Cerro Coso College
Course Outline of Record Report
05/07/2020

MATHC141 : Precalculus: Algebra

General Information

Author (s):	- Steven Rogers - Bernsten, Dean - Kessler, Jaclyn - Bonner, Michael - Martin, Jorge - Slovacek, Joseph
Course Code (CB01) (CB01) :	MATHC141
Course Title (CB02) (CB02) :	Precalculus: Algebra
Department:	Mathematics
Proposal Start:	Spring 2021
TOP Code (CB03) :	(1701.00) Mathematics, General
SAM Code (CB09) (CB09) :	Non-occupational
Distance Education Approved:	Yes
Course Control Number (CB00) (CB00) :	CCC000316010
Curriculum Committee Approval Date:	02/28/2020
Board of Trustees Approval Date:	04/09/2020
External Review Approval Date:	04/09/2020
Course Description:	This precalculus course is an intensive study of algebraic functions and relations and their graphical representations, exponential and logarithmic functions and their applications, theory of equations, matrices, sequences, series, mathematical induction, the binomial theorem, and an introduction to the theory of limits.
Submission Type:	Mandatory Revision
	Changing the course title, description, textbook, and previously there was no C-ID associated with the course and is now being brought through. Reduced the number of SLO's, old COR had no objectives so proposer took the previous SLOs and turned them into objectives and created new SLOs. Last assessed: Spring 2019, several SLOs did not meet the 70% target even after implementing strategies. Some SLOs were modified as a result to be broader in scope.

Faculty Minimum Qualifications

Master Discipline Preferred:	Mathematics
Alternate Master Discipline Preferred:	- Chemistry - Engineering - Physics/Astronomy
Bachelors or Associates Discipline Preferred:	No value
Additional Bachelors or Associates Discipline:	No value

Course Formerly Known As

Course Formerly Known As

College Algebra

Course Development Options

Basic Skills Status (CB08) (CB08)

Course is not a basic skills course.

Course Special Class Status (CB13) (CB13)

Course is not a special class.

Grade Options

- Pass/No Pass
- Letter Grade methods

☐ Allow Students to Gain Credit by Exam/Challenge

Allowed Number of Retakes

0

Course Prior to College Level (CB21)

Not applicable.

Rationale For Credit By Exam/Challenge

No value

Retake Policy Description

Type:|Non-Repeatable Credit

☑ Allow Students To Audit Course

Associated Programs

☑ Course is part of a program (CB24)

Associated Program	Award Type
CC Liberal Arts: Mathematics & Science	A.A. Degree Major
CSU General Education (CSU GE Breadth)	CSU General Education (CSU GE Breadth)
Intersegmental General Education Transfer Curriculum Certificate of Achievement	Intersegmental General Education Transfer Curriculum Certificate of Achievement
Liberal Arts: Mathematics & Science Associate in Arts Degree	Liberal Arts: Mathematics & Science Associate in Arts Degree

Transferability & Gen. Ed. Options

Transferability

Transferable to both UC and CSU

Transferability Status

Approved

Cerro Coso General Education Requirements	**Categories**	**Transferability Status**	**Comparable Course**
Area 4.2	Language & Rationality Analytical Thinking	Approved	No Comparable Course defined.

CSU General Education Certification	**Categories**	**Transferability Status**	**Comparable Course**
Area B.4	Scientific Inquiry & Quantitative Reasoning Mathematics / Quantitative Reasoning	Approved	No Comparable Course defined.

Intersegmental General Education Transfer Curriculum	**Categories**	**Transferability Status**	**Comparable Course**
Area 2	Mathematical Concepts & Quantitative Reasoning	Approved	No Comparable Course defined.

C-ID	**Categories**	**Transferability Status**	**Comparable Course**
Mathematics	C-ID discipline	Pending	MATH 151

Units and Hours

Summary

Minimum Credit Units (CB07) (CB07)	4	**Total Course In-Class (Contact) Hours**	72	**Total Student Learning Hours**	216
Maximum Credit Units (CB06) (CB06)	4	**Total Course Out-of-Class Hours**	144	**Faculty Load**	-

Credit / Non-Credit Options

Course Credit Status (CB04) (CB04)	**Course Non Credit Category (CB22) (CB22)**	**Non-Credit Characteristics**
Credit - Degree Applicable	Credit Course.	No value

Course Classification Code (CB11) (CB11)	**Funding Agency Category (CB23) (CB23)**	☐ Cooperative Work Experience Education Status (CB10) (CB10)
Credit Course.	Not Applicable.	

