Proposal for Course Revisions
Fall 2018

Subject and Number: Mathematics 67

Descriptive Title: General Education Algebra

Course Discipline(s): Mathematics

Division: Mathematical Sciences

Department: Mathematics

Faculty Proposer: Susan Taylor and Ronald Martinez

Division CCC Rep: Diaa Eldanaf

Division Curriculum Committee Approval Date: 10/13/18

Course Review Rationale (The standard rationale verbiage is included. Add additional rationale information if needed): This course is being reviewed to meet Title 5 regulations and local standards. Add additional justification as needed:

☐ **Inactivation**
Justification:
(If this course is being inactivated, <u>stop here.</u> No other parts of the form need to be complete.)

I. Course Name and Number
☒ No changes
☐ Revisions
Justification:

Descriptive Title
☒ No Changes
☐ Revisions
Justification:

Catalog Description
☒ No Changes
☐ Revisions
Justification:

Conditions of Enrollment
☐ No Changes
☒ Revisions (If prerequisite changes are being proposed, contact the Curriculum Advisor.)
Justification: Compliance with AB705

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II. Student Learning Outcomes (SLOs)

☒ No Changes

☐ Revisions

Justification:

III. Objectives

☒ No Changes

☐ Revisions

Justification:

IV. Major Topics

☒ No Changes

☐ Revisions

Justification:

V. Primary Methods of Evaluation

☒ No Changes

☐ Revisions

Justification:

VI. Instructional Methods

☒ No Changes

☐ Revisions

Justification:

VII. Work Outside of Class

☒ No Changes

☐ Revisions

Justification:

VIII. TEXTS AND MATERIALS

☒ No Changes

☐ Revisions

Justification:

IX. Distance Education Addendum

If a Distance Education Addendum exists for this course, you must complete the Distance Education Addendum below. Please refer to CurricUNET version if needed.

Distance Education Version of this Course

Current version ☐ Online ☐ Hybrid
☒ No Changes
☐ Revisions
Justification:

Delivery Method:
☐ Online (Complete Section A)
☐ Hybrid (Complete Section B)

A. Online (51% or more online instruction with an optional or mandatory on-campus orientation.)
Complete this section.

    I.   **Methods of Regular Effective Contact Between Instructor and Student** (Check all that apply)
        A. Group Meetings:
        ☐Chat Room
        ☐Interactive Videoconferencing
        ☐Teleconference
        ☐On Campus
        ☐Other(Please specify)

        B. Electronic/Technology-Assisted Contact
        ☐Online
        ☐Email
        ☐Listserv
        ☐Chat Room
        ☐Interactive Videoconferencing
        ☐Website/Bulletin Board
        ☐Telephone
        ☐U.S. Mail
        ☐On Camus
        ☐Other (Please specify)

        C. Office Hours
        ☐Online
        ☐On Campus

    II.   **Methods of Evaluation**
        ☐Methods of Evaluation do NOT differ from those in the Course Outline of Record
        ☐Methods of Evaluation in the Course Outline of Record are modified or supplemented

III. **Administration of Examinations**
☐On Campus
☐Online
☐Email
☐U.S. Mail
☐Proctored Off Campus
☐Not applicable
☐Other (Please specify)

IV. **Text/Supplemental Readings/Materials**
☐Texts, Supplemental Readings, and Materials do NOT differ from those listed in the Course Outline of Record
☐Texts, Supplemental Readings, and Materials differ from those listed in the Course Outline of Record

V. **Accommodations for Students with Disabilities and Instructional Delivery**
In compliance with ECC Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973 – Sections 504 and 508, and the Americans with Disabilities Act, instructional delivery shall provide access, full inclusion, and effective communication for students with disabilities. Instructional delivery methods may include, but are not limited to, Braille/audiotape for print material, on-site interpreter/real-time transcription/live captioning for audio material, captioning for video material, alternative text for images, and captioning of audio information for electronic media materials (such as web and online).

☐ Instructors of the distance education version of this course will read and will comply with the Accommodations for Students with Disabilities and Instructional Deliver.

