

# Mathematics for Transfer (AS-T)

## CAREER PATHS:

Mathematician

Mathematics or Mathematical Science Teacher

Mathematical Technician

Statistician

Additional Career Paths and related data, including state-by-state wage info and growth in the field, can be found at [www.onetonline.org](http://www.onetonline.org).

This program map represents one possible pathway. See a counselor to create a customized education plan. Map is for the 2019-2020 catalog year.



**SOLANO**  
COMMUNITY COLLEGE

## Mathematics for Transfer

Associate in Sciences for Transfer  
GE Pattern: IGETC  
Program Total Units: 62

For more information  
please contact:  
(707) 864-7211

## 1 FIRST SEMESTER

Total Recommended Units: 16

- MATH 020** **5 units**  
Analytic Geometry and Calculus I (IGETC 2)
- ENGL 001** **4 units**  
English Composition (IGETC 1A)
- LR 010** **1 units**  
Introduction to Library Research and Information Competency
- IGETC 4** **3 units**
- IGETC 3A** **3 units**

## 2 SECOND SEMESTER

Total Recommended Units: 17

- MATH 021** **5 units**  
Analytic Geometry and Calculus II
- IGETC 5A or 5B** **5 units**  
With Lab
- IGETC 1B** **4 units**  
Suggested: ENGL 002 or 004
- IGETC 3B/Am Inst Grp 2** **3 units**  
Suggested: HIST 017 or 018 or 028 or 029 or 037

## 3 THIRD SEMESTER

Total Recommended Units: 15

- MATH 022** **4 units**  
Analytic Geometry and Calculus III
- MATH 040** **5 units**  
Intro to Linear Algebra
- IGETC 1C** **3 units**  
Suggested: COMM 001, COMM 002, or COMM 006
- IGETC 4** **3 units**  
Suggested: COMM 012 or COUN 015 or PSYC 007

## 4 FOURTH SEMESTER

Total Recommended Units: 14

- MATH 023** **5 units**  
Intro to Ordinary Differential Equations
- IGETC 5A or 5B** **3 units**  
Without Lab. Whichever not previously taken.
- IGETC 3A or 3B** **3 units**
- IGETC 4/Am Inst Grp 1** **3 units**  
Suggested: PLSC 001 or 005

Required Courses/Courses in Discipline     GE Courses/Categories

## GET STARTED NOW!

### Get started on your Pathway now with these recommended courses!

*Then* – See a counselor to create a **CUSTOMIZED** education plan personalized to your career and transfer goals!

Required courses may change depending on a student's career and transfer goals, including requirements for cross-cultural and foreign language courses, and/or specific requirements for an individual CSU or UC.

Unique transfer requirements for a specific institution can be found at [www.assist.org](http://www.assist.org).

## LET US HELP YOU!

**How to Apply:** [solano.edu/ar/apply.php](http://solano.edu/ar/apply.php)

■ **Questions? Talk to a Counselor Now!**  
Main Campus, Fairfield: (707) 864-7101  
Vacaville Center: (707) 863-7836  
Vallejo Center: (707) 642-8188  
Travis AFB: (707) 863-7878  
Visit online at [solano.edu/counseling](http://solano.edu/counseling)

■ **Contact Our Career Center to Learn Your Career Options!**  
Call 707-864-7124, or email at [CareerCenter@solano.edu](mailto:CareerCenter@solano.edu)  
Visit online at [solano.edu/career](http://solano.edu/career)

■ **You Can Afford College! Learn more about Financial Aid!**  
Call 707-864-7103, or email at [FinancialAid@solano.edu](mailto:FinancialAid@solano.edu)  
Visit online at [solano.edu/financial\\_aid](http://solano.edu/financial_aid)

■ **College is Accessible!** Contact our Disability Services Program (DSP) at 707-864-7136.

# 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 problems expressed symbolically.
2. Analyze problems using a graphical or numerical perspective.
3. Interpret and analyze information to develop strategies to solve applications.

### 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.

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## MATH 002

### Algebra for Calculus (College Algebra)

*Prerequisite:* MATH 104 with a minimum grade of C or a Multiple Measures Evaluation. MATH 104 with a minimum grade of C is highly recommended for students who have not completed Algebra 2 or Integrated Math III in high school with a minimum grade of C.

*General Education:* Option A: Area D2; Option B: Area 2; Option C: Area B4

*Transferable to UC/CSU*

*Hours:* 48-54 lecture.

Develops the skills and introduces 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.

## MATH 004 Precalculus and Trigonometry 5.0 Units

*Prerequisite:* A minimum grade of C in MATH 103 and MATH 104 or recommendation of a counselor or math instructor based on a Multiple Measures Evaluation.

