

# Mathematics

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## Program Description

Successful completion of this major will assure competence in mathematics through differential and integral calculus, providing an adequate background for employment in many technological and scientific areas as well as providing a firm foundation for students planning advanced study.

## Associate in Arts Degree

An Associate in Arts Degree can be obtained upon completion of 60 units, including the 18-19 unit major listed below, general education requirements, and electives. All courses for this major must be completed with a grade of C or better or a P if the course is taken on a pass-no pass basis.

## Program Outcomes

Students who complete an Associate Degree will be able to:

1. Solve problems by applying appropriate math concepts and ideas; and
2. Effectively communicate the solution(s) of these problems.

<b>Required Courses</b>	<b>Units</b>
MATH 020 Analytic Geometry and Calculus I	4
MATH 021 Analytic Geometry and Calculus II	4
MATH 022 Analytic Geometry and Calculus III	4
MATH 023 Differential Equations	3
<i>or</i>	
MATH 011 Elementary Statistics	4
<i>or</i>	
MATH 012 Mathematical Ideas	3
MATH 040 Introduction to Linear Algebra	3
<b>Total Units</b>	<b>18-19</b>

# Mathematics

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## *Associate in Science in Mathematics for Transfer*

### **Program Description**

Successful completion of this major will assure competence in mathematics through differential and integral calculus, providing an adequate background for employment in many technological and scientific areas as well as providing a firm foundation for students planning to pursue a baccalaureate degree in mathematics.

### **Associate in Science in Mathematics for Transfer**

The Associate in Science for Transfer is especially appropriate for students who plan to complete a bachelor's degree in Mathematics at a CSU campus. Students completing an AS-T degree are guaranteed admission to the CSU system, but not to a particular campus or major. Students transferring to a CSU campus that does accept the AS-T will be required to complete no more than 60 units after transfer to earn a bachelor's degree. This degree also prepares students for mathematics degree programs at other four-year institutions, but does not come with the same guarantees. In all cases, students should consult with a counselor for more information on university admission and transfer requirements.

### **To earn this AS-T degree, students must:**

1. complete the following major requirements with grades of C or better;
2. complete a minimum of 60 CSU-transferable semester units with a minimum grade point average of 2.0
3. complete either the California State University General Education Breadth pattern (CSU GE), which requires 39 units, or the Intersegmental General Education Transfer Curriculum (IGETC), which requires 34-39 units. Students are not required to complete Solano's Cross-Cultural Studies requirement.

### **Program Outcomes**

Students who complete an Associate Degree will be able to:

1. Solve a problem applying appropriate math concepts and ideas.
2. Effectively communicate solution(s). These will be assessed using techniques employed by individual instructors in the capstone courses of MATH 022 and MATH 040.

<b>Required Courses</b>	<b>Units</b>
MATH 020 Analytic Geometry and Calculus I	5
MATH 021 Analytic Geometry and Calculus II	5
MATH 022 Analytic Geometry and Calculus III	4
MATH 040 Introduction to Linear Algebra	3
MATH 023 Differential Equations	4
<i>or</i>	
MATH 011 Elementary Statistics	4
<b>Total Units</b>	<b>21</b>