B. Hybrid (51% of more online instruction with regularly scheduled mandatory on-campus meetings.)
Complete this section.

I. **Methods of Regular Effective Contact Between Instructor and Student** (Check all that apply)
   A. **Group Meetings:**
      ☐Chat Room
      ☐Interactive Videoconferencing
      ☐Teleconferencing
      ☐On Campus
      ☐Other (Please specify)

   B. **Electronic/Technology-Assisted Contact**
      ☐Online
      ☐Email
      ☐Listserve
      ☐Chat Room
      ☐Interactive Video Conferencing
      ☐Website/Bulletin Board
      ☐Telephone
      ☐U.S. Mail
      ☐On Campus
      ☐Other (Please specify)

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    C. Office Hours
        ☐Online
        ☐On Campus

II. Methods of Evaluation
☐Methods of Evaluation do NOT differ from those in the Course Outline of Record
☐Methods of Evaluation in the Course Outline of Record are modified or supplemented

III. Administration of Examinations
☐On Campus
☐Online
☐Email
☐U.S. Mail
☐Proctored Off Campus
☐Not applicable
☐Other (Please specify)

IV. Text/Supplemental Readings/Materials

☐Texts, Supplemental Readings, and Materials do NOT differ from those listed in the Course Outline of Record
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☐Instructors of the distance education version of this course will read and will comply with the Accommodations for Students with Disabilities and Instructional Delivery.

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Instructions:

To facilitate course review, please make your changes directly on this document and indicate the changes using strikethroughs (~~strikethroughs~~), <mark>highlights</mark>, or by changing the color of the font. Please <u>do not</u> use Track Changes.

El Camino College
COURSE OUTLINE OF RECORD - Pending

I.   GENERAL COURSE INFORMATION

Subject and Number: **Mathematics 67**
Descriptive Title: **General Education Algebra**
Course Disciplines: **Mathematics**
Division: **Mathematical Sciences**

Catalog Description:

Using data and real-world applications, students in this course reinforce their numeracy skills and learn the algebra, descriptive statistics, and other quantitative reasoning skills needed for statistics and some other transfer-level general education mathematics courses. (See note.)

 Note:

Mathematics 67 is a prerequisite course only for Mathematics 110, 111, 115, 120, 140, and 150. Mathematics, computer science, science, engineering, and business students should take Mathematics 80 if they plan to take Math 130, 165, 170, or 180.

Conditions of Enrollment:

Prerequisite: ~~Mathematics 23 with a minimum grade of C or Mathematics 37 with a grade of P or qualification by testing (El Camino College Mathematics Placement Test) and assessment~~ None

Course Length: X Full Term   Other (Specify number of weeks):

Hours Lecture: 5.00 hours per week TBA

Hours Laboratory: hours per week TBA

Course Units: 5.00

Grading Method: Letter

Credit Status: Associate Degree Credit

Transfer CSU: No

Transfer UC: No

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General Education:

 El Camino College:

> **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. SLO #1 Application Problems

 Students will be able to recognize and apply appropriate mathematical concepts and models involving a variety of functions to contextualized problems involving authentic, real-world data.

2. SLO #2 Solving Equations and Manipulating Expressions

 Students will be able to symbolically (algebraically) solve a variety of equations, inequalities and linear systems and manipulate symbolic (algebraic) expressions that arise in contextualized problems using authentic, real-world data.

3. SLO #3 Visual and Graphical Methods

 Students will use visual and graphical methods to represent, analyze and solve contextualized problems involving authentic, real-world data.

4. SLO #4 Articulating Mathematical Reasoning

Students will be able to articulate the mathematical reasoning used in solving a variety of contextualized problems using authentic, real-world data, orally or in writing.

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. Recognize proportional relationships from verbal and numeric representations and compare proportional relationships represented in different ways.

   Objective Exams

2. Solve problems involving ratios, proportions and percents.

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Homework Problems

3. Analyze simple data sets by using appropriate exploratory data analysis techniques.

    Homework Problems

4. Calculate quantities using summation notation.

    Homework Problems

5. Construct and analyze various graphs, including bar graphs, pie charts, histograms, stem-and-leaf plots, boxplots and scatterplots.

    Laboratory reports

6. Analyze readings that include quantitative or statistical information.

    Written homework

7. Calculate measures of center, measures of dispersion, and measures of relative position and distinguish when to apply them appropriately.

    Homework Problems

8. Present statistical results orally and in written form after analyzing data or solving applied problems.

    Oral exams

9. Translate problems from a variety of contexts into a mathematical representation (symbolic, tabular, and graphic) and vice versa.

