

# Mathematics

## The Curriculum

The curriculum in mathematics is designed to provide the transfer student the opportunity to achieve an associate degree in the student's area of specialization.

## The Associate Degree Major

While a baccalaureate degree is recommended preparation for those considering professional careers related to this field, the completion of the suggested program will demonstrate commitment to the field and will provide comprehensive preparation for upper-division work and/or attainment of a degree supportive of attempts to gain entry-level employment in a degree-oriented society.

## If you intend to transfer:

Courses that fulfill major requirements for an associate degree at Irvine Valley College may not be the same as those required for completing the major at a transfer institution offering a baccalaureate degree. If you plan to transfer to a four-year college or university, you should (1) refer to the transfer section of this catalog, (2) consult the catalog of your prospective transfer institution (see the IVC Transfer Center for assistance), and (3) schedule an appointment with an IVC counselor to develop a plan of study before you begin your program. In addition, it may be helpful to meet with the appropriate department faculty at IVC.

## If you plan to complete an associate degree:

You must complete the following set of courses to fulfill the major requirement and, in addition, meet the general education requirements listed on page 21 for the Associate in Arts (A.A.) degree. Refer to page 16 for additional options for fulfilling the major requirement.

## MATHEMATICS MAJOR

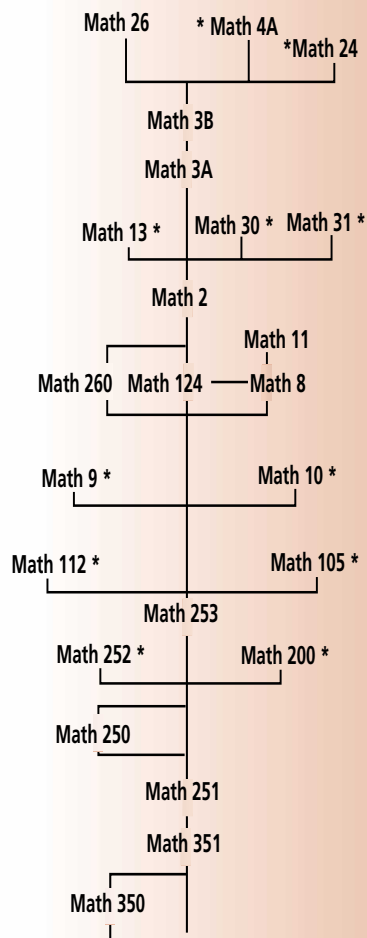
### (A.A. Degree)

		Units
MATH 3A	Analytic Geometry and Calculus I	5
MATH 3B	Analytic Geometry and Calculus II	5
MATH 4A	Analytic Geometry and Calculus III	5
MATH 13	Introduction to Abstract Mathematics	3
MATH 24	Elementary Differential Equations	4
MATH 26	Introduction to Linear Algebra	4
PHYS 4A	General Physics	4
	<b>Total units:</b>	<b>30</b>

**The Faculty**  
 Mohammad Araeipour  
 Shahriar Arjmand  
 Terry Barbee  
 Miriam Castroconde  
 Shu-Yung Chen  
 Sierra Chen  
 Terry Cheng  
 Matthew Cribb  
 Howard Dachslager  
 Cameron English  
 Ilknur Erbas-White  
 Ramin Esfandiari  
 Farimah Fazeli Tehrani  
 Fanta Gelenchi  
 Masato Hayashi  
 Nancy Ikeda  
 Steve Kassman  
 Brent Monte  
 Arabinda Nandi  
 JoAnn Noyes  
 Bob Papendick  
 Barry Pearlstein  
 Ann Marie Pelot  
 Patrick Quigley  
 Jeff Redona  
 Ladera Rosenberg  
 Mahvash Samiian  
 Constantine Sharpe  
 Dorothy Sherling  
 John Sinek  
 Froylan Tiscareno  
 Mariana Voicu  
 Julie Willard  
 Steve Zicree  
 Richard Zucker

School of Mathematics, Computer Science and Engineering

# Mathematics Courses Schematic



\* The range of topics addressed in the prerequisite course is not limited to skills required for the target course.