*General Education:* Option A: Area D2; Option B: Area 2; Option C: Area B4

*Transferable to UC/CSU*

*Hours:* 80-90 lecture.

A comprehensive study of mathematics that is prerequisite to the calculus sequence. Topics included are the study of polynomial, absolute value, radical, rational, exponential, and logarithmic functions, analytic geometry, and polar coordinates. The study of trigonometric functions, their inverses and their graphs, identities and proofs related to trigonometric expressions, trigonometric equations, solving right triangles, solving triangles using the Law of Cosines and the Law of Sines, and introduction to vectors.

Note: Not open for enrollment to students who have completed Math 051 or Math 002 with a minimum grade of C. Assignments may be given to students that require completion in the Math Activity Center.

## 3.0 Units

## MATH 011 Elementary Statistics

## 4.0 Units

*Prerequisite:* A minimum grade of C in either MATH 104 or MATH 112 or Multiple Measures Evaluation.

*Course Advisory:* Eligibility for ENGL 001.

*General Education:* Option A: Area D2; Option B: Area 2; Option C: Area B4

*Transferable to UC/CSU*

*Hours:* 64-72 lecture.

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)

## MATH 012 Mathematical Ideas

## 3.0 Units

*Prerequisite:* A minimum grade of C in either MATH 104 or MATH 112 or Multiple Measures Evaluation.

*Course Advisory:* SCC minimum English standard.

*General Education:* Option A: Area D2; Option B: Area 2; Option C: Area B4

*Transferable to UC/CSU*

*Hours:* 48-54 lecture.

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.

## MATH 020 Analytic Geometry and Calculus I 5.0 Units

*Prerequisite:* A minimum grade of C in MATH 002 and MATH 051; or MATH 004.

*General Education:* Option A: Area D2; Option B: Area 2; Option C: Area B4

*Transferable to UC/CSU*

*Hours:* 80-90 lecture.

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.

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

*Prerequisite: MATH 020 with a minimum grade of C.*

*General Education: Option A: Area D2; Option B: Area 2; Option C: Area B4*

*Transferable to UC/CSU*

*Hours: 80-90 lecture.*

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.

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

*Prerequisite: MATH 021 with a minimum grade of C.*

*General Education: Option A: Area D2; Option B: Area 2; Option C: Area B4*

*Transferable to UC/CSU*

*Hours: 64-72 lecture.*

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. (C-ID MATH 230)

## **MATH 023 Differential Equations 4.0 Units**

*Prerequisite: MATH 021 with a minimum grade of C.*

*Transferable to UC/CSU*

*General Education: Option A: Area D2; Option B: Area 2; Option C: Area B4*

*Hours: 64-72 lecture.*

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. (C-ID MATH 240)

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

*Prerequisite: MATH 021 with a minimum grade of C (may enroll concurrently).*

*Transferable to UC/CSU*

*Hours: 48-54 lecture, 48-54 lab by arrangement.*

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.

## **MATH 030 Analytic Geometry and Calculus 3.0 Units**

*Prerequisite: Math 104 with a minimum grade of C or Multiple Measures Evaluation*

*Course Advisory: SCC minimum English standard.*

*General Education: Option A: Area D3B; Option B: Area 2; Option C: Area B4*

*Transferable to UC/CSU*

*Hours: 48-54 lecture.*

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. NOTE: Not open to students who have completed MATH 020 with a minimum grade of C.

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

*Prerequisite: MATH 030 with a minimum grade of C or recommendation of a counselor or math instructor based on a Multiple Measures Evaluation.*

*Course Advisory: SCC minimum English standard.*

*General Education: Option A: Area D2; Option B: Area 2; Option C: Area B4*

*Transferable to UC/CSU*

*Hours: 48-54 lecture.*

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.

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

*Prerequisite: MATH 021 with a minimum grade of C.*

*Course Advisory: A relatively high degree of mathematical maturity is required for this course.*

*General Education: Option A: Area D2; Option B: Area 2; Option C: Area B4*

*Transferable to UC/CSU*

*Hours: 48-54 lecture.*

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)

## **MATH 049 Mathematics Honors 1.0 to 3.0 Units**

*Prerequisite: MATH 021 with a minimum grade of B.*

*Transferable to CSU*

*Hours: 48-162 lab by arrangement.*

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.

## **MATH 051 Trigonometry 3.0 Units**

*Prerequisite: Minimum grade of C in both MATH 103 and MATH 104 or Multiple Measures Evaluation.*

*Course Advisory: SCC minimum English standard.*

*General Education: Option A: Area D2; Option C: Area B4*

*Transferable to CSU*

*Hours: 48-54 lecture.*

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.

