

## **COURSE OUTLINE** **College Algebra**

### **Course Description**

MA 135. College Algebra. 3 hours credit. Prerequisite: Placement score or MA 120 or MA 125 with C or better. This course will enable the student to interpret mathematical symbols and notation, simplify expressions, factor polynomials, solve equations (including absolute value, quadratic and systems of linear equations), perform operations on radical expressions, write equations of lines and evaluate functions. The successful student will begin to conceptualize abstract ideas.

### **Course Relevance**

The concepts learned in this course will improve the student's math skills, leading to success in subsequent courses. The student's ability to think analytically will improve. Discipline, perseverance and the ability to follow directions will also improve. Mathematical literacy will be increased, leading to informed choices when making decisions in life.

### **Required Materials**

Bittinger, M., Beecher, J., Ellenbogen, D., Penna, J. (2009). *College algebra graphs & models* (4<sup>th</sup> ed.). Boston, MA: Pearson Addison Wesley Publishing Company.

Graphing calculator: The Texas Instrument Model 83, 83+, 84, or 84+ is preferred for this course and for continuing in mathematics. The student will be responsible for the knowledge necessary to use any other make or model of calculator besides the four listed above.

Supplemental Materials:

Student Solution Manual (2009). Pearson Addison Wesley Publishing Company.

*MyMathLab*® software by the text book's publishers contains the entire text book (e-book) online and the *Student Solution Manual*

The soft cover text listed above under required materials *and* the software *MathXL*® which also contains the *Student Solution Manual*

### **Learning Outcomes**

The intention is for the student to be able to

1. Use problem solving to be successful in future learning
2. Gain confidence in personal mathematical ability
3. Perform mathematical procedures and techniques correctly
4. Conceptualize abstract ideas

**Learning PACT Skills that will be DEVELOPED and/or documented in this course**

Through the student's involvement in this course, he/she will develop his/her ability in the following PACT skill areas:

### **Analytic Thinking Skills**

#### 1. Problem Solving

- Through the process of learning to solve multi-step problems and real world application problems, the student will develop not only the general concepts involved in problem solving, but skills that can also be applied and transferred to real life analytical types of situations.

### **Communication Skills**

#### 2. Reception and interpretation of messages

- Through the process of working through word problems, the student will develop the ability to interpret and evaluate real world application problems from text form into a mathematical equation.

### **Technology Skills**

#### 3. Field-Related Technology

- Through the use of graphing calculators, the student will learn basic skills involved in problem solving with the aid of visual graphs and immediate calculations that apply to mathematics and real world situations.

### **Major Summative Assessment Task(s)**

These learning outcomes and the Learning PACT skills will be demonstrated by

1. Completion of the departmental final exam which demonstrates a cumulative knowledge of the material

### **Course Content**

#### I. Themes – Key recurring concepts that run throughout this course:

- A. Solving equations
- B. Graphing
- C. Following directions
- D. Analyzing functions

#### II. Issues – Key areas of conflict that must be understood in order to achieve the intended outcome:

- A. Graphing calculator usage
- B. Recognizing which technique to use
- C. Remembering prerequisite material

#### III. Concepts – Key concepts that must be understood to address the issues:

- A. Notation and terminology
- B. Graphing
- C. Functions

#### IV. Skills/Competencies – Actions that are essential to achieve the course outcomes:

- A. Solving equations and inequalities
- B. Modeling
- C. Graphing
- D. Determining equations of lines, parabolas and circles
- E. Operations with complex numbers
- F. Use and apply logarithms and exponential functions

## Learning Units

- I. Graphs, functions, and models
  - A. Introduction to graphing
  - B. Functions and graphs
  - C. Linear functions, slope, and applications
  - D. Equations of lines and modeling
  - E. Linear equations, functions, zeros, and applications
  - F. Solving linear inequalities
  
- II. Functions
  - A. Increasing, decreasing, and piecewise functions
  - B. The algebra of functions
  - C. The composition of functions
  - D. Symmetry and transformations
  
- III. Quadratic functions and equations; Inequalities
  - A. The complex numbers
  - B. Quadratic equations, functions, zeros, and models
  - C. Analyzing graphs of quadratic functions
  - D. Solving rational equations and radical equations
  - E. Solving equations and inequalities with absolute value
  
- IV. Polynomial and rational functions
  - A. Polynomial functions and modeling
  - B. Graphing polynomial functions
  - C. Polynomial division; The remainder and factor theorems
  - D. Theorems about zeros of polynomial functions
  - E. Rational functions
  - F. Polynomial and rational inequalities
  
- V. Exponential and logarithmic functions
  - A. Inverse functions
  - B. Exponential functions and graphs
  - C. Logarithmic functions and graphs
  - D. Properties of logarithmic functions
  - E. Solving exponential and logarithmic functions
  - F. Applications and models: Growth and decay; Compound interest
  
- VI. Systems of equations and matrices
  - A. Matrices and systems of equations

## Learning Activities

Lecture, class discussion, reading, and in-class work. Group work and/or projects will also contribute to the learning process. Online teaching/learning activities such as posted web pages, discussions, written assignments, email interaction with the

instructor and assigned problems will collectively assist the student to achieve course outcomes.

**Grade Determination**

The student will be graded on assessment tasks, tests, quizzes, daily work, out-of-class assignments and other methods of evaluation at the discretion of the instructor.