MATH R115: COLLEGE ALGEBRA

Originator
ptrujillo

College
Oxnard College

Discipline (CB01A)
MATH - Mathematics

Course Number (CB01B)
R115

Course Title (CB02)
College Algebra

Banner/Short Title
College Algebra

Credit Type
Credit

Start Term
Fall 2023

Catalog Course Description
An advanced course in algebra, this course focuses on the study of functions and their graphs. Students will analyze and graph functions (absolute value, radical, polynomial, rational, exponential, and logarithmic). Topics also include inequalities, conic sections, systems of equations and inequalities, matrices, sequences, and series. This course includes applications to many areas including business and sciences.

Taxonomy of Programs (TOP) Code (CB03)
1701.00 - Mathematics, General

Course Credit Status (CB04)
D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)
A (Transferable to both UC and CSU)

Course Basic Skills Status (CB08)
N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)
E - Non-Occupational

Course Cooperative Work Experience Education Status (CB10)
N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)
Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)
N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)
Y - Not Applicable

Course Noncredit Category (CB22)
Y - Credit Course

Funding Agency Category (CB23)
Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)
2 - Not Program Applicable

General Education Status (CB25)
B - Satisfies Math/Quantitative Reasoning req (CSUGE-B B4, IGETC 2, or 4-yr)

Support Course Status (CB26)
N - Course is not a support course

Field trips
Will not be required

Grading method
(L) Letter Graded

Does this course require an instructional materials fee?
No

Repeatable for Credit
No

Is this course part of a family?
No

Units and Hours

Carnegie Unit Override
No

In-Class

Lecture
Minimum Contact/In-Class Lecture Hours
70
Maximum Contact/In-Class Lecture Hours
70

Activity

Laboratory

Total in-Class

Total in-Class
Total Minimum Contact/In-Class Hours
70
Total Maximum Contact/In-Class Hours
70

Outside-of-Class

Internship/Cooperative Work Experience

Paid

Unpaid

Total Outside-of-Class

Total Outside-of-Class
Minimum Outside-of-Class Hours
140
Maximum Outside-of-Class Hours
140

Total Student Learning

Total Student Learning
Total Minimum Student Learning Hours
210
Total Maximum Student Learning Hours
210

Minimum Units (CB07)
4
Maximum Units (CB06)
4

Prerequisites
Course taught at the level of intermediate algebra or placement as determined by the college's multiple measures assessment process.

Entrance Skills
Entrance Skills
Algebraic fluency with expressions and equations. Understanding functions and graphs.

Requisite Justification
Requisite Type
Prerequisite

Requisite
Course taught at the level of intermediate algebra or placement as determined by the college's multiple measures assessment process

Requisite Description
Course in a sequence

Level of Scrutiny/Justification
Content review

Student Learning Outcomes (CSLOs)	
	Upon satisfactory completion of the course, students will be able to:
1	Students will solve logarithmic and exponential applications.
2	Students will solve systems of equations using matrices (row operations).

Course Objectives

	Upon satisfactory completion of the course, students will be able to:
1	Analyze and investigate properties of functions;
2	Synthesize results from the graphs and/or equations of functions;
3	Apply transformations to the graphs of functions;
4	Recognize the relationship between functions and their inverses graphically and algebraically;
5	Solve and apply rational, linear, polynomial, radical, absolute value, exponential, and logarithmic equations and solve linear, nonlinear, and absolute value inequalities;
6	Solve systems of equations and inequalities;
7	Apply techniques for finding zeros of polynomials and roots of equations;
8	Apply functions and other algebraic techniques to model real world applications;
9	Analyze conics algebraically and graphically;
10	Use formulas to find sums of finite and infinite series.

Course Content

Lecture/Course Content
1. Analysis and graphing of functions and non-functions
    a. Using function notation
    b. Identifying equations as functions or non-functions
    c. Using concepts of symmetry, intercepts, left to right end behavior, asymptotes, and transformations to sketch graphs of functions and non-functions (such as: polynomials, absolute value, radicals, rational, exponential, logarithmic and circles)
    d. Finding the domain and range of a function both analytically and graphically
    e. Writing the equation of a function (or non-function) given its description
    f. Applying modeling techniques to solve application problems that involve functions
    g. Algebra of functions; including the composition of functions
    h. Finding inverses of one-to-one functions
2. Solutions of equations and inequalities
    a. Solving an equation; such as linear, rational, polynomial, radical, absolute value, logarithmic and exponential (employing various methods, including: the Factor Theorem, Remainder Theorem, Descartes' Rule of Signs, right/left behavior, zeros of a polynomial)
    b. Applications of both equations and inequalities
    c. Properties and characteristics of complex numbers
3. Systems of equations and inequalities
    a. Solving systems of equations using substitution, eliminations, graphing, matrices, and Cramer's Rule
    b. Solving systems of nonlinear equations in two variables
    c. Graphing systems of inequalities
4. Finding the partial fraction decomposition of rational expressions
5. Conic sections and their graphs
    a. Identifying type of conic (circle, ellipse, parabola, hyperbola) from its equation
    b. Specifying the attributes that include center, vertices, foci, axes of symmetry, and asymptotes
    c. Writing the standard form of the equation given the attributes of the conic equation
6. Series and Sequence
    a. Finding the patterns of a sequence; use factorial and summation notation
    b. Calculating the common difference, the general term, and the sum of the first n terms of an arithmetic sequence
    c. Calculating the common ratio, the general term, the sum of the first n terms of a geometric sequence, and the sum of an infinite geometric series
    d. Using the Binomial Theorem to expand binomials of the form $(a + b)^n$, where n is a natural number
    e. Verifying statements using mathematical induction

