I. GENERAL COURSE INFORMATION

Subject and Number: **Mathematics 80**
Descriptive Title: **Intermediate Algebra for Science, Technology, Engineering, and Mathematics**
Course Disciplines: **Mathematics**
Division: **Mathematical Sciences**

Catalog Description:
This intermediate algebra course is designed for students who are considering further study in the sciences, technology, engineering, or mathematics. In the context of studying a large library of basic functions and their graphs, students strengthen and expand their algebra skills. The library includes linear, quadratic, polynomial, rational, radical, exponential, and logarithmic functions, as well as inverse functions and the absolute value function. Particular emphasis is placed on the operations on functions, as well as solving equations and inequalities. Other topics include solving systems of equations, operations on complex numbers, and applications.

Note: Mathematics 80 serves as a prerequisite course for all transfer-level mathematics course sequences, including the calculus sequence (Mathematics 170, 180, 190, 191 and 220).

Conditions of Enrollment:
Prerequisite: Mathematics 40 with a minimum grade of C or Mathematics 37 with a grade of P and evidence of having passed Levels A, B, and C or qualification by appropriate assessment.

Course Length:	**X Full Term**	**Other (Specify number of weeks):**
Hours Lecture:	**5.00 hours per week**	**TBA**
Hours Laboratory:	**0 hours per week**	**TBA**
Course Units:	**5.00**	

Grading Method: **Letter**
Credit Status: **Associate Degree Credit**

Transfer CSU: **X Effective Date: Proposed**
Transfer UC: **No**

General Education:
El Camino College:
4B – Language and Rationality – Communication and Analytical Thinking
Term: Other:

6 – Mathematics Competency
Term: Other:

CSU GE:

IGETC:

II. OUTCOMES AND OBJECTIVES

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

1. Given a relation in graphical, tabular or equation form the student will be able to identify whether the relation represents a function or not with a verbal explanation (some form of definition, such as each input has only one output) in the case where the relation is a function, or with a counter example (either numerical or sketching on the graph or a rewriting of the equation) that clearly shows at least one input has multiple outputs.

2. On a test in Elementary Algebra, Intermediate Algebra, or Geometry, where the student is given information on the lengths of two sides of a right triangle, the student will be able to correctly determine the third side using the Pythagorean Theorem and write the solution in simplest exact form.

3. Given a quadratic function y = f(x) = 3x^2 - 2x - 4 solve f(x) = 0 using the quadratic formula and write the solution in simplest exact form.

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the El Camino College SLO webpage at http://www.elcamino.edu/academics/slo/.

B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)

1. Carry out numerical operations and manipulate algebraic expressions, including expressions with rational and negative exponents, complex numbers, and logarithms.
   Objective Exams

2. Recognize functional relationships in the form of graphs, data or symbolic equations.
   Objective Exams

3. Solve problems involving a variety of function types, including linear, quadratic, polynomial, rational, radical, exponential, and logarithmic functions.
   Objective Exams

4. Graph a variety of functions and relations and draw connections between these graphs and solutions to problems.
   Objective Exams

5. Solve a variety of equations and inequalities, as well as systems of equations and inequalities, using algebraic and graphical methods. Types of equations include linear, quadratic, polynomial, rational, radical, exponential and logarithmic equations.
   Objective Exams

6. Using numerical, symbolic and graphical methods, model application problems, solve them and interpret the results in the contact of the problem.
   Objective Exams

III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lecture	13	I	BASIC OPERATIONS AND MANIPULATIONS: A. Review of operations on polynomial, rational and radical expressions B. Operations on exponential and logarithmic expressions, power expressions with negative or rational exponents, as well as absolute value expressions C. Factoring polynomial expressions D. Rewriting radical expressions as expressions with rational exponents E. Properties of exponential and logarithmic expressions F. Conversion between logarithmic and exponential statements G. Operations on complex numbers
Lecture	18	II	FUNCTIONS: A. Definitions of function, domain and range B. Function notation C. Functions as rules, as sets of ordered pairs, as algebraic equations, and as graphs. Function types include polynomial, power, rational, radical, exponential, logarithmic and the absolute value D. Operations on functions, including addition, subtraction, multiplication, division, exponentiation and composition E. One-to-one functions F. Inverse functions G. Determining the equation for a linear function given the graph or sufficient data
Lecture	19	III	GRAPHING A. Graphing functions of all types, especially the basic functions f(x) = x, x2, x3, v x, |x|, 1/x, ax, log a (x). B. Graphing solutions to equations and inequalities C. Graphing basic conic sections D. Graphing quadratic functions using the completing-the-square technique to identify the vertex of a parabola E. Transformations of graphs of functions, including translations, reflections and re-scalings
Lecture	21	IV	EQUATIONS AND INEQUALITIES A. Algebraic and graphical methods for solving equations and inequalities B. Techniques for solving quadratic equations over the complex numbers C. Techniques for solving quadratic inequalities over the real numbers

