1. **COURSE ID:** MATH 123  
**TITLE:** Intermediate Algebra II  
**Units:** 3.0 units  
**Hours/Semester:** 48.0-54.0 Lecture hours  
**Method of Grading:** Letter Grade Only  
**Prerequisite:** MATH 122  
**Recommended Preparation:** MATH 115 and READ 830

2. **COURSE DESIGNATION:**  
Degree Credit  
Transfer credit: none  
**AA/AS Degree Requirements:**  
- CSM - COMPETENCY REQUIREMENTS: C1 Math/Quantitative Reasoning Basic Competency  
- CSM - GENERAL EDUCATION REQUIREMENTS: E2c. Communication and Analytical Thinking

3. **COURSE DESCRIPTIONS:**  
**Catalog Description:**  
Covers the second half of MATH 120 - a comprehensive review of elementary algebra with certain topics studied in greater depth. Extension of fundamental algebraic concepts and operations; problem solving and applications; linear, quadratic, rational, and radical equations; equations in two variables; graphs; systems of equations; complex numbers; review of exponential and logarithmic functions; sequences and series. Math 122 and 123 together are equivalent to Math 120.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**  
Upon successful completion of this course, a student will meet the following outcomes:  
1. Identify and apply basic algebraic concepts including function and its properties (domain, range, intercepts, inverse function); slope and its meaning (rate of change); absolute value, equations and equivalency of equations. inequalities, exponents, laws of exponents and logarithms; Pythagorean Theorem, distance and midpoints.  
2. Perform basic operations on and simplify expressions containing algebraic expressions: Complex numbers; Polynomial expressions, Exponential expressions, Logarithmic expressions, Radical expressions, Rational expressions.  
3. Solve equations and inequalities: Equations in one or two variables; Inequalities in one variable; Systems of linear equations in two or three unknowns using elimination, substitution and graphing; Quadratic equations by factoring, completing the square, and quadratic formula; for real and complex roots; Simple exponential and logarithmic equations; Equations involving radicals; Equations involving rational expressions.  
4. Sketch the graphs of functions and relations: Algebraic, including linear equalities and inequalities, polynomial, rational; Radical; Logarithmic; Exponential; Circles.  
5. Find and sketch inverse functions.  
6. Solve problems by application of linear, exponential and quadratic functions.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**  
Upon successful completion of this course, a student will be able to:  
1. Identify and apply basic algebraic concepts, including functions and their properties (domain, range, intercepts, inverse functions); slope and its meaning (rate of change); absolute value; equations and equivalency of equations; inequalities; laws of exponents and logarithms; Pythagorean Theorem, distance, and midpoints.  
2. Perform basic operations on and simplify expressions containing algebraic expressions: Complex numbers; Polynomial, Exponential, Logarithmic, Radical, and Rational expressions.  
3. Solve equations and inequalities: Equations in one or two variables; Inequalities in one variable; Systems of linear equations in two or three unknowns using elimination, substitution, and graphing; Solving quadratic equations by factoring, completing the square, and the quadratic formula; Real and complex roots; Simple exponential and logarithmic equations; Equations involving radicals; Equations involving rational expressions.  
4. Sketch the graphs of functions and relations, including: Algebraic, including linear equalities and inequalities, polynomial, and rational graphs; Logarithmic and Exponential graphs; Circles.
5. Find and sketch inverse functions.
6. Solve application problems involving linear, exponential, logarithmic, and quadratic functions.

6. COURSE CONTENT:
   Lecture Content:
   Topics Introduced in Math 122 and reviewed as appropriate in Math 123
   1. Linear Equations and Linear Functions
   2. Modeling with Linear Functions
   3. Systems of Linear Equations
   4. Exponential Functions
   5. Logarithmic Functions
      Topics introduced in Math 123
   1. Polynomial Functions
      A. Adding and Subtracting Polynomial Expressions and Functions
      B. Multiplying Polynomial Expressions and Functions
      C. Factoring Trinomials of the Form \( x^2 + bx + c \); Factoring Out the GCF
      D. Factoring Polynomials
      E. Factoring Special Binomials; A Factoring Strategy
      F. Using Factoring to Solve Polynomial Equations
   2. Quadratic Functions
      A. Graphing Quadratic Functions in Vertex Form
      B. Graphing Quadratic Functions in Standard Form
      C. Using the Square Root Property to Solve Quadratic Equations
      D. Solving Quadratic Equations by Completing the Square
      E. Using the Quadratic Formula to Solve Quadratic Equations
      F. Solving Systems of Linear Equations in Three Variables; Finding Quadratic Functions
      G. Finding Quadratic Models
      H. Modeling with Quadratic Functions
   3. Rational Functions
      A. Finding the Domains of Rational Functions and Simplifying Rational Expressions
      B. Multiplying and Dividing Rational Expressions
      C. Adding and Subtracting Rational Expressions
      D. Simplifying Complex Rational Expressions
      E. Solving Rational Equations
      F. Modeling with Rational Functions
      G. Variation
   4. Radical Functions
      A. Simplifying Radical Expressions
      B. Adding, Subtracting, and Multiplying Radical Expressions
      C. Rationalizing Denominators and Simplifying Quotients of Radical Expressions
      D. Graphing and Combining Square Root Functions (optional)
      E. Solving Radical Equations
      F. Modeling with Square Root Functions (optional)
   5. Other
      A. Pythagorean theorem
      B. Performing Operations with Complex Numbers (optional)
      C. Distance Formula, and Circles (optional)
      D. Ellipses and Parabolas (optional)
      E. Solving Nonlinear Systems of Equations (optional)

7. REPRESENTATIVE METHODS OF INSTRUCTION:
   Typical methods of instruction may include:
   A. Lecture
   B. Other (Specify): a. Out-of-class assignments: students will need to complete assigned problems and projects. b. Reading assignments: Instructor will assign text readings prior to discussion of a topic in class. c. Writing assignments: a. Students will submit written homework assignments. b. Students may be assigned papers including mathematical modeling. d. Critical thinking: a. Lecture/discussion to understand problem solving process b. Students will practice critical thinking in small group problem solving c. Students will evaluate proposed solutions in light of constraints of the problem
8. **REPRESENTATIVE ASSIGNMENTS**
Representative assignments in this course may include, but are not limited to the following:

**Writing Assignments:**
Students will submit written homework assignments. Students may be assigned papers including mathematical modeling.

**Reading Assignments:**
Instructor will assign text readings prior to discussion of a topic in class.

**Other Outside Assignments:**
Students will need to complete assigned problems and projects.

9. **REPRESENTATIVE METHODS OF EVALUATION**
Representative methods of evaluation may include:

A. Class Participation
B. Exams/Tests
C. Group Projects
D. Homework
E. Quizzes
F. a. written individual assignments and/or journal- to demonstrate individual student progress toward objectives b. small group presentations- to demonstrate student participation in problem solving process c. written exams/quizzes - to reflect student knowledge of vocabulary, concepts, and application of concepts to problem solving as presented in lectures and discussion, small group sessions, and text readings. d. Final Examination - to reflect student knowledge of vocabulary, concepts, and applications of concepts to problem solving as presented in lectures and discussions, small group sessions, and text readings. e. participation - to reflect student involvement in class discussions, small group sessions and presentations, etc.

10. **REPRESENTATIVE TEXT(S):**
Possible textbooks include:


**Origination Date:** June 2014
**Curriculum Committee Approval Date:** November 2014
**Effective Term:** Fall 2016
**Course Originator:** Cheryl Gregory