MATHEMATICS

Contact Information

Division
STEM

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Overview

Mathematics is a dynamic and developing field of study. It is the foundation and language of all scientific endeavor. Mathematics contributes in direct and important ways to business, finance, engineering, health and public policy.

A degree in Mathematics or Statistics provides many challenging and rewarding career opportunities. These include teaching, research in engineering fields, molecular structures, genetics and medicine, robotics, digital imagery, computer-aided design, economic forecasting and environmental design and modeling.

TRANSFER AND MAJOR REQUIREMENTS in Mathematics are available in the Counseling Center. In all cases, students should consult with a counselor for specific transfer requirements.

Preparation for Mathematics Courses

- All prerequisite courses must be completed with grades of "C" or better.
- Two years of high school algebra means "Algebra I and Algebra II."

Faculty

Charles Albright
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B.A., California State University, Sacramento
B.A., California State University, Sacramento
M.A., California State University, Sacramento

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M.A., San Francisco State University

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Professor, Mathematics
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M.S., Alabama State University

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M.S., University of California, Davis

Pitt Turner
Professor, Mathematics
B.A., University of California, Santa Cruz
M.A., University of Hawaii, Manoa

Kiet Vo
Professor, Mathematics
A.A., San Joaquin Delta College
B.A., University of California, Berkeley
M.A., California State University, Sacramento

Michael Waterson
Professor, Mathematics
B.S., University of California, San Diego
M.S., Salem State University

Ian Wu
Professor, Mathematics
B.S., California State University, Chico
M.A., California State University, Sacramento

Degrees/Certificates

Associate Degree for Transfer

- Mathematics for Transfer (p. 2)

Associate Degree

- Mathematics (p. 2)

Mathematics for Transfer
AS-T Degree

The Associate in Science in Mathematics for Transfer (AS-T) degree includes curriculum focusing on the mastery of calculus, linear algebra and differential equations. Students will master these concepts using algebraic and visual models in pure and applied contexts and be able to communicate mathematically.

The Associate in Science in Mathematics for Transfer degree prepares students to transfer into the CSU system to complete a bachelor's degree in Mathematics or a major deemed similar by a CSU campus. Students earning an associate degree for transfer and meeting the CSU minimum transfer admission requirements are guaranteed admission with junior standing to the CSU system, but not to a particular campus or major. Upon transfer, students will be required to complete no more than 60 additional prescribed units to earn a bachelor's degree.

To earn the Associate in Science in Mathematics for Transfer degree, students must complete 60 CSU-transferable semester units with a minimum grade point average of 2.0, including both of the following:

- completion of all courses required for the major with grades of "C" or better; and
- (http://catalog.sierracollege.edu/student-resources/general-education/associate-degree-requirements/)California General Education Transfer Curriculum (Cal-GETC) (http://catalog.sierracollege.edu/student-resources/general-education/california-general-education-transfer-curriculum-cal-getc/)

The exact wording of the law pertaining to associate degrees for transfer may be found in Education Code Section 66746.

It is highly recommended that, prior to transferring, students complete courses that satisfy the CSU United States History, Constitution and American Ideals graduation requirement. In all cases, students should consult with a counselor for more information on university admission and transfer requirements.

RESTRICTION: International coursework from non-United States regionally accredited institutions cannot be applied to associate degrees for transfer.

Required Courses

Code	Title	Units
MATH 0030	Analytical Geometry and Calculus I	4
MATH 0031	Analytical Geometry and Calculus II	4
MATH 0032	Analytical Geometry and Calculus III	4
MATH 0033	Differential Equations and Linear Algebra	6
Total Units		**18**

Mathematics
AA or AS Degree

The Mathematics major recognizes a concentration in the field of Mathematics. Successful completion of the curriculum in Mathematics and the associated electives prepare Mathematics students for transfer to four-year colleges or universities. The program in Mathematics outlined below is typical of lower-division requirements for four-year colleges and universities: some requirements vary from college to college. In all cases, students should consult with a counselor for more information on university admission and transfer requirements. Students must fulfill the following major requirements with grades of "C" or better, complete a minimum of 60 degree-applicable semester units (12 of which must be completed at Sierra College) with a grade point average of at least 2.0 and complete one of the following three general education patterns:

