MATHEMATICS

Mathematics is a rapidly expanding, dynamic discipline which has contributed to recent advances in astronomy, biology, chemistry, engineering, medicine and physics. Mathematics is truly becoming the necessary language of a wide spectrum of knowledge.

The mathematics program is designed to accept students at many levels of mathematical maturity and enable them to gain the mathematical knowledge necessary for them to achieve their goals.

Career Opportunities

An undergraduate degree in mathematics can lead to a variety of jobs in business, industry, government, and teaching. Mathematicians are employed by companies in communication, computers, energy and finance.

Faculty

Mecklenburg, Trinity

Melkonian, Arda

Moore, Adam

Ngobi, Said

Redona, Jeff

Ridge, Patrick

Schellhous, Thomas

Simanyi, John

Viehweg, Jarom

Weis, Anh

Transfer

- California State University, San Bernardino: Mathematics major
- University of California, Riverside: Mathematics major

For the most up-to-date information on these programs and others, visit assist.org (http://www.assist.org). Please stop by the Transfer Center in Building 23 or make an appointment with a counselor if you have questions.

Mathematics, AS-T

State Control Number: 31025
Program Code: MASCT.AS or MASCT.IGETC.AS
Approved for Federal Financial Aid: Yes

The role of mathematics is vital and growing, providing solutions to problems in a wide range of sciences: social, biological, physical, behavioral, and management. As a whole, mathematics is necessary for understanding and expressing ideas in science, engineering, and human affairs. Mathematics is integrally related to computer science and statistics, which have proven in- valuable to advancing research and modern industrial technology. The Mathematics curriculum academically prepares the student to transfer to a 4-year university to complete a Baccalaureate degree in a similar major. The major requirements for the AS-T degree align with the intersegmental Transfer Model Curriculum

(TMC) for Mathematics. Students should consult with a counselor to determine whether this degree is the best option for their transfer goals.

To earn this degree complete the major coursework listed here with "C" grades or better and the following graduation requirements: 60 CSU transferable units; either the CSU General Education (https://catalog.vvc.edu/degrees-certificates/csuge-breadth/#csuge) or IGETC (https://catalog.vvc.edu/degrees-certificates/igetc/#igetc) (for CSU or UC) pattern; and a 2.0 minimum overall CSU GPA. Courses used in the major may also be counted in the general education areas. Courses used for this major may also be used to earn other degrees at VVC.

Code	Title	Units
Required Courses		
MATH 226	Analytic Geometry and Calculus I	4.0
or MATH 226H	Honors Analytic Geometry and Calculus I	
MATH 227	Analytic Geometry and Calculus II	4.0
or MATH 227H	Honors Analytic Geometry and Calculus II	
MATH 228	Analytic Geometry and Calculus III	5.0
or MATH 228H	Honors Analytic Geometry and Calculus III	
List A		
MATH 270	Differential Equations	3.0
MATH 231	Linear Algebra	3.0
Total Units		**19**

Mathematics Courses

MATH 047 Fresh Start Academy Statistics (0.0 Units)
This noncredit course is offered as a study or review of the fundamental concepts of beginning algebra and statistics. The course is intended for students who need to refresh their math skills prior to taking a college level statistics course. This course will not apply to the Associate Degree.
Lecture Hours: 32.0
Transfer: Not transferable

MATH 048 Fresh Start Academy Algebra (0.0 Units)
This noncredit course is offered as a study or review of the fundamental concepts of beginning algebra and intermediate algebra as appropriate. The course is intended for students who need to refresh their math skills prior to taking a college level math course. This course will not apply to the Associate degree.
Lecture Hours: 27.0
Transfer: Not transferable

MATH 049 Preparation for College Mathematics (0.0 Units)
This non-credit course will help students prepare for transfer-level math courses by reviewing content from introductory and intermediate algebra courses. Topics will include the solving and graphing of equations and systems of equations, both linear and nonlinear. This course will also cover properties of real numbers, exponents, radicals and complex numbers, as well as topics such as factoring, rational expressions, complex numbers, logarithms, and applications. This course will not apply to the Associate Degree.
Lab Hours: 54.0
Transfer: Not transferable