			D. Techniques for solving other equations and inequalities, which contain polynomial, rational, radical exponential and logarithmic expressions, as well as the absolute value of linear expressions E. Finding domains of radical, rational and logarithmic functions by setting up and solving appropriate inequalities F. Using interval notation to expression solutions of inequalities G. Operations on sets: unions and intersections H. Systems of linear equations (2 x 2 systems and 3 x 3 systems)
Lecture	19	V	APPLICATIONS A. Modeling verbally expressed problems numerically, symbolically and graphically B. Solving problems numerically, symbolically and graphically C. Pattern recognition strategies D. Perimeter and area of rectangles, triangles and circles E. Pythagorean Theorem F. Rate, distance and time problems G. Exponential growth and decay problems H. Other applied problems whose solutions utilize the function types listed above, as well as the types of equations and inequalities listed above I. Applied problems whose solutions require the use of systems of linear equations
Total Lecture Hours		90	
Total Laboratory Hours		0	
Total Hours		90	

IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

A. PRIMARY METHOD OF EVALUATION:

Problem solving demonstrations (computational or non-computational)

B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:

Solve the inequality 2x - 3/4 - x > 2, check your work and present the solution in interval notation. Also, graph the solution on a number line and on the x-y coordinate plane.

C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

1. The price of computer technology has been dropping steadily for the past ten years. If a certain computer cost $6700 ten years ago and a computer with the same level of computing power cost $2200 three years ago, find the rate of decrease in cost of this level of computing power per year. Predict what this level of computing power would cost today. Why will this model stop making sense at some point in time? Show all of your work.

2. The population of the world in 1960 was about four billion human beings. If the population is growing according to the Malthusian model with an annual growth rate of 1.8%, what does this model predict the population of the world to be in the year 2000? Find the actual world population in the year 2000. Compare your answer with the actual world population in the year 2000. What does this tell you about the Malthusian model? Write a paragraph explaining your reasoning.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:
Other exams
Quizzes
Homework Problems

V. INSTRUCTIONAL METHODS
Lecture

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. WORK OUTSIDE OF CLASS
Study
Required reading
Problem solving activities

Estimated Independent Study Hours per Week: 10

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS
A. Tussy and R. Gustafson. INTERMEDIATE ALGEBRA. 4th ed. Brooks/Cole, 2008.

B. ALTERNATIVE TEXTBOOKS

C. REQUIRED SUPPLEMENTARY READINGS

D. OTHER REQUIRED MATERIALS

VIII. CONDITIONS OF ENROLLMENT

A. Requisites (Course and Non-Course Prerequisites and Corequisites)

Requisites	Category and Justification
Course Prerequisite Mathematics-43 or	Sequential
Non-Course Prerequisite	Qualification by appropriate assessment

B. Requisite Skills

Requisite Skills
Manipulate algebraic expressions, including expressions with fractions and radicals. MATH 37 -Use the order of operations to evaluate expressions that combine the addition, subtraction, multiplication, division and exponentiation of real numbers. MATH 40 -Use the properties of the real numbers to evaluate, simplify, and factor algebraic expressions, including expressions with fractions and radicals.

Solve quadratic equations and systems of linear equations. MATH 37 -Represent linear and quadratic models with tables, graphs and equations (coordinate graphing), and transform the model from one representation to another. MATH 37 -Set up, graph, and solve linear equations, systems of linear equations, and linear inequalities using a variety of techniques. MATH 37 -Set up, graph and solve quadratic equations using a variety of methods, including factoring, the square root property, completing the square, and the quadratic formula. MATH 40 -Set up and solve application problems using linear equations and inequalities, systems of two linear equations with two variables, and quadratic equations.

C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification

D. Recommended Skills

Recommended Skills

E. Enrollment Limitations

Enrollment Limitations and Category	Enrollment Limitations Impact

Course created by Amy Muneoka on 02/01/1977.

BOARD APPROVAL DATE:

LAST BOARD APPROVAL DATE: 04/15/2019

Last Reviewed and/or Revised by Lars Kjeseth **Date: 11/10/2018**
17177