- Sierra College Associate Degree Requirements (Local General Education) (http://catalog.sierracollege.edu/student-resources/general-education/associate-degree-requirements/)
- (http://catalog.sierracollege.edu/student-resources/general-education/associate-degree-requirements/)California General Education Transfer Curriculum (Cal-GETC) (http://catalog.sierracollege.edu/student-resources/general-education/california-general-education-transfer-curriculum-cal-getc/)

Required Courses

Code	Title	Units
MATH 0030	Analytical Geometry and Calculus I	4
MATH 0031	Analytical Geometry and Calculus II	4
MATH 0032	Analytical Geometry and Calculus III	4
MATH 0033	Differential Equations and Linear Algebra	6
Select 3-5 units from the following:		**3-5**
CSCI 0012	Programming Concepts and Methodology I	
CSCI 0027	Visual Basic .NET Programming I	
CSCI 0046	System Programming with C	
MATH 0010	Problem Solving	
MATH 0013		
MATH 0015	Discrete Mathematics	
MATH 0017	Concepts of Mathematics	
MATH 0018	The Nature of Mathematics	

PHYS 0205 & 0205L	Principles of Physics: Mechanics and Principles of Physics Laboratory: Mechanics	
Total Units		**21-23**

Courses

ATTENTION: Effective Fall 2025, the California Community College system will implement Common Course Numbering (CCN) per state mandate (AB1111). CCN courses will be common across all California Community Colleges. One course in Mathematics has been included in CCN effective Fall 2025: STAT C1000 (formerly MATH 13). See Also: Statistics **(**http://catalog.sierracollege.edu/departments/statistics/#coursestext**)**

Understanding course descriptions (http://catalog.sierracollege.edu/student-resources/course-information/understanding-course-descriptions/)

MATH 0010. Problem Solving
Units: 4
Prerequisite: Completion of Intermediate Algebra or equivalent with grade of "C" or better, or appropriate placement
Hours: 72 lecture
Individual and small-group problem solving geared toward real life situations and nontraditional problems. Problem solving strategies include: draw a diagram, eliminate possibilities, make a systematic list, look for a pattern, guess and check, solve an easier related problem, subproblems, use manipulatives, work backward, act it out, unit analysis, use algebra, finite differences, and many others. Divergent thinking and technical communication skills of writing and oral presentation are enhanced. Designed to teach students to think more effectively and vastly increase their problem solving ability. (CSU)

MATH 0011. Data Science for All
Units: 4
Prerequisite: Completion of Intermediate Algebra or equivalent with grade of "C" or better, or appropriate placement
Hours: 108 (54 lecture, 54 laboratory)
Designed for students from any major, provides high-level understanding of how data, statistics, and inference are inter-related. Introduces the core concepts of data science, including statistical inference and computational thinking. Teaches critical concepts and skills in computer programming and statistical inference while working with real data, such as economic data, geographic data, and social networks. Prepares students to make more data-driven decisions, gaining experience with machine learning and with the practical application of statistical concepts like hypothesis testing, confidence intervals via bootstrapping, regression, inference for regression, and predictive modeling while considering the social issues surrounding data privacy and data ownership. (C-ID MATH 110) (CSU, UC)

MATH 0012. College Algebra
Units: 4,6
Prerequisite: Completion of Intermediate Algebra or equivalent with grade of "C" or better, or appropriate placement
Hours: 72 lecture (4 units); 108 lecture (6 units)
Study of algebra topics beyond Intermediate Algebra; including functions, graphs, logarithms, systems of equations, analytic geometry, and sequences and series. (CSU-with unit limitation, UC-with unit limitation)

MATH 0012S. Just in Time Support for Math 12 College Algebra
Units: 2
Corequisite: Concurrent enrollment in Math 12
Hours: 36 lecture
Just in time support covering the core prerequisite skills, competencies, and concepts from College Algebra. Intended for students who are concurrently enrolled in Math 12. Topics include competencies from Intermediate Algebra that are needed to understand the basics of College Algebra. (not degree applicable) (pass/no pass grading)

MATH 0013S. Just in Time Support for Introduction to Statistics
Units: 2
Corequisite: Concurrent enrollment in STAT C1000
Hours: 36 lecture
Just in time support option covering the core prerequisite skills, competencies, and concepts for Introduction to Statistics. Intended for students who are concurrently enrolled in STAT C1000. Topics include concepts from arithmetic, pre-algebra, elementary and intermediate algebra, and descriptive statistics that are needed to understand the basics of college-level statistics. Concepts are taught through the context of descriptive data analysis including an introduction to technologies such as Desmos, Excel, Statcrunch, Minitab, SPSS or graphing calculators. Recommended for students taking STAT C1000 with little or no recent algebra knowledge. (not transferable) (not degree applicable) (pass/no pass grading)