MATH 80 Corequisite Support for Introductory Statistics (2.0 Units)
A review of the core prerequisite skills, competencies, and concepts needed in Introduction to Statistics. Intended for students who are concurrently enrolled in Math 120, College Introduction to Statistics. Topics include a review of skills such as decimals, ratios, percents and proportions, solving and graphing linear equations, interpretation of slope, as well as basic probability. This course will also provide additional instruction and activities related to the key concepts learned in MATH 120.
Lecture Hours: 36.0
Transfer: Not transferable

MATH 85 Corequisite Support for College Algebra (2.0 Units)
A review of the core prerequisite skills, competencies, and concepts needed in College Algebra. Intended for students who are concurrently enrolled in MATH 105, College Algebra. Topics include a review of skills developed in Elementary and Intermediate Algebra such as solving and graphing equations (linear, quadratic, rational, radical, logarithmic and exponential) and inequalities, solving systems of equations, factoring, functions, and transformations.
Lecture Hours: 36.0
Transfer: Not transferable

MATH 86 Corequisite Support for Analytic Geometry and Calculus I (2.0 Units)
A review of the core prerequisite skills, competencies, and concepts needed in first semester calculus. Students may concurrently enroll in MATH 226 or MATH 226H. Topics include a review of equation solving and graphing skills developed in algebra and trigonometry as well as a just-in-time review of operations on functions and geometrical concepts as needed.
Lecture Hours: 36.0
Transfer: Not transferable

MATH 87 Corequisite Support for Analytic Geometry and Calculus II (2.0 Units)
A review of the core prerequisite skills, competencies, and concepts needed in second semester calculus. Students may concurrently enroll in MATH 227 or MATH 227H. Topics include a review of differentiation and integration developed in first semester calculus as well as a just-in-time review of other skills needed in second semester calculus, such as partial fraction decomposition, series and sequences, graphing and trigonometry.
Lecture Hours: 36.0
Transfer: Not transferable

MATH 103 College Algebra for Allied Health (4.0 Units)
College level course in algebra for Allied Health majors: Functions including linear, polynomial, absolute value, rational, radical, exponential, logarithmic: definitions, evaluation, domain and range of each; Algebra of functions; Direct and inverse variation models; Graphs of functions including asymptotic behavior, intercepts, vertices; Equations including rational, linear, absolute value, polynomial, radical, exponential, logarithmic; Linear and nonlinear inequalities; Systems of equations; Complex numbers; Substantial introduction to Inverses of functions, logarithmic, and exponential functions; Applications in science and health topics. CSU/UC
Prerequisite(s): MATH 90, Minimum grade C
Lecture Hours: 72.0
Transfer: Transfers to both UC/CSU

MATH 104 Trigonometry (4.0 Units)
Topics for this preparatory course for calculus include trigonometric functions and equations, solutions of both right and oblique triangles, trigonometric forms of complex numbers and De Moivre's Theorem. Course content also includes verification of trigonometric identities, inverse trigonometric functions, half and multiple angles, vectors and their applications, parametric equations, polar coordinates and polar equations. CSU
Lecture Hours: 72.0
Transfer: Transfers to CSU only

MATH 105 College Algebra (4.0 Units)
The course offers a review of real numbers, real number exponents, and factoring polynomials. The course also covers equations and inequalities, solutions to systems of equations and inequalities, solutions to equations and inequalities involving absolute value, graphing relations and functions, matrices, determinants of matrices, matrix algebra. Complex numbers, the real and complex zeros of polynomials, the zeros of exponential, rational and radical functions, the conic sections, sequences, mathematical inducation and the binomial theorem are also covered. (UC credit limitation). CSU,UC
Co-requisite(s): MATH 90 or MATH 90S Minimum grade C
Lecture Hours: 72.0
Transfer: Transfers to both UC/CSU

MATH 114 Mathematical Concepts for Elementary School Teachers (3.0 Units)
This course 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. All topics will be taught through a pedagogical lens with support activities for students.
Prerequisite(s): MATH 90, MATH 90S or completion of two years of high school algebra, Minimum grade C
Lecture Hours: 54.0
Transfer: Transfers to CSU only

MATH 120 Introduction to Statistics (4.0 Units)
The use of probability techniques, hypothesis testing, and predictive techniques to facilitate decision-making. Topics include descriptive statistics; probability and sampling distributions; statistical inference; correlation and linear regression; analysis of variance, chi-square and t-tests; and application of technology for statistical analysis including the interpretation of the relevance of the statistical findings. Applications using data from disciplines including business, social sciences, psychology, life science, health science, and education. C-ID: MATH 110. CSU,UC
Co-requisite(s): MATH 63, MATH 90, or MATH 90S,
Lecture Hours: 72.0
Transfer: Transfers to both UC/CSU