Laboratory or Activity Content
None

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):
Problem solving exercises

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):
Computational homework
Objective exams
Problem-solving exams
Quizzes
Problem-Solving Assignments

Instructional Methodology

Specify the methods of instruction that may be employed in this course
Class activities
Class discussions
Collaborative group work
Computer-aided presentations
Distance Education
Instructor-guided interpretation and analysis
Instructor-guided use of technology
Lecture
Small group activities

Describe specific examples of the methods the instructor will use:
1. Instructor-led class discussion on theories and processes used to analyze functions and their graphs.
2. Instructor lecture and/or demonstration of concepts such as the various techniques used to generate sequences and series.
3. Small group practice utilizing mathematical skills and problem-solving techniques. For example, given a function, analyze the attributes of the function and sketch the graph.
4. Use of technology, such as graphing or online calculators.

Representative Course Assignments

Writing Assignments
Written responses (for example, Use your own words to explain how to determine if two functions are inverses of each other.)

Critical Thinking Assignments
1. Participate in class and small group discussions discussing, debating, and developing problem solving techniques in real world applications.
2. Developing error-analysis skills to find any algebraic mistakes in a problem.

Reading Assignments
1. Textbook readings of definitions, rules, properties, processes, and helpful hints.
2. Critical reading and thinking in application problems (for example, A person standing close to the edge of an 80-foot cliff throws a rock upward with an initial speed of 64 feet per second. The height of the rock is described by the function y = -16x2 + 64x + 80. After how many seconds will the rock reach its maximum height above the water?)

Problem-Solving and Other Assignments (if applicable)
Student projects permitting more in-depth exploration of course topics.

Outside Assignments

Representative Outside Assignments
1. Homework skill building exercises.
2. Preparation for exams (including review of notes, watching video, practice exams)logarithmic properties.

Articulation

C-ID Descriptor Number
MATH 151

Status
Approved

Comparable Courses within the VCCCD
MATH M05 - College Algebra for STEM Studies
MATH V04 - College Algebra

District General Education

A. Natural Sciences

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

Area F: Ethnic Studies

CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals
Resource Type
Textbook

Description
Robert Blitzer (2017). *College Algebra*. Pearson .

Distance Education Addendum

Definitions

Distance Education Modalities
Hybrid (1%−50% online)
Hybrid (51%−99% online)
100% online

Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.
Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.
Yes

Regular Effective/Substantive Contact

Hybrid (1%−50% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Students will post a discussion board topic on the process of finding the maximum height of a projectile, and they will respond to others classmate with the intent of dialogue.
Other DE (e.g., recorded lectures)	Students will watch lecture videos.
Video Conferencing	Students will participate in group activities through a video conferencing tool.
E-mail	Responses to specific email questions.

Hybrid (51%−99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Students will post a discussion board topic on the process of finding the maximum height of a projectile, and they will respond to others classmate with the intent of dialogue.
Other DE (e.g., recorded lectures)	Students will watch lecture videos.
Video Conferencing	Students will participate in group activities through a video conferencing tool.
E-mail	Responses to specific email questions.

100% online Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Students will post a discussion board topic on the process of finding the maximum height of a projectile, and they will respond to others classmate with the intent of dialogue.
Other DE (e.g., recorded lectures)	Students will watch lecture videos.

| E-mail | Responses to specific email questions. |
| Video Conferencing | Students will participate in group activities through a video conferencing tool. |

Examinations

Hybrid (1%–50% online) Modality
On campus
Online

Hybrid (51%–99% online) Modality
On campus
Online

Primary Minimum Qualification
MATHEMATICS

Review and Approval Dates

Department Chair
05/09/2023

Dean
05/09/2023

Technical Review
05/10/2023

Curriculum Committee
05/10/2023

DTRW-I
MM/DD/YYYY

Curriculum Committee
MM/DD/YYYY

Board
MM/DD/YYYY

CCCCO
MM/DD/YYYY

Control Number
CCC000563142

DOE/accreditation approval date
MM/DD/YYYY