Course Title: **College Algebra**  
Course Number: **MAT 110**

**COURSE CATALOG DESCRIPTION**

Definition of function and sequence; linear and nonlinear functions and graphs including logarithmic and exponential functions; systems of linear equations and Gauss-Jordan method; theory of polynomial equations; conic sections and optional topics such as mathematical induction, matrix solution of linear systems and Cramer's rule.

Number of credits: 3  
Contact hours per week: 3

**PREREQUISITES**

A grade of C or better in MAT 105 or placement based on placement test score.

**DEPARTMENT LEARNING OBJECTIVES FOR THIS COURSE**

The successful student will be able to:

1. Graph a variety of basic equations using intercepts and symmetry where appropriate.
2. Complete the square for graphing circles and parabolas.
3. Graph polynomial and rational functions.
4. Use function transformations.
5. Use function arithmetic and composition.
6. Understand functions and inverse function evaluation.
7. Use the Factor Theorem for polynomials, and the Fundamental Theorem of Algebra.
8. Apply the properties of Logarithms.
9. Solve logarithmic and exponential equations.
10. Solve systems of linear equations.
11. Solve applied Problems.

**PRESENTATIVE TEXTS USED BY UW COLLEGES FACULTY IN THIS COURSE**

2. Lial, Hornsby, Schneider-College Algebra, Pub-Addison Wesley Longman
3. Cohen-Algebra and Trigonometry, Pub-West
4. Gustafson, Frisk-College Algebra, Pub-Brooks Cole

**MAJOR TOPICS COVERED BY UW COLLEGES FACULTY IN THIS COURSE.**

1. **Review of Basic Algebra** (Optional, keep this to a minimum of a day or so and get to functions in the first week. Topics that need review can be dealt with as needed. The first few days should give students a sense of what this course is about!)

   Binomial Theorem (Optional)
2. **Functions**
   - Basic Properties
   - Include sequences as functions on $N$
   - Graphing linear and quadratic functions and applications
   - Graphing polynomials and other functions
   - Translating and stretching graphs
   - Graphing rational functions
   - Arithmetic and Composition of functions
   - Inverse functions

3. **Theory of Polynomial Equations**
   - Remainder and factor theorems
   - Complex numbers and the Fundamental Theorem of Algebra
   - Use technology to produce graphs and support the factor theorem (Optional)
   - Synthetic Division (Optional)
   - Descartes’ Rule of Signs (Optional)
   - Rational roots of polynomial equations (Optional)

4. **Exponential and Logarithmic Functions**
   - Exponential functions: geometric sequences, basic properties, graphing
   - Applications of Exponential functions
   - Logarithmic functions: basic properties, inverse of exponential, graphing
   - Applications of logarithms
   - Exponential and logarithmic equations

5. **Systems of Equations and Matrices**
   - Solving systems of linear equations
   - Gauss-Jordan method for solution of systems of linear equations
   - Determinants and Cramer’s rule (Optional)
   - Matrix Algebra (Optional)
   - Matrix Inversion and applications to systems (Optional)

6. **Conic Sections**
   - Vertex and focus of horizontal and vertical parabolas
   - Horizontal and vertical ellipses and hyperbolas

*Approved November 10, 2011*