## Mathematics Courses

**MATH 2** 5 units

### PRE-CALCULUS

*Prereq:* Math 124. *Recom:* Concurrent enrollment in Math 180 strongly recommended. This course is designed for students who seek a better understanding of and preparation for mathematics prior to enrolling in a calculus course. Topics include the complex number system; elementary functions, including polynomial, rational, algebraic, exponential, logarithmic, and trigonometric functions; polar coordinates and parametric equations; relations and their graphs; methods for solving linear and non-linear systems of equations; sequences and series; and the binomial expansion. UC credit provisions (see UC course list). (CAN MATH 16) NR

*Lecture hours:* 5

**MATH 3A** 5 units

### ANALYTIC GEOMETRY AND CALCULUS I

*Prereq:* Math 2. *Recom:* Concurrent enrollment in Math 180 strongly recommended. This course covers basic concepts of analytic geometry; limits and continuity; and differentiation and integration of algebraic and trigonometric functions. Applications include related rates, optimization problems, area between curves, volumes of solids of revolution, and work and liquid pressure. UC credit provisions (see UC course list). (CAN MATH 18; Math 3A+3B: CAN MATH SEQ B; MATH 3A+3B+4A: CAN MATH SEQ C) NR

*Lecture hours:* 5

**MATH 3B** 5 units

### ANALYTIC GEOMETRY AND CALCULUS II

*Prereq:* Math 3A. *Recom:* Concurrent enrollment in Math 180 strongly recommended. This course continues the study of single-variable differential and integral calculus begun in Math 3A. It covers integration and differentiation of trigonometric, exponential, logarithmic and hyperbolic functions; parametric equations; transformations in the plane; indeterminate forms; and improper integrals. Taylor's formula and infinite series are studied. (CAN MATH 20; Math 3A+3B: CAN MATH SEQ B; MATH 3A+3B+4A: CAN MATH SEQ C) NR

*Lecture hours:* 5

**MATH 4A** 5 units

### ANALYTIC GEOMETRY AND CALCULUS III

*Prereq:* Math 3B. *Recom:* Concurrent enrollment in Math 180 strongly recommended. Studies include vectors and parametric equations, partial differentiation, functions of two or more variables, gradients, higher-order derivatives, multiple integrals, cylindrical and spherical coordinates, vector functions and their derivatives, vector fields, surface and line integrals, the theorems of Green and Stokes, and the Divergence Theorem. (CAN MATH 22; MATH 3A+3B+4A: CAN MATH SEQ C) NR

*Lecture hours:* 5

**MATH 8** 5 units

### COLLEGE ALGEBRA

*Prereq:* Math 253. *Recom:* Concurrent enrollment in Math 180. This course reviews basic algebraic topics and elementary functions for those seeking preparation prior to enrolling in a calculus course for non-science majors. Course topics include equations and inequalities, relations and functions, polynomial and rational functions, exponential and logarithmic functions, matrices and determinants, sequences and series, limits, the binomial expansion, and curve-sketching techniques. UC credit provisions (see UC course list). NR

*Lecture hours:* 5

**MATH 9** 3 units

### FINITE MATHEMATICS

*Prereq:* Math 253. *Recom:* Concurrent enrollment in Math 180 strongly recommended. This course is a study of linear function, matrices and vectors, and these topics as they apply to linear programming techniques. The course involves the study of sets, logic, and counting, and their applications to probability and stochastic processes. The course also covers topics in statistics and the mathematics of finance. NR

*Lecture hours:* 3

**MATH 10** 3 units

### INTRODUCTION TO STATISTICS

*Prereq:* Math 253. *Recom:* Concurrent enrollment in Math 180. This course teaches students to collect, organize and describe data. Students will learn the measures of central tendency, measures of dispersion, measures of correlation, laws of probability, and laws of statistical estimation by confidence intervals and hypothesis testing. All of these topics are applied to the natural, social, and business sciences and to the understanding and use of numerical data by the general public. UC credit provisions (see UC course list). (CAN STAT 2) NR

*Lecture hours:* 3

**MATH 11** 4 units  
**A