MATH 0015. Discrete Mathematics
Units: 4
Prerequisite: Completion of MATH 30 with grade of "C" or better
Hours: 72 lecture
Study of set theory, relations and functions, logic, combinatorics and probability, algorithms, computability, matrix algebra, graph theory, recurrence relations, number theory including modular arithmetic. Various forms of mathematical proof are developed: proof by induction, proof by contradiction. (CSU, UC)

MATH 0016A. Calculus for Social and Life Sciences
Units: 4
Prerequisite: Completion of MATH 12 with grade of "C" or better or placement by matriculation assessment process
Advisory: Not recommended for students with grade of "C" or better in MATH 30
Hours: 72 lecture
Review of functions, limits, differentiation and integration of algebraic functions, calculus for exponential and logarithmic functions, applications of calculus in social and life sciences. This course is not intended for students majoring in mathematics, engineering, physics, or chemistry. (CSU, UC-with unit limitation)

MATH 0016B. Calculus for Social and Life Sciences
Units: 4
Prerequisite: Completion of MATH 16A or 30 with grade of "C" or better
Advisory: Completion of MATH 27 with grade of "C" or better
Hours: 72 lecture
Differentiation and integration of trigonometric functions, functions of several variables, partial derivatives, double integrals, introduction to differential equations, sequences and series, applications of calculus in the social and life sciences. (CSU, UC-with unit limitation)

MATH 0017. Concepts of Mathematics
Units: 3
Prerequisite: Completion of Intermediate Algebra and Geometry or equivalent with grade of "C" or better, or appropriate placement
Hours: 54 lecture
Exploration of mathematical patterns and relations, formulation of conjectures based on the explorations, proving (or disproving) the conjectures. Includes different problem solving techniques, number theory, probability, statistics, sequences and series, and geometry. Intended for students interested in elementary education. (CSU, UC-with unit limitation)

MATH 0017S. Concepts of Mathematics Support
Units: 2
Corequisite: Concurrent enrollment in Math 17
Hours: 36 lecture
Concurrent support for competency and concepts from Euclidean Geometry. Intended for students concurrently enrolled in Math 17. (not degree applicable) (pass/no pass grading)

MATH 0018. The Nature of Mathematics
Units: 3
Prerequisite: Completion of Intermediate Algebra or equivalent with grade of "C" or better, or appropriate placement
Hours: 54 lecture
Introduces students to the art and application of mathematics in the world around them. Topics include mathematical modeling, voting and apportionment, and mathematical reasoning with applications chosen from a variety of disciplines. Not recommended for students entering elementary school teaching or business. (CSU, UC-with unit limitation)

MATH 0019. Mathematical Concepts for Elementary School Teachers
Units: 3
Prerequisite: Completion of Intermediate Algebra or equivalent with grade of "C" or better, or appropriate placement
Hours: 54 lecture
Focuses on the development of quantitative reasoning skills through in-depth, integrated explorations of topics in mathematics, including the real number system and its subsystems. The emphasis is on comprehension and analysis of mathematical concepts and applications of logical systems. (C-ID MATH 120) (CSU, UC)

MATH 0024. Modern Business Mathematics
Units: 3
Prerequisite: Two years of high school algebra or MATH D or MATH G with grade(s) of "C" or better, or placement by matriculation assessment process
Hours: 54 lecture
Applications of mathematics in economics and business contexts. Topics include tables and graphs, functions, finance (interest and exponential models), rates of change including applications and optimization, and linear programming. (CSU, UC)

MATH 0024S. Just in Time Support for Math 24 Modern Business Mathematics
Unit: 1.5
Corequisite: Concurrent enrollment in Math 24
Hours: 27 lecture
Just in time support option covering the core prerequisite skills, competencies, and concepts for Modern Business Mathematics. Intended for students who are concurrently enrolled in MATH 24. Topics include numeracy; computational skills; the vocabulary of algebra; simplification, manipulation and evaluation of expressions and functions; solving and graphing linear equations and inequalities in one and two variables; solving and graphing systems of equations in two variables; factoring; algebraic operations on polynomial and rational expressions. Recommended for students taking Math 24 with little or no recent algebra knowledge. (not degree applicable) (pass/no pass grading)