☐ Variable Credit Course

Weekly Student Hours

	In Class	Out of Class
Lecture Hours	4	8
Lab Hours	-	-
Activity Hours	-	-

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	54

Course In-Class (Contact) Hours

Lecture	72
Lab	-
Activity	-
Total	72

Course Out-Of-Class Hours

Lecture	144
Lab	-
Activity	-
Total	144

Time Commitment Notes for Students

Approximately 8 hours of study outside of class per week

Faculty Load

Extra Duty: -   **Faculty Load:** -

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No value	No value	No value	No value

Requisites

Prerequisite

MATHC055 - Intermediate Algebra

Outcomes
- Consistently perform signed number operations correctly.
- Demonstrate proficiency with operations of algebraic fractions.
- Use the rules of exponents and radicals to simplify expressions and solve equations.
- Recognize the difference between functions and non-functions.
- Graph a line and write the equation of a line.
- Recognize and graph at least one quadratic - parabola, circle, ellipse, or hyperbola.
- Solve a linear system of equations by at least two of the following methods: graphing, substitution, addition elimination, Cramer's rule.

- Solve quadratic equations by at least two of the following methods: factoring, completing the square, quadratic formula, graphing calculator.
- Graph exponential and logarithmic functions.
- Use the properties of exponential and logarithmic functions to solve equations.
- Set up and solve word problems related to the skills above.

Entrance Skills

Skill	Content Review
No value	No value

Limitations on Enrollment

Limitation	Provide Rationale
No value	No value

Specifications

Methods of Instruction	Methods of Instruction Rationale
Lecture	Lectures are based on the course objectives. Example: a lecture on how to find the real zeros of a polynomial function.
Outside reading	Textbook readings and homework either written or using an online course management system will be assigned. Example: Students read a chapter section on graphing techniques using transformations and then graph functions using shifts, compressions and stretches,and reflections.
Group Work	Example: Students work collaboratively to build a mathematical model to maximize revenue given a demand equation.

Assignments

A. Daily homework assignments Students work mathematics problems assigned from the text and from hand-outs to reinforce concepts and skills discussed in lecture. Examples: Students sketch the graphs on a handout defining a library of functions or students solve a system of three equations and three unknowns using multiple methods.
B. Online Course Management System Example: Students analyze the graph of a rational function.

Methods of Evaluation	Methods of Evaluation Rationale
Participation	A. Daily in-class assignments Example: Students work mathematics problems assigned from the text and from hand-outs to reinforce concepts and skills discussed in lecture.
Tests	B. Weekly Quizzes Weekly quizzes over the previous week's lecture material, homework, and in-class assignments

assess the student's understanding.
C. Chapter Exams
Chapter exams over the previous chapter's lecture material, homework, and in-class assignments assess the student's understanding.

Distance Education Description: how outcomes are evaluated

D. Proctored online exams
Example: An exam involving solving systems of equations

Equipment

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
Sullivan, M	Precalculus	Pearson	2020	9780135228982

Other Instructional Materials

Description	Instructor may require an access code to MyMathLab
Author	Sullivan, M.
Citation	No value

Materials Fee

No

Learning Outcomes and Objectives

Course Objectives

Use function notation, perform function evaluation, and apply composition of functions.

Demonstrate how to find the domain of a function and the inverse of a one-to-one function.

Recognize the equations of lines, conics, and rational functions; describe their graphs and use their properties.

Recognize and demonstrate the interrelationships of transformations, symmetry, odd/even, maximum/minimum, asymptotes, and finding roots of polynomial functions by algebraic and calculator methods.

Recognize the equations of exponential functions and logarithmic functions, describe their graphs and use their properties algebraically and via calculator methods.

Use arithmetic and geometric sequences in applications.

Perform basic operations with matrices and determinants; solve systems of equations by multiple methods.

Find limit values through exploratory numerical methods and through application of basic algebraic principles.

Apply multiple approaches to problem solving, using algebraic, graphical, and numerical methods to solve applied problems in other areas of mathematics, natural sciences, computer graphics, and computer animation.

CSLOs

Analyze and apply transformations to the graphs of functions and their inverses.

Expected SLO Performance: 70.0

Solve and apply rational, linear, polynomial, radical, absolute value, exponential, and logarithmic equations and solve linear, nonlinear, and absolute value inequalities.

Expected SLO Performance: 70.0

Apply techniques for finding zeros of polynomials and roots of equations.

Expected SLO Performance: 70.0

Solve systems of equations and inequalities.

Expected SLO Performance: 70.0

Analyze conics algebraically and graphically.

Expected SLO Performance: 70.0

Use formulas to find sums of finite and infinite series.

Expected SLO Performance: 70.0

Outline

Outline

The Mathematics Department has adopted the following best practices for teaching this course: offering or awarding extra-credit is forbidden; the allowance of multiple attempts at exams is forbidden; and an approved on-site proctor for online course exams is required.

A. Fundamental Concepts
    1. Review of algebraic operations including rational expressions, exponents, radicals, and complex numbers
    2. Review of solving equations including fractional, radical, linear, and quadratic equations
    3. Review of systems of linear equations and inequalities algebraically and with a computer algebra system
    or graphing utility.

