

## **Course Outline** **College Algebra with Review**

### **Course Description:**

**MA131.** College Algebra with Review. 3 hours credit. Prerequisite: Placement score or MA120 or MA 125 with C or better. The student will be able 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 after a review of some topics from intermediate algebra. The 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 are necessary for success, so these skills will also improve. Mathematical literacy will be increased, leading to informed choices when making decisions in life.

### **Required Materials:**

Text: Lial, Margaret L. and Hornsby, John (2000). *Algebra for College Students* 4<sup>th</sup> edition. Reading, MA: Addison- Wesley.

Graphing calculator. The Texas Instrument Model 80, Model 83 or Model 83+ is required for enrollment in College Algebra. The TI-83+ is preferred for students continuing in mathematics. Students will be responsible for the knowledge necessary to use any other make or model of calculator besides those listed above.

Online materials: same as above

### **Recommended Materials:**

Jeffrey A. Cole. *Student's Solutions Manual*. Addison/Wesley Publishing Company.

### **Learning Outcomes**

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

**Learning PACT Statement:** Butler prepares students to be principled, productive individuals who are responsible, involved lifelong learners. To accomplish this goal Butler has established a Learning PACT for the skills that learners need during their career and has integrated PACT skill-building activities and assessments through a variety of program coursework, extra curricular activities, and other learning opportunities.

The BCCC Learning PACT consists of:

**P** = Personal Development Skills

**A** = Analytical Thinking Skills

**C** = Communication Skills

**T** = Technological Skills

The Learning PACT Skills are vital for any adult to function successfully in the ever changing world of the 21<sup>st</sup> century. Butler expects learners to be full partners in the learning process and as such to assume primary responsibility for their own choices.

**Through the student involvement in this course, they will develop and document their achievement of the following PACT skills:**

Primary skill developed and documented:

problem solving

- through the solution of multi-step problems
- through the solution of word problems

field-related technology

- through the use of graphing calculators

Secondary skills (developed but not documented):

time management

reading

listening

**Assessment Tasks:**

The learning outcomes and primary Learning PACT skill will be demonstrated by:

1. Completion of a department written common final exam including three open ended multi-step questions
2. Completion of a self assessment inventory

**Course Content:**

Themes – Key **recurring concepts** that run throughout this course:

- solving equations
- graphing
- following directions
- analyzing functions

Issues – Key **issues** that will be addressed in this course: areas of conflict that must be understood in order to achieve the intended outcome:

- graphing calculator usage
- recognizing which technique to use
- remembering prerequisite material

Concepts – That must be understood to address the issues:

- notation and terminology
- graphing
- functions

Skills – Actions that are essential to achieve the course outcomes:

- solving equations and inequalities
- modeling
- graphing
- determining equations of lines, parabolas and circles
- operations with complex numbers
- use and apply logarithms and exponential functions

### **Learning Units:**

#### I. Linear Equations and Inequalities

- A. linear equations and functions
- B. solving formulas for the indicated variable
- C. several types of applications
- D. linear inequalities
- E. compound inequalities
- F. absolute value equations and inequalities

#### II. Graphs, Linear Equations, and Functions

- A. graphing points and lines
- B. finding intercepts
- C. the slope of a line
- D. the equation of a line in standard form, or in slope-intercept form
- E. functions and their domains and ranges
- F. function notation and function values
- G. problems involving variation

#### III. Integer Exponents and Factoring

- A. integer exponents
- B. factoring by various methods
- C. solving equations by factoring
- D. solving equations by use of a graphing calculator

#### IV. Rational Expressions and Functions

- A. operations on rational expressions
- B. complex fractions
- C. dividing polynomials
- D. solving equations involving rational expressions
- E. solving equations by use of a graphing calculator
- F. formulas and applications involving rational expressions

#### V. Roots and Radicals

- A. rational exponents
- B. simplifying radicals
- C. operations on radicals
- D. graphing radical functions

- E. domain and range of radical functions
- F. solving radical equations
- G. solving radical equations using a graphing calculator
- H. complex numbers
- VI. Quadratic Equations and Inequalities
  - A. quadratic equations
  - B. equations in quadratic form
  - C. formulas and applications
  - D. the equation of a circle
  - E. piecewise functions
- VIII. Polynomials and Rational Functions (omit oblique asymptotes)
  - A. synthetic division and the remainder theorem
  - B. zeros of polynomials and the rational roots theorem
  - C. graphing polynomials
  - D. graphing polynomials on the graphing calculator and finding zeros
  - E. vertical and horizontal asymptotes of rational functions
- IX. Inverse, Exponential, and Logarithmic Functions
  - A. one-to-one functions
  - B. inverse functions
  - C. graphs of exponential and logarithmic functions
  - D. converting logarithmic equations to exponential equations and vice versa
  - E. properties of logarithms
  - F. evaluating logarithms
  - G. exponential and logarithmic equations
  - H. application problems, including compound interest
- X. Systems of Equations
  - A. solving systems of equations in two variables by various methods
  - B. solving systems of equations in three variables by various methods

**Learning Activities:**

Classroom: Independent learning activities will be assigned to assist the student to achieve the intended learning outcomes. Activities identified in the syllabus, such as class discussion, lecture, reading, group work or projects will also contribute to learning.

Online: Online teaching/learning activities such as the following will assist the student to achieve course outcomes: posted web pages, threaded discussions, written assignments, assigned reading, and interaction with instructor through e-mail and discussion boards.

**Grade Determination:**

Grade determination will be based on assessment tasks and other activities such as exams, assignment or attendance that the instructor identifies in the syllabus.