MATH 0027. Trigonometry
Units: 4
Formerly known as MATH 8
Prerequisite: Completion of Intermediate Algebra or equivalent with grade of "C" or better, or appropriate placement
Hours: 72 lecture
Fundamentals of trigonometry. Topics include review of algebraic functions, definitions of trigonometric and circular functions, graphs, identities and applications. Other material includes solving trigonometric equations, solving triangles using the Laws of Sines and Cosines, parametric equations, vectors, polar coordinates and graphs, and polar representations of complex numbers. (CSU)

MATH 0028. Independent Study
Units: 1-3
Designed for students interested in furthering their knowledge at an independent study level in an area where no specific curriculum offering is currently available. Independent study might include, but is not limited to, research papers, special subject area projects, and research projects. See Independent Study page in catalog. (CSU, UC-with unit limitation)

MATH 0029. Pre-Calculus Mathematics
Units: 4
Prerequisite: Completion of MATH 27 with grade of "C" or appropriate placement
Hours: 72 lecture
Study of polynomials, rational functions, exponential and logarithmic functions, trigonometric functions, systems of linear equations, rectangular and polar coordinates, conic sections, complex number systems, and sequences and series. (CSU, UC-with unit limitation)

MATH 0030. Analytical Geometry and Calculus I
Units: 4
Prerequisite: Completion of MATH 12 and MATH 27, or MATH 29 with grades of "C" or better, or appropriate placement
Hours: 72 lecture
Introduction to differential and integral calculus. Content includes limits, continuity, differentiation and integration of algebraic, trigonometric, exponential, logarithmic, hyperbolic and other transcendental functions; as well as application problems. (C-ID MATH 210) (combined with MATH 31, C-ID MATH 900S) (CSU, UC-with unit limitation)

MATH 0030S. Just in Time Support for Math 30 Calculus I
Units: 2
Corequisite: Concurrent enrollment in Math 30
Hours: 36 lecture
Just in time support covering the core prerequisite skills, competencies, and concepts from Calculus I. Intended for students who are concurrently enrolled in Math 30. Topics include competencies from College Algebra and Trigonometry that are needed to understand the basics of Calculus. (CSU)

MATH 0031. Analytical Geometry and Calculus II
Units: 4
Prerequisite: Completion of MATH 30 with grade of "C" or better
Hours: 72 lecture
Continuation of MATH 30. Content includes techniques of integration, improper integrals, applications of integration, infinite series, parametric equations and polar coordinates. (C-ID MATH 220) (combined with MATH 30, C-ID MATH 900S) (CSU, UC-with unit limitation)

MATH 0032. Analytical Geometry and Calculus III
Units: 4
Prerequisite: Completion of MATH 31 with grade of "C" or better
Hours: 72 lecture
Continuation of MATH 31. Vectors and analytic geometry in the plane and space; functions of several variables; partial differentiation, multiple integrals, and application problems; vector functions and their derivatives; motion in space; and surface and line integrals, Stokes' and Green's Theorems, and the Divergence Theorem. (C-ID MATH 230) (CSU, UC)

MATH 0033. Differential Equations and Linear Algebra
Units: 6
Prerequisite: Completion of MATH 31 with grade of "C" or better
Advisory: Completion of MATH 32 with grade of "C" or better strongly recommended
Hours: 108 lecture
First and second order ordinary differential equations, linear differential equations, numerical methods and series solutions, Laplace transforms, modeling and stability theory, systems of linear differential equations, matrices, determinants, vector spaces, linear transformations, orthogonality, eigenvalues and eigenvectors. (C-ID MATH 910S) (CSU, UC)

MATH 0042. Business Calculus
Units: 4
Prerequisite: Completion of Intermediate Algebra or equivalent with grade of "C" or better, or appropriate placement
Advisory: Completion of MATH 12 strongly recommended, especially for students who have not recently taken Intermediate Algebra
Hours: 72 lecture
Introduction to differential and integral calculus with particular emphasis on applications in the fields of business, economics, and social sciences. Includes: concepts of a function, limits, derivatives, integrals of polynomial, exponential and logarithmic functions, optimization problems, and calculus of functions of more than one variable. Recommended for Business Majors transferring to CSU, Sacramento. Not recommended for students with credit for MATH 30. (C-ID MATH 140) (CSU, UC-with unit limitation)