## **MATH 055 3.0 Units**

### **Mathematical Concepts for Elementary School Teachers**

*Prerequisite: MATH 104 or MATH 112 with a minimum grade of C or Successful completion of two years of high school algebra or recommendation of a counselor or math instructor based on a Multiple Measures Evaluation.*

*Course Advisory: SCC minimum English Standard.*

*Transferable to CSU*

*Hours: 48-54 lecture.*

Focuses on the development of quantitative reasoning skills through in-depth, integrated explorations of topics in mathematics, including real number systems and subsystems. Emphasis is on comprehension and analysis of mathematical concepts and applications of logical reasoning.

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

*Course Advisory: A minimum grade of C in either MATH 330 or MATH 330B; SCC minimum English standard.*

*Hours: 48-54 lecture.*

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.

## **MATH 104 Intermediate Algebra 5.0 Units**

*Course Advisory: MATH 330; SCC minimum English standard.*

*General Education: Option A: Area D2*

*Hours: 80-90 lecture, 16-18 lab.*

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.

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## **MATH 112**

**4.0 Units**

### **Intermediate Algebra for Liberal Arts**

*Course Advisory: A minimum grade of C in MATH 330; SCC minimum English standard.*

*General Education: Option A: Area D3A  
Hours: 64-72 lecture, 16-18 lab.*

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 Associate 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.

## **MATH 160 Math for Nursing School Students 0.5 Unit**

*Prerequisite: Current acceptance or on the waiting list of an RN Program.*

*Hours: 8-9 lecture.*

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. It 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.

## **MATH 305 Prepare for Math Success 0.5 Unit**

*Hours: 8-9 lecture.*

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.

## **MATH 310 Arithmetic**

**3.0 Units**

*Course Advisory: SCC minimum English standard.  
Hours: 64-72 lecture.*

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.

## **MATH 311 Elementary Statistics Support 0.5 Unit**

*Corequisite: MATH 011.*

*Hours: 32-36 lab.*

A review of the core prerequisite skills, competencies, and concepts needed in statistics. Intended for students who are concurrently enrolled in MATH 011, Elementary Statistics. 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. Additional emphasis is placed on solving and graphing linear equations and modeling with linear functions. Enrollment in the course may occur as a result of the recommendation of a counselor or math instructor based on a Multiple Measures Evaluation. This course is Pass/No Pass only.

## **MATH 312 Mathematical Ideas Support 0.5 Unit**

*Corequisite: MATH 012.*

*Hours: 24-27 lab.*

A review of the core prerequisite skills, competencies, and concepts needed in Mathematical Ideas. A companion course to Mathematical Ideas to provide needed support for student success. This includes just in time remediation, math study skills, and affective learning. Enrollment in the course may occur as a result of the recommendation of a counselor or math instructor based on a Multiple Measures Evaluation. This course is Pass/No Pass only.

## **MATH 320 Pre-Algebra 4.0 Units**

*Course Advisory: SCC minimum English standard.  
Hours: 64-72 lecture, 16-18 lab.*

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.

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## **MATH 330 Elementary Algebra**

**5.0 Units**

*Course Advisory: MATH 320 with a minimum grade of C; SCC minimum English standard.*

*Hours: 80-90 lecture.*

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.

## **MATH 330A Elementary Algebra, Part I**

**3.0 Units**

*Course Advisory: MATH 320 with a minimum grade of C; SCC minimum English standard.*

*Hours: 48-54 lecture.*

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.

## **MATH 330B Elementary Algebra, Part II**

**3.0 Units**

*Course Advisory: MATH 330A with a minimum grade of C; SCC minimum English standard.*

*Hours: 48-54 lecture.*

Introductory examination of the structure of the number system. 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.

## **MATH 500 Supervised Tutoring in MATH**

**0.0 Units**

*Corequisite: Concurrent enrollment in a MATH course for which tutoring assistance is requested.*

*Hours: 16-180 lab.*

Provides students with tutorial support for all mathematics courses. Open entry/open exit, ungraded.

## **MATH 505 Supplemental Instruction: MATH**

**0.0 Units**

*Hours: 16-180 lab.*

An open-entry, open-exit course for students who seek academic support, through supplemental instruction and use of computers, to fill in missing prerequisite knowledge and strengthen skills developed in a referring course or courses as follows: Math 002, 004, 011, 012, 020, 021, 022, 023, 026, 030, 031, 040, 051, 103, 104, 112, 310, 320, 330, 330A, 330B.