    Objective Exams

10. Construct and use equations and inequalities to represent relationships involving one or more unknown or variable quantities to solve problems.

    Objective Exams

11. Describe the behavior of linear and exponential functions using symbolic expressions, verbal descriptions, tables and graphs.

    Presentation

12. Identify when a linear or exponential model or trend is appropriate for data and use a linear or exponential model to answer questions about such data.

    Objective Exams

13. Compute and interpret both empirical (experimental) and classical (theoretical) probabilities.

    Quizzes

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	8	I	Numeracy and Proportional Reasoning A. Working with fractions, decimals and percents, including appropriate rounding, in context

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			B. Determining and interpreting ratios and rates in context C. Proportional reasoning and working with scales and magnitude effectively D. Dimensional analysis (units conversion) E. Use scientific notation in calculations
Lecture	8	II	**Variables and Expressions** A. Roles played by symbols in an algebraic expressions B. Simplifying and evaluating algebraic expressions using order of operations and the distributive properties C. Arithmetic operations on simple polynomial expressions and exponential expressions
Lecture	8	III	**Equations and Inequalities** A. Interpreting and setting up equations and inequalities in context, including proportional equations B. Solutions of equations and inequalities, including interpretation of solutions in context C. Symbolic, graphical, and numerical representations of solutions of equations and inequalities D. Using and transforming formulas and literal equations
Lecture	8	IV	**Symbolic, Graphical, and Numerical Representations of Functions** A. Use and interpret function and sigma notation B. Functions as rules (or function machines), as sets of ordered pairs (or tables), as algebraic equations, and as graphs C. Solving equations and evaluating expressions using function notation, both symbolically and graphically, including exponential and linear functions D. In-depth exploration of linear functions and exponential functions and exposure to other functions, such as reciprocals, square roots, sequences and multivariable functions that involve the use of sigma notation E. Graphing techniques, including appropriate scaling
Lecture	10	V	**Linear Relations, Equations and Functions** A. Finding, estimating and interpreting the slope of a linear relation (proportional reasoning) B. Graphs and equations of linear relations given: a) a point and a slope, b) a slope and y-intercept, and c) two points C. Solutions of linear inequalities in one variable and graphs of the solutions on number lines D. Determining when data may be appropriately modeled using a linear function E. Meaningful domains of linear functions modeling authentic data F. Creating and using linear models to make predictions in context

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Lecture	10	VI	Exponential Relations, Equations and Functions
			
			  A. Finding, estimating and interpreting the multiplier and percent change of an exponential relation
			  B. Graphs and equations of exponential relations given an initial value and multiplier or given a table of values.
			  C. Determining when data may be appropriately modeled using an exponential function
			  D. Meaningful domains of exponential functions modeling authentic data
			  E. Creating and using exponential models to make predictions in context

Lecture	20	VII	Describing and Displaying Data
			
			  A. Gathering, organizing, analyzing, presenting and interpreting data
			  B. Exploratory Data Analysis: dot plots, stem-and-leaf plots, five-number summaries, and boxplots
			  C. Creating and interpreting visual displays of data or distributions: bar graphs, pie charts, scatter plots, and histograms
			  D. Verbal descriptions of distributions, including measures of central tendency and measures of spread
			  E. Measures of central tendency: mean, median, mode
			  F. Measures of spread: standard deviation, inter-quartile range, range
			  G. Measures of relative position: quartiles and percentiles
			  H. Bivariate data, correlation and regression equations

Lecture	10	VIII	Percents and Probability
			
			  A. Two-way tables and segmented bar graphs
			  B. Subjective (Informal) Probability
			  C. Empirical (Experiential) Probability
			  D. Classical (Theoretical) Probability
			  E. Addition and Multiplication Rule
			  F. Conditional Probability

Lecture	4	IX	Quantitative Reasoning and Critical Thinking in Mathematics
			
			  A. Critical analysis of readings and charts containing quantitative or statistical information
			  B. Quantitative and mathematical reasoning skills

Lecture	4	X	Mathematical Success Skills
			
			  A. Problem solving in mathematics
			  B. Strategies for success in mathematics
			  C. Use of technology (graphing calculators and spreadsheet software) in mathematics

Total Lecture Hours	90		

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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:**

Lars swims 1000m every morning for a month. Examine the scatterplot given below *[omitted from the course outline of record]* comparing Lars' swim time each day to his ending pulse rate. Write a few sentences describing the scatterplot. Identify any points that you would consider outliers and explain why they should be excluded. Sketch a line that you think fits the data fairly well, and find a formula for the line, using swim time as the input variable and pulse rate as the output variable. Use your linear model to predict what Lars' ending pulse rate would be if his swim time were 15 minutes.