MATH 0042S. Just in Time Support for Math 42 Business Calculus
Units: 2
Corequisite: Concurrent enrollment in Math 42
Hours: 36 lecture
Just in time support option covering the core prerequisite skills, competencies, and concepts for Business Calculus. Intended for students who are concurrently enrolled in MATH 42. Topics include numeracy; computational skills; the vocabulary of algebra; simplification, manipulation and evaluation of expressions and functions; solving and graphing linear equations and inequalities in one and two variables; solving and graphing systems of equations in two variables; factoring; algebraic operations on polynomial and rational expressions. Recommended for students taking Math 42 with little or no recent algebra knowledge. (not degree applicable) (pass/no pass grading)

MATH 0584. Math Success-Overcoming Math Anxiety
Unit: 1
Hours: 18 lecture
Designed to assist students to recognize common fears and misconceptions of mathematics and develop personal strategies to overcome math and test anxiety. Specific study skills and strategies are discussed. Individual math learning styles are analyzed. (not degree applicable)

MATH 0812S. Just in Time Support for Math 12 College Algebra
Units: 0
Corequisite: Concurrent enrollment in Math 12
Hours: 36 lecture
Just in time support covering the core prerequisite skills, competencies, and concepts from College Algebra. Intended for students who are concurrently enrolled in Math 12. Topics include competencies from Intermediate Algebra that are needed to understand the basics of College Algebra. (pass/no pass grading) (noncredit)

MATH 0813S. Just in Time Support for Introduction to Statistics
Units: 0
Corequisite: Concurrent enrollment in STAT C1000
Hours: 36 lecture
Just in time support option covering the core prerequisite skills, competencies, and concepts for Elementary Statistics. Intended for students who are concurrently enrolled in STAT C1000. Topics include concepts from arithmetic, pre-algebra, elementary and intermediate algebra, and descriptive statistics that are needed to understand the basics of college-level statistics. Concepts are taught through the context of descriptive data analysis including an introduction to technologies such as Desmos, Excel, Statcrunch, Minitab, SPSS or graphing calculators. Recommended for students taking STAT C1000 with little or no recent algebra knowledge. (pass/no pass grading) (noncredit)

MATH 0824S. Just in Time Support for Math 24 Modern Business Mathematics
Units: 0
Formerly known as MATH 824
Corequisite: Concurrent enrollment in Math 24
Hours: 27 lecture
Just in time support option covering the core prerequisite skills, competencies, and concepts for Modern Business Mathematics. Intended for students who are concurrently enrolled in MATH 24. Topics include numeracy; computational skills; the vocabulary of algebra; simplification, manipulation and evaluation of expressions and functions; solving and graphing linear equations and inequalities in one and two variables; solving and graphing systems of equations in two variables; factoring; algebraic operations on polynomial and rational expressions. Recommended for students taking Math 24 with little or no recent algebra knowledge. (noncredit)

MATH 0842S. Just in Time Support for Math 42 Business Calculus
Units: 0
Formerly known as MATH 842
Corequisite: Concurrent enrollment in Math 42
Hours: 36 lecture
Just in time support option covering the core prerequisite skills, competencies, and concepts for Business Calculus. Intended for students who are concurrently enrolled in Math 42. Topics include numeracy; computational skills; the vocabulary of algebra; simplification, manipulation and evaluation of expressions and functions; solving and graphing linear equations and inequalities in one and two variables; solving and graphing systems of equations in two variables; factoring; algebraic operations on polynomial and rational expressions. Recommended for students taking Math 42 with little or no recent algebra knowledge. (noncredit)

STAT C1000. Introduction to Statistics
Units: 4
Formerly known as MATH 13
Prerequisite: Placement as determined by the college's multiple measures assessment process or completion of a course taught at or above the level of intermediate algebra
Hours: 72 lecture
This course is an introduction to statistical thinking and processes, including methods and concepts for discovery and decision-making using data. Topics include descriptive statistics; probability and sampling distributions; statistical inference; correlation and linear regression; analysis of variance, chi-squared, and t-tests; and application of technology for statistical analysis including the interpretation of the relevance of the statistical findings. Students apply methods and processes to applications using data from a broad range of disciplines. (C-ID MATH 110) (CSU, UC-with unit limitation)

Program Student Learning Outcomes (PSLOs)

- Use mathematical techniques to translate, model, and solve applied problems.
- Differentiate between expressions and equations; and, using appropriate mathematical techniques, simplify expressions and solve equations.
- Interpret and construct visual models of mathematical concepts.
- Clearly communicate mathematical information, concepts, and processes to others.
- Develop a growth mindset, math sophistication, and confidence.