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- MATH 002** 3.0 Units  
**Algebra For Calculus (College Algebra)**  
*Prerequisite: A grade of "C" or better in MATH 104. Course Advisory: SCC minimum English standard.* Designed to develop the skills and introduce the concepts necessary for further study in mathematics, and facilitate the application of those skills and concepts to other fields. Included is a review of elementary set algebra; the algebra of functions; the real and complex numbers as a field; algebraic, exponential, and logarithmic functions; equations and inequalities of these functions; solution of linear systems, matrix algebra, and introduction to sequences and series. *Three hours lecture, one hour lab.*
- MATH 004** 5.0 Units  
**Pre-Calculus Mathematics**  
*Prerequisites: A grade of "C" or better in MATH 103 and 104. NOTE: Not open to students who have completed MATH 051 or MATH 002 with a grade of 'C' or better. Course Advisory: SCC minimum English standard.* A comprehensive study of the mathematics that is prerequisite to the calculus sequence. Topics included are the elementary functions and their graphs, methods of solving equations and systems of equations, applied problems that are relevant to calculus, analytic geometry and mathematical induction. *Five hours lecture, one hour lab.*
- MATH 011** 4.0 Units  
**Elementary Statistics**  
*Prerequisite: A grade of "C" or better in MATH 104. Course Advisory: Eligibility for ENGL 001.* An introduction to elementary probability and statistics including the basic rules of probability, probability distributions, descriptive statistics, hypothesis testing, estimation, correlation and regression analysis. *Four hours lecture, one hour lab.*
- MATH 012** 3.0 Units  
**Mathematical Ideas**  
*Prerequisite: A grade of "C" or better in MATH 104. Course Advisory: SCC minimum English standard.* An introduction to the diversity of mathematics through the examination of ideas from logic, sets, the numeration systems, and other topics from contemporary mathematics. The emphasis is on problem solving. *Three hours lecture.*
- MATH 018** 2.0 Units  
**Exploring Math and Science Teaching**  
*Prerequisite: Math 104 with a grade of "C" or better. Course Advisory: SCC minimum English standard.* This course is an education-based field experience in mathematics and science. Weekly seminars will explore how children learn and develop understanding in math and science. Students will be assigned to area schools to assist in the classroom and work in structured one-on-one or group settings for a minimum of two hours per week. Repeatability: Repeatable 1 time. *Two lecture hours.*
- MATH 020** 5.0 Units  
**Analytic Geometry And Calculus I**  
*Prerequisites: Grades of "C" or better in MATH 002 and 051, or MATH 004. Course Advisory: SCC minimum English standard.* MATH 020, the first of the three-semester sequence in Analytic Geometry and Calculus for students majoring in mathematics, engineering, and most physical sciences, is the study of the differential and integral calculus of functions of one variable. Topics covered are limits, continuity, differentiation of algebraic and transcendental functions, applications of the derivative, definite and indefinite integrals, fundamental theorem of calculus, and applications of the definite integral. *Five hours lecture, one hour lab.*
- MATH 021** 5.0 Units  
**Analytic Geometry And Calculus II**  
*Prerequisites: A grade of "C" or better in MATH 020. Course Advisory: SCC minimum English standard.* Math 021, the second of the three-semester sequence in Analytic Geometry and Calculus for students majoring in mathematics, engineering, and most physical sciences, continues the study of the differential and integral calculus of functions of one variable. Topics included are introduction to differential equations, computing area and volume, applications and techniques of integration, polar coordinates, infinite series, improper integrals, and L'Hopital's Rule. *Five hours lecture, one hour lab.*
- MATH 022** 4.0 Units  
**Analytic Geometry And Calculus III**  
*Prerequisites: A grade of "C" or better in MATH 021. Course Advisory: SCC minimum English standard.* Math 022, the third of the three-semester sequence in Analytic Geometry and Calculus for students majoring in mathematics, engineering, and most physical sciences, is a study of three-dimensional analytic geometry, vectors and vector-valued functions, functions of several variables, the calculus of these functions, and vector analysis including Green's and Stokes' theorems. *Four hours lecture, one hour lab.*
- MATH 023** 4.0 Units  
**Differential Equations**  
*Prerequisite: A grade of "C" or better in MATH 021. Course Advisory: SCC minimum English standard.* This course covers ordinary differential equations emphasizing linear differential equations and systems with applications to engineering, physics, and chemistry. Included are Laplace transforms and power series methods of solution. *Four hours lecture.*
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## MATH 030 3.0 Units Analytic Geometry And Calculus

*Prerequisites:* A grade of "C" or better in MATH 104. *NOTE:* Not open to students who have completed MATH 020 with a grade of 'C' or better. *Course Advisory:* SCC minimum English standard. MATH 030 and 031 is a two-semester sequence in analytic geometry and calculus for students majoring in business, biological, and social sciences. This is not the calculus course for students majoring in mathematics, engineering or the physical sciences. MATH 030 covers differential and integral calculus of a single variable. Topics include limits, continuity, derivatives of algebraic and transcendental functions and their applications, integrals and their applications, and plane analytic geometry. *Three hours lecture, one hour lab.*

