.

### **X. Text.**

The outline is based on Hall & Mercer, *Beginning and Intermediate Algebra, the Language and Symbolism of Mathematics*, 3rd Ed., McGraw-Hill, 2011.

### **XI. Waiver Policy.**

This course may be waived by departmental exam.