MATH 120S Introduction to Statistics With Skills Support (5.0 Units)
The use of probability techniques, hypothesis testing, and predictive techniques to facilitate decision-making. Topics include descriptive statistics; probability and sampling distributions; statistical inference; correlation and linear regression; analysis of variance, chi-square and t-tests; and application of technology for statistical analysis including the interpretation of the relevance of the statistical findings. Applications using data from disciplines including business, social sciences, psychology, life science, health science, and education. This class also focuses on study skills and extra support for students by teaching some concepts using different learning modalities. C-ID: MATH 110. CSU/UC
Lecture Hours: 90.0
Transfer. Transfers to both UC/CSU

MATH 129 Independent Study (1-3 Units)
Independent study provides individual students challenging and in-depth study on approved topics within any subject area. Independent study proposals must have the approval of the instructor and appropriate administrator. It is expected that the study will not duplicate existing curriculum; rather, it will be of an advanced nature and extend approved courses or series of courses. Interested students should contact discipline faculty for more information
Transfer: Transfers to CSU only

MATH 129AH Independent Study Honors-First Semester (1.0 Units)
This first semester honors independent study course is intended to be an in-depth study of advanced topics. The study will not duplicate existing curriculum; rather, it will be of an advanced nature. CSU
Transfer: Transfers to CSU only

MATH 129BH Independent Study Honors-Second Semester (1.0 Units)
This second semester honors independent study course is intended to be an in-depth study of advanced topics. The study will not duplicate existing curriculum; rather, it will be of an advanced nature. CSU
Prerequisite(s): MATH 129AH, Minimum grade C
Transfer: Transfers to CSU only

MATH 129CH Independent Study Honors-Third Semester (1.0 Units)
This third semester honors independent study course is intended to be an in-depth study of advanced topics. The study will not duplicate existing curriculum; rather, it will be of an advanced nature. CSU
Prerequisite(s): MATH 129BH, Minimum grade C
Transfer: Transfers to CSU only

MATH 132 The Ideas of Math (3.0 Units)
Sets and their application to permutations, combinations, finite probability measures and expectation; statistics; linear and exponential modeling; financial mathematics, and geometry. CSU/UC
Lecture Hours: 54.0
Transfer: Transfers to both UC/CSU

MATH 138 Work Experience Education Mathematics (1-8 Units)
Work Experience Education is a key element of Victor Valley College's comprehensive approach to career development. Work Experience Education is a 16-, 12-, or 8-week course that enables students to receive college credit for paid or unpaid work opportunities. This course helps students gain valuable on-the-job work experience while providing practical education, best practices in professional development, and academic guidance through the course of their work opportunity. The combination of practical experience and curricular development empowers students to be more competi tive, efficient and valuable employees upon completion of this program and/or their academic program trajectory. The course is ideal for students who are cross-training at their current worksite for upward mobility or seeking career changes, as well as those looking for entry-level occupati onaltraining through work-based learning experiences such as through an internship. Work Experience Education transforms community businesses, industries, and public agencies into expanded educational training laboratories.Credit is awarded on the basis of learning objectives completed and the number of hours the student trains.Students must create/complete new learning objectives each semester they enroll. Students may utilize their present work sites. More details are available in the Work Experience Education Office, (760) 245-4271, ext. 2281.The office, located in the Academic Commons, is open Monday-Thursday, 8:00 a.m.-1:00 p.m., 2:00-6:00 p.m., and by appointment. Please refer to the Work Experience Education section in this catalog for more information. CSU
Transfer: Transfers to CSU only

MATH 226 Analytic Geometry and Calculus I (4.0 Units)
This class offers an introduction to the calculus of single variables. Topics covered include limits, using limits of functions to determine continuity, finding derivatives and integrals of functions, basic properties of derivatives and integrals, the relationship between derivatives and integrals as given by the Fundamental Theorem of Calculus, and applications. CSU/UC
Prerequisite(s): (MATH 104) and (MATH 105 or MATH 105H, Minimum grade C)
Lecture Hours: 72.0
Transfer: Transfers to both UC/CSU

