MATH A115: COLLEGE ALGEBRA

Item	Value
Curriculum Committee Approval Date	03/20/2024
Top Code	170100 - Mathematics, General
Units	4 Total Units
Hours	72 Total Hours (Lecture Hours 72)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)
Associate Arts Local General Education (GE)	• Area 1B Communication and Analytical Thinking (OA2)
Associate Science Local General Education (GE)	• Area 1B Communication and Analytical Thinking (OAS2) • Area 2 Mathematical Concepts and Quantitative Reasoning (OMTH)
California General Education Transfer Curriculum (Cal-GETC)	• Cal-GETC 2A Math Concepts (2A)
Intersegmental General Education Transfer Curriculum (IGETC)	• IGETC 2A Math Concepts (2A)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B4 Math/Quant.Reasoning (B4)

Course Description

Topics include linear, quadratic, rational, logarithmic, and exponential functions and their graphs, systems of equations, matrices, sequences, series, and basic combinations. This course prepares students to enter MATH A140 but does not provide sufficient preparation to enter MATH A180. PREREQUISITE: MATH A030 or higher or appropriate placement. Transfer Credit: CSU; UC: Credit Limitation: MATH A115 and MATH A170 combined: maximum credit, 5 semester/7.5 quarter units.

Course Level Student Learning Outcome(s)

1. Solve and apply equations and inequalities including linear, quadratic, absolute value, polynomial, rational, radical, exponential and logarithmic equations.
2. Graph linear, quadratic, absolute value, polynomial, rational, radical, exponential, logarithmic, and parametric equations.
3. Perform function operations including composition, transposition, and finding inverse functions.
4. Apply techniques for finding zeros of polynomial functions.
5. Solve systems of equations by application of algebraic techniques and/or matrix techniques.
6. Define, recognize, and solve for terms of arithmetic and geometric series.

Course Objectives

- 1. Solve linear and nonlinear systems of equations and inequalities.
- 2. Graph linear, quadratic and cubic functions.
- 3. Add, subtract, multiply and divide functions as well as to determine the domain and range of functions.
- 4. Graph rational functions and find asymptotes as well as using the concepts of infinity to study their behavior.
- 5. Solve exponential and logarithmic equations.
- 6. Solve and apply systems of linear equations in three or more variables with and without matrices.
- 7. Find the nth term of a sequence.
- 8. Find the sum of a series.
- 9. Use sigma notation to evaluate sums.
- 10. Use the binomial theorem to expand binomials.
- 11. Evaluate probabilities in elementary situations.

Lecture Content

Functions, equations and inequalities Solve linear and quadratic equations and inequalities Interval notation Solve higher degree polynomial, rational and absolute value equations and inequalities Analyze linear equations: point-slope form, parallel and perpendicular lines Graph linear, quadratic, cubic, radical and absolute value equations (with shifts and stretches) Graph piecewise defined functions Apply and analyze linear, quadratic and cubic models and applications Polynomial and rational functions Function notation, domain and range of functions Apply functions to optimization problems in business and economics as a preparation for calculus Analyze functions: increasing, decreasing and constant Use functions to solve various applications Find the inverse of a function graphically and algebraically Apply the Intermediate Value Theorem Graph polynomial and rational functions including asymptotes, intercepts, and vertices Use informal limit concepts with polynomials and rational functions to find the limit as x approaches positive and negative infinity Use informal limit concepts to find asymptotes for rational functions Logarithmic and exponential functions Define and graph exponential functions with base e and other bases Graph logarithmic and natural logarithmic functions Use the properties of logarithms to simplify or expand logarithmic expressions Solve exponential and logarithmic equations Apply and analyze exponential and logarithmic models and applications Systems of linear and quadratic equations Solve a system of three or more linear equations using addition and substitution Solve a system of three or more linear equations using augmented matrices or Cramer s Rule Use systems of linear equations in various applications Solve linear and non-linear systems of equations and inequalities Complex Numbers Perform addition, subtraction, multiplication, and division of complex numbers Write complex numbers in a+bi form Sequences and series Introduction to sequences Find the terms of a sequence given the nth term Introduce finite sums Combinatorics Calculate permutations and combinations Use the binomial theorem to expand binomials and to find a term in a binomial expansion Introduce probability theory and compute probabilities in elementary situations

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)

Instructional Techniques

The primary mode of instruction is the lecture/demonstration method as well as in-class exercises that allow students to analyze and solve problems. Some instructors may also utilize graphing calculators.

Reading Assignments

From assigned text 1 hour.

Writing Assignments

Computational and applied problems (i.e., word problems) commonly appear on exams and/or quizzes. These require written responses. 1 hour

Out-of-class Assignments

Computational and applied problems (i.e., word problems) commonly appear on exams and/or quizzes. These require written responses. Critical thinking and problem solving skills are part of this course. 6 hours

Demonstration of Critical Thinking

Grades are determined by performance on exams and quizzes. Some instructors may also include grades on homework and collaborative projects. A comprehensive final exam is part of the course evaluation. Critical thinking will be evaluated through a problem-solving approach. Writing is encouraged throughout the course but is not necessarily a part of the grading on exams.

Required Writing, Problem Solving, Skills Demonstration

Computational and applied problems (i.e., word problems) commonly appear on exams and/or quizzes. These require written responses.

Textbooks Resources

1. Required Miller, J. Gerken, D.. College Algebra, 3rd ed. McGraw Hill, 2023 Rationale: -

Other Resources

1. Other appropriate textbook as chosen by faculty.