## MATH 031 3.0 Units Analytic Geometry And Calculus

*Prerequisites:* MATH 030 with a grade of "C" or better. *Course Advisory:* SCC minimum English standard. A continuation of the calculus of functions of one variable (MATH 030). Topics included are the fundamental theorem of calculus, techniques of integration, numerical methods of integration, functions of several variables, elementary differential equations, and infinite series. *Three hours lecture, one hour lab.*

## MATH 040 3.0 Units Introduction To Linear Algebra

*Prerequisites:* A grade of "C" or better in MATH 020 or 030. *NOTE:* A relatively high degree of mathematical maturity is required for this course. *Course Advisory:* SCC minimum English standard and MATH 021. An introduction to linear algebra, with a focus on finite dimensional real vector spaces. Topics include systems of linear equations and matrices, linear transformations, general vector spaces, eigenvectors and eigenvalues and associated eigenspaces, inner products and orthogonality. *Three hours lecture, one hour lab.*

## MATH 051 3.0 Units Trigonometry

*Prerequisites:* A grade of "C" or better in MATH 103 and 104. *Course Advisory:* SCC minimum English standard. Presents the essentials of plane trigonometry to prepare students for subsequent studies in physics, calculus or related technical programs. Topics include definitions of the trigonometric functions and inverse trigonometric functions, solutions of triangles and applied problems, graphs, trigonometric identities and equations, and the trigonometric form of complex numbers. *Three hours lecture, one hour lab.*

## MATH 098 Special Topics

These courses, numbered 048, 098, 148 or 198 depending upon their transferability, are courses of contemporary interest centered on changing knowledge and important issues in the field. Announcements of Special Topics courses appear in the Schedule of Classes.

## MATH 103 3.0 Units Plane Geometry

*Prerequisite:* A grade of "C" or better in MATH 330 or MATH 330B. *Course Advisory:* SCC minimum English standard. The study of Euclidean (plane) geometry through conjecture, proof, and problem solving. Topics include the mathematical relationships of angles, parallels, triangles, quadrilaterals, circles, and solids. Additionally, coordinate geometry transformations are covered. *Three hours lecture, one hour lab.*

## MATH 104 5.0 Units Intermediate Algebra

*Prerequisites:* A grade of "C" or better in MATH 330 or MATH 330B. *Course Advisory:* SCC minimum English standard. An extension of the fundamental algebraic concepts developed in elementary algebra. Additional topics include arithmetic operations on functions; composition of functions; basic graphing techniques; absolute value, exponential, logarithmic, quadratic, linear, and polynomial functions; equations of the second degree and their graphs; complex numbers; and systems of linear equations in two and three variables. *Five hours lecture, one hour lab.*

## MATH 112 3.0 Units Algebraic Reasoning

*Prerequisites:* MATH 330 or MATH 330B with a grade of "C" or better. *Course Advisory:* SCC minimum English standard. Students will develop their ability to solve problems with algebraic reasoning. Topics including financial math, voting methods, apportionment, and probability have been chosen for their "real-world" applicability and usefulness. Additional topics may be picked by the instructor from various fields of mathematics such as geometry, linear programming, statistics, graph theory, set theory and number theory. *Three hours lecture, one hour lab.*

## MATH 114 3.0 Units Math For Health Occupations

*Prerequisite:* Math 330 or Math 330B with a grade of "C" or better. *Course Advisory:* SCC minimum English standard. This course is designed for A.S/A.A health occupation students to prepare them for math topics encountered in their chemistry, biology, and health occupation courses. Topics include metric system, dimensional analysis, counting techniques, linear models, exponential models, and common logarithms. *Three hours lecture.*