B. Functions
    1. Basic concepts: relation, function, domain, range
    2. Characteristics: increasing, decreasing, maximum value, minimum value, odd, even, one-to-one
    3. Transformations of functions
    4. Composition of functions and inverse functions

5. Graphs of polynomial and rational functions
6. Use a computer algebra system or graphing utility to graph functions and relations

C. Theory of Equations
      1. Remainder and Factor theorems, synthetic division
      2. Methods of finding rational zeros
      3. Methods of isolating irrational zeros
      4. Complex zeroes and the Fundamental Theorem of Algebra
      5. Using graphing utilities to approximate roots
      6. Rational functions and asymptotes

D. Exponential and Logarithmic Functions
      1. Exponential functions and their graphs
      2. Logarithmic functions and their graphs
      3. Properties of logarithms and their application
      4. Solving exponential and logarithmic equations
      5. Fitting non-linear models to data

E. Sequences and Series
      1. Summation notation, general term of a sequence
      2. Arithmetic Sequences and Series and their applications
      3. Geometric Sequences and Series and their applications
      4. Proof by Mathematical Induction
      5. The Binomial Theorem

F. Matrices and Determinants
      1. Matrices and systems of linear equations
      2. Operations with matrices
      3. Inverse matrices and systems of linear equations
      4. The determinant of a square matrix
      5. Applications of matrices and determinants

G. Analytic Geometry
      1. Identify Conics
      2. The Parabola
      3. The Ellipse
      4. The Hyperbola

H. Selected Algebraic Applications to Be Chosen From
      1. Mathematics: other branches
      2. Biological Sciences: e.g., general biology, anatomy, physiology, microbiology
      3. Physical Sciences: e.g., chemistry, physics, geology, astronomy, oceanography
      4. Computer Science: e.g., computer graphics, computer animation

Delivery Methods

Delivery Method: Please list all that apply -Face to face -Online (purely online no face-to-face contact) -Online with some required face-to-face meetings ("Hybrid") -Online course with on ground testing -iTV – Interactive video = Face to face course with significant required activities in a distance modality -Other

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- Online (purely online no face-to-face contact)
- Online with some required face-to-face meetings ("Hybrid")
- Online course with on ground testing
- iTV – Interactive video = Face to face course with significant required activities in a distance modality

Rigor Statement: Assignments and evaluations should be of the same rigor as those used in the on-ground course. If they are not the same as those noted in the COR on the Methods of Evaluation and out-of-class assignments pages, indicate what the differences are and why they are being used. For instance, if labs, field trips, or site visits are required in the face

to face section of this course, how will these requirements be met with the same rigor in the Distance Education section? Describe the ways in which instructor-student contact and student-student contact will be facilitated in the distance ed environments.

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All assignments in distance education courses (online, hybrid and iTV) are the same as those in the on-ground course, except that students in purely online sections will submit all of their assignments virtually, and students in hybrid sections will submit some of their assignments virtually. Instructor evaluation of student work in distance education courses is the same as in the on-ground course, except that evaluation of student work in online and hybrid courses is presented virtually. Instead of onsite lectures, hybrid and online courses will use videos and written lecture notes.

As with any on-ground class, the instructor must provide substantive critiques of all submitted material and at least general responses to discussion posts. Instructor assigns the completion of math problems in a publisher site as an exercise including check figures and assistance when needed. The publisher's site will reinforce the course's SLO's.

Student-Instructor contact will include the following: discussion forums, learning management system messages, announcements, and feedback for each student's work.
Student-Instructor contact MAY include the following: chat/Zoom, newsgroup/discussion board, phone, and iTV.
Student-Student contact will include the following: discussion forums.
Student-Student contact MAY include the following: chat/Zoom, learning management system messages, group work, and peer reviewed projects
Good practice requires both asynchronous and synchronous contact for effective contact. List the methods expected of all instructors teaching the course. -Learning Management System -Discussion Forums -Message -Other Contact -Chat/Instant Messaging -E-mail -Face-to-face meeting(s) -Newsgroup/Discussion Board -Proctored Exam -Telephone -iTV - Interactive Video -Other

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- Discussion Forums
- Message
- Chat/Instant Messaging
- E-mail
- Proctored Exam
- iTV - Interactive Video

Software and Equipment: What additional software or hardware, if any, is required for this course purely because of its delivery mode? How is technical support to be provided?

For online courses a Pearson access code may be required. There is a student technical support chat link included with the access code.

Accessibility: Section 508 of the Rehabilitation Act requires access to the Federal government's electronic and information technology. The law covers all types of electronic and information technology in the Federal sector and is not limited to assistive technologies used by people with disabilities. It applies to all Federal agencies when they develop, procure, maintain, or use such technology. Federal agencies must ensure that this technology is accessible to employees and the

public to the extent it does not pose an "undue burden". I am using -iTV—Interactive Video only -Learning management system -Publisher course with learning management system interface.

- Publisher course with learning management system interface.

Class Size: Good practice is that section size should be no greater in distance ed modes than in regular face-to-face versions of the course. Will the recommended section size be lower than in on-ground sections? If so, explain why.

For accessibility faculty will use the Canvas accessibility checker, along with other resources provided by our Distance Education Director, to ensure all learning materials are accessible, including but not limited to documents, pdfs, OERs, external websites, and videos.

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