MATH 226H Honors Analytic Geometry and Calculus I (4.0 Units)
As an introduction to the calculus of single variables, students will develop the concept of limit; apply limits to functions to determine if they are continuous; find the derivative and determine integrals. Students will study the properties of the derivative and integral, their relationship to each other given by the Fundamental Theorem of Calculus. The student will also learn to read and write simple proofs. UC credit limitation. C-ID: MATH 210. CSU/UC
Prerequisite(s): (MATH 104) and (MATH 105 or MATH 105H, Minimum grade C)
Lecture Hours: 72.0
Transfer: Transfers to both UC/CSU

MATH 227 Analytic Geometry and Calculus II (4.0 Units)
This second course in differential and integral calculus of a single variable: integration; techniques of integration; infinite sequences and series; polar and parametric equations; applications of integration. C-ID: MATH 221. CSU,UC
Prerequisite(s): MATH 226 or MATH 226H, Minimum grade C
Lecture Hours: 72.0
Transfer: Transfers to both UC/CSU

MATH 227H Honors Analytic Geometry and Calculus II (4.0 Units)
The second course in differential and integral calculus of a single variable: integration; techniques of integration; infinite sequences and series; polar and parametric equations; applications of integration. In addition, the honors component will include reading proofs, writing complete proofs from sketches of proofs and applying techniques learned to real-life problems.) UC credit limitation). C-ID: MATH 220. CSU/UC
Prerequisite(s): MATH 226 or MATH 226H
Lecture Hours: 72.0
Transfer: Transfers to both UC/CSU

MATH 228 Analytic Geometry and Calculus III (5.0 Units)
This course covers vectors and the geometry of space, vector-valued functions, the calculus of several variables, multiple integration, Green's Theorem, divergence theorem, Stoke's Theorem, and applications. CSU,UC
Prerequisite(s): MATH 227 or MATH 227H, Minimum grade C
Lecture Hours: 90.0
Transfer: Transfers to both UC/CSU

MATH 228H Honors Analytic Geometry and Calculs III (5.0 Units)
Vectors and the geometry of space, vector-valued functions, the calculus of function of several variables, multiple integration, Green's Theorem, divergence theorem, Stoke's Theorem, and applications. In addition the honors component will include reading proofs, writing complete proofs and applying techniques learned to real-life problems. (UC credit limitation). CSU/UC
Prerequisite(s): MATH 227 or MATH 227H, Minimum grade C
Lecture Hours: 90.0
Transfer: Transfers to both UC/CSU

MATH 231 Linear Algebra (3.0 Units)
This course develops the techniques and theory needed to solve and classify systems of linear equations. Solution techniques include row operations, Gaussian elimination, and matrix algebra. Investigates the properties of vectors in two and three dimensions, leading to the notion of an abstract vector space. Vector space and matrix theory are presented including topics such as inner products, norms, orthogonality, eigenvalues, eigenspaces, and linear transformations. Selected applications of linear algebra are included. CSU/UC
Co-requisite(s): MATH 226 or MATH 226H, Minimum grade C
Lecture Hours: 54.0
Transfer: Transfers to both UC/CSU

MATH 270 Differential Equations (3.0 Units)
This course covers elementary differential equations, solutions of first order equations, linear equations with constant coefficients, simultaneous linear systems, series solutions, the Laplace transform, and applications to physics and engineering. CSU,UC
Prerequisite(s): MATH 227 or MATH 227H, Minimum grade C
Lecture Hours: 54.0
Transfer: Transfers to both UC/CSU

Program Learning Outcomes

Program Learning Outcomes (PLOs) are statements of the kind of learning a program hopes a student will achieve. The PLOs describe the knowledge, skills, problem-solving, communication and values that apply to all certificates and/or degrees within that program.

Upon completion of this program, students should be able to:

1. Calculate arithmetic, algebraic, geometric, spatial, and statistical quantities using appropriate technology.

2. Estimate arithmetic, algebraic, geometric, spatial, and statistical solutions.

3. Solve arithmetic, algebraic, geometric, spatial, and statistical expressions, equations, functions, and problems using appropriate technology.

4. Represent mathematical information numerically, symbolically, graphically, verbally, and visually using appropriate technology.

5. Interpret mathematical and statistical models such as formulas, functions, graphs, tables, and schematics, drawing conclusions and making inferences based on those models.

6. Develop mathematical and statistical models such as formulas, functions, graphs, tables, and schematics using appropriate technology.

7. Communicate mathematical theories and ideas clearly and concisely to others in the oral and written form.