C.   **COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:**

   0.   By statute, the State of California declares that a classroom is properly sized if each student has 15 square feet. In your groups, answer the following question: For what range of class sizes (number of students) is this statute reasonable?

   In a five-minute presentation in class, describe the assumptions you made about a typical classroom and what "reasonable" means, the mathematical reasoning you used to answer the question, and the conclusions you drew.

   1.   Your local bar and grill (where cash is all that is accepted) is having a quarter wing night, during which chicken wings cost $0.25 each. A pitcher of beer for you and your friends costs $9; ranch dressing costs $1.50 (and is enough for ten wings), tax is 8.5%; and the expected tip is 15%. If you are treating your friends to a pitcher of beer, chicken wings and enough ranch dressing for the wings, what is the maximum number of wings can you order and still keep the total bill (including tax and tip) within $80. Set up an equation first with all of the details and then solve the equation. (You decide whether or not to pay tip on the tax, but indicate your choice clearly in your equation.) You may speak with your fellow students as your work on this problem, but each of you will need to turn in a written solution.

D.   **OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:**
Objective Exams
Oral exams
Embedded questions
Quizzes
Reading reports
Written homework
Homework Problems
Completion
Presentation

V. INSTRUCTIONAL METHODS

Discussion
Group Activities
Internet Presentation/Resources
Laboratory
Lecture
Multimedia presentations

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
Skill practice
Required reading
Problem solving activities

Estimated Independent Study Hours per Week: 10

VII. TEXTS AND MATERIALS

A.   **UP-TO-DATE REPRESENTATIVE TEXTBOOKS**

Jay Lehmann. A Pathway to Introductory Statistics (Pathways Solutions). 1st ed.   Pearson, 2015.

B.   **ALTERNATIVE TEXTBOOKS**

C.   **REQUIRED SUPPLEMENTARY READINGS**

Instructor's choice of readings that contain quantitative or statistical information.

D.   **OTHER REQUIRED MATERIALS**

TI-84 graphing calculator.

VIII. CONDITIONS OF ENROLLMENT

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

Requisites	Category and Justification
Course Prerequisite Mathematics-23 or	Sequential
Course Prerequisite Mathematics-37	Sequential

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or	
Non-Course Prerequisite	Based on ongoing study and review of our cut scores, the faculty believe that a student who has not passed a prerequisite course nor achieved the required placement cut score does not have the necessary entrance skills to succeed in this course.

B.   Requisite Skills

Requisite Skills
Find perimeters, areas, and volumes of various geometrical shapes and use in applications. MATH 23 -   Find perimeters, areas, and volumes of various geometrical shapes and use in applications.   MATH 37 -   Find perimeters, areas, and volumes of various geometrical shapes and use in applications.
Formulate mathematical representations of real-world applications including the recognition of proportional relationships. MATH 23 -   Formulate mathematical representations of real-world applications including the recognition of proportional relationships.   MATH 37 -   Formulate mathematical representations of real-world applications including the recognition of proportional relationships.
Solve linear equations using a variety of techniques. MATH 23 -   Solve linear equations.   MATH 37 -   Set up, graph, and solve linear equations, systems of linear equations, and linear inequalities using a variety of techniques.
Recognize and apply the concepts of variable, expression, and equation. MATH 23 -   Recognize and apply the concepts of variable, expression, and equation.   MATH 37 -   Recognize and apply the concepts of variable, expression, equation and function.

C.   Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification

D.   Recommended Skills

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Recommended Skills

E. **Enrollment Limitations**

Enrollment Limitations and Category	Enrollment Limitations Impact

Course created by Lars Kjeseth on 10/02/2012. (DO NOT CHANGE)

BOARD APPROVAL DATE: 01/22/2013 (DO NOT CHANGE)

LAST BOARD APPROVAL DATE: (DO NOT CHANGE)

Last Reviewed and/or Revised by:

Date:

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