## MATH 118 3.0 Units The Beauty of Mathematics

*Prerequisites:* Math 330 or Math 330B with a "C" or better, or the equivalent. *Course Advisory:* SCC minimum English standard. An introduction to the beauty of mathematics, where the emphasis is on discovery and appreciation of the ideas and their history rather than computations and algorithms. Topics include accessible concepts in geometry, the theory of numbers and analysis including the Pythagorean Theorem, Euler's formula for polyhedra, prime numbers, the irrationality of square root 2, harmonic and other series, and logarithms. *Three hours lecture.*

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## MATH 160 2.0 Units

### Review of Scientific Principles of Pre-Nursing

*Prerequisite: CONDITION OF ENROLLMENT: Current acceptance or on the waiting list of an RN Program.* This course focuses on science and mathematics topics that are critical to success for students entering an RN program. This course provides a review of select anatomy, physiology, chemistry, nutrition, microbiology, and mathematics topics for students entering nursing school. This course is especially designed for students that have had an extended time period between finishing their pre-nursing requirements and entering nursing school. (Same as BIO 160) Pass / No Pass Class. *Eight hours lecture.* (4 week course)

## MATH 310 3.0 Units

### Arithmetic (Lecture)

*Prerequisite: None. NOTE: Not open for credit to students who have completed MATH 304. Course Advisory: SCC minimum English standard.* A course in basic mathematical computations designed to improve arithmetic skills and prepare the student for a pre-algebra level math course. Major topics include whole numbers, fractions, decimals, percents, simple geometry, measurement, and basic statistics. *Three hours lecture.*

## MATH 320 4.0 Units

### Pre-Algebra

*Prerequisite: Grade of "C" or better in MATH 310, or 3 units of credit in MATH 304, or 3 units of BUS 181 with a grade of "C" or better. Course Advisory: SCC minimum English standard.* A course in pre-algebra designed to prepare the student for transition into a beginning algebra course. Major topics include operations on integers and rational numbers, the order of operations, introduction to variables, simplifying and evaluating expressions, solving basic linear equations, proportions, percents, basic geometry, graphing, and application problems. *Four hours lecture, one hour lab.*

## MATH 330 5.0 Units

### Elementary Algebra

*Prerequisite: A grade of "C" or better in MATH 320. Course Advisory: SCC minimum English standard.* Introductory examination of the structure of the number system. Covers such topics as an introduction to set operations, the field axioms of the real numbers, and the properties of the whole number exponents. Emphasizes operations with fundamental expressions, solutions of first-degree equations, inequalities and linear systems. Introduces absolute value, radical and quadratic equations, applied problems involving first and second degree equations in one variable, point-slope and slope-intercept equations of lines and their graphs, and the concepts of relations and functions. Not open to students who have passed MATH 330A. *Five hours lecture, one hour lab.* (formerly MATH 102)

## MATH 330A 3.0 Units

### Elementary Algebra, Part I

*Prerequisite: A grade of "C" or better in MATH 320. Course Advisory: SCC minimum English standard.* Introductory examination of the structure of the number system. Covers such topics as an introduction to the concept of set operations, the field axioms of the real numbers, order of operations, properties of whole number exponents, variables, variable expressions, operations with monomials, definition of a polynomial, addition and subtraction of polynomials, linear equations, graphing linear equations, linear inequalities, and systems of linear equations, solutions of first degree equations and inequalities in one variable, and applications. A student must take MATH 330B to complete Elementary Algebra. Students who pass MATH 330A are not eligible for MATH 330. *Three hours lecture, one hour lab.* (formerly MATH 107)

## MATH 330B 3.0 Units

### Elementary Algebra, Part II

*Prerequisite: A grade of "C" or better in MATH 330A. Course Advisory: SCC minimum English standard.* Covers such topics as multiplication and division of polynomials, factoring, solving quadratic equations by factoring, operations with rational expressions, simplifying rational expressions, solutions of equations containing rational expressions, roots, radicals and the quadratic formula, and introduction to functions. Successful completion of Math 330B completes Elementary Algebra. *Three hours lecture, one hour lab.* (formerly MATH 108)

### MATH Special Topics

These courses, numbered 048, 098, or 148 depending upon their transferability, are courses of contemporary interest centered on changing knowledge and important issues in the field. Announcements of Special Topics courses appear in the Schedule of Classes.