

# Mathematics

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## Mathematics

### 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 20-21 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 the Mathematics Associate Degree will be able to:

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

<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 023 Differential Equations	4
OR	
MATH 011 Elementary Statistics	4
OR	
MATH 012 Mathematical Ideas	3
MATH 040 Introduction to Linear Algebra	3
<b>Total Units</b>	<b>20 - 21</b>

# Mathematics

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## *Associate in Science in Mathematics for Transfer (ADT: A.S.-T)*

### **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 the Associate in Science in Mathematics for Transfer degree, students must:**

1. Complete 60 semester units that are eligible for transfer to the California State University, including both of the following:
  - a. The Intersegmental General Education Transfer Curriculum (IGETC) or the California State University General Education – Breadth Requirements
  - b. A minimum of 18 semester units in a major or area of emphasis, as determined by the community college district.
2. Obtain a minimum grade point average of 2.0.

### **Program Outcomes**

Students who complete the Associate in Science in Mathematics for Transfer degree will be able to:

1. Solve a problem applying appropriate math concepts and ideas.
2. Effectively communicate solution(s).

### **REQUIRED COURSES ..... Units**

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

OR

MATH 011 Elementary Statistics ..... 4

**Required Major Total Units ..... 21**

CSU General Education or IGETC Pattern Units .... 37 - 39

CSU Transferable Electives (as needed to reach 60 transferable units)\* ..... 3 - 5

**Total Degree Units ..... 60**

\* 3 units may be double counted toward both the major area of emphasis and CSU General Education or IGETC Pattern. Consult with a counselor for more information on completing this degree.

# Mathematics

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**MATH 002** **3.0 Units**  
**Algebra For Calculus (College Algebra)**

*Prerequisite:* MATH 104 with a minimum grade of C. *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. Assignments may be given that require completion in the Math Activities Center. *Three hours lecture.*

**MATH 004** **5.0 Units**  
**Precalculus Mathematics**

*Prerequisite:* A minimum grade of C in both in MATH 103 and 104. *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. Assignments may be given that require completion in the Math Activities Center. NOTE: Not open to students who have completed MATH 051 or MATH 002 with minimum grade of C. *Five hours lecture.*

**MATH 011** **4.0 Units**  
**Elementary Statistics**

*Prerequisite:* A minimum grade of C in either MATH 104 or MATH 112. *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 using data from a variety of disciplines and appropriate technology. Assignments may be given that require completion in the Math Activities Center. C-ID MATH 110. *Four hours lecture.*

**MATH 012** **3.0 Units**  
**Mathematical Ideas**

*Prerequisite:* A minimum grade of C in MATH 104 or MATH 112. *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 020** **5.0 Units**  
**Analytic Geometry and Calculus I**

*Prerequisite:* A minimum grade of C in both MATH 002 and MATH 051, or MATH 004 with a minimum grade of C. *Course Advisory:* SCC minimum English standard. 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. Assignments may be given that require completion in the Math Activities Center. *Five hours lecture.*

**MATH 021** **5.0 Units**  
**Analytic Geometry and Calculus II**

*Prerequisite:* MATH 020 with a minimum grade of C. *Course Advisory:* SCC minimum English standard. 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. C-ID MATH 220. Assignments may be given that require completion in the Math Activities Center. *Five hours lecture.*

**MATH 022** **4.0 Units**  
**Analytic Geometry and Calculus III**

*Prerequisite:* MATH 021 with a minimum grade of C. *Course Advisory:* SCC minimum English standard. 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.*

# Mathematics

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**MATH 023****Differential Equations**

*Prerequisite:* MATH 021 with a minimum grade of C. *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 La Place transforms and power series methods of solution. C-ID MATH 240. *Four hours lecture.*

**4.0 Units****MATH 026****Mathematics and Engineering Problem Solving Using Matlab**

*Prerequisite:* MATH 021 with a minimum grade of C; *May be taken concurrently.* This course covers methodologies for solving mathematics and engineering problems. Students will also learn to perform mathematics and engineering computation and visualization using the MATLAB language. Students will write a variety of programs in the MATLAB language. Same course as ENGR 026. *Three hours lecture, three hours by arrangement.*

**4.0 Units****MATH 030****Analytic Geometry and Calculus**

*Prerequisite:* Math 104 with a minimum grade of C. *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. Assignments may be given that require completion in the Math Activities Center. NOTE: Not open to students who have completed MATH 020 with a minimum grade of C. *Three hours lecture.*

**3.0 Units****MATH 031****Analytic Geometry and Calculus**

*Prerequisite:* MATH 030 with a minimum grade of C. *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. Assignments may be given that require completion in the Math Activities Center. *Three hours lecture.*

**3.0 Units****MATH 040****Introduction to Linear Algebra**

*Prerequisite:* MATH 021 with a minimum grade of C. *Course Advisory:* SCC minimum English standard. NOTE: A relatively high degree of mathematical maturity is required for this course. 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. C-ID MATH 250. *Three hours lecture.*

**3.0 Units****MATH 049****Mathematics Honors**

*Prerequisite:* MATH 021 with a minimum grade of B. This course requires students to complete an independent student project under the supervision of a member of the faculty. The project may involve extensive problem solving, research, or data analysis. In all cases, the final written product should show integration and synthesis of ideas. Students may take this course up to the maximum number of units over multiple semesters. This course requires approval of a faculty member sponsor and the Dean of the School of Math & Sciences. *Three to nine hours lab by arrangement.*

**1.0 to 3.0 Units****MATH 051****Trigonometry**

*Prerequisite:* A minimum grade of C in both MATH 103 and MATH 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. Assignments may be given that require completion in the Math Activities Center. *Three hours lecture.*

**3.0 Units****MATH 103****Plane Geometry**

*Prerequisite:* A minimum grade of C in either 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. Assignments may be given that require completion in the Math Activities Center. *Three hours lecture.*

**3.0 Units**

# Mathematics

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**MATH 104****Intermediate Algebra**

*Prerequisite:* A minimum grade of C in either 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. Assignments may be given that require completion in the Math Activities Center. *Five hours lecture.*

**MATH 112****Intermediate Algebra for Liberal Arts**

*Prerequisite:* A minimum grade of C in either MATH 330 or MATH 330B. *Course Advisory:* SCC minimum English standard. In this course students will develop their ability to solve problems with algebraic reasoning and learn to effectively communicate their solutions. Topics include number sense, functions, use of linear and exponential functions to model bivariate data, logarithms and an introduction to descriptive statistics and probability. This course is designed to meet the mathematics graduation requirement for an associates degree. This course can also be taken by students planning to transfer to a four-year institution and major in an area of liberal arts (non-STEM majors) that requires either Statistics (MATH 011) or Math Ideas (MATH 012). Students who need a calculus course must take MATH 104 in preparation for pre-calculus. All transfer students should consult with a counselor or mathematics instructor for advice on whether to take MATH 112 or MATH 104. Lab hours may be scheduled or TBA depending on the section. Students are expected to complete both the lecture and lab portions of the course. *Four hours lecture, one hour lab.*

**MATH 160****Math for Nursing School Students**

*Prerequisite:* CONDITION OF ENROLLMENT: Current acceptance or on the waiting list of an RN Program. This course focuses on mathematics topics that are critical to success for students entering an RN program. This course provides a review of select 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. Pass/No Pass only course. *Two hours lecture. (4-week course)*

**5.0 Units****MATH 305****Prepare for Math Success**

Students will review basic skills math topics from the last math course previously completed with the online math review program. In addition, students will explore and improve their math study skills. Students will need access to the internet. *4 hours lecture (2 week course).*

**0.5 Units****MATH 310****Arithmetic**

*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. NOTE: Not open for credit to students who have completed MATH 304. *Three hours lecture.*

**3.0 Units****MATH 320****Pre-Algebra**

*Prerequisite:* MATH 310 with a minimum grade of C, or 3 units of credit in MATH 304, or 3 units of BUS 181 with a minimum grade of C. *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. Lab hours may be scheduled or TBA depending on the section. Students are expected to complete both the lecture and lab portions of the course. *Four hours lecture, one hour lab.*

**4.0 Units****MATH 330****Elementary Algebra**

*Prerequisite:* MATH 320 with a minimum grade of C. *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. Assignments may be given that require completion in the Math Activities Center. *Five hours lecture.*

**5.0 Units**



# Mathematics

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## **MATH 330A**

### **Elementary Algebra, Part I**

*Prerequisite: MATH 320 with a minimum grade of C. 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. Assignments may be given that require completion in the Math Activities Center. Three hours lecture.*

**3.0 Units**

## **MATH 330B**

### **Elementary Algebra, Part II**

*Prerequisite: MATH 330A with a minimum grade of C. 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. Assignments may be given that require completion in the Math Activities Center. Three hours lecture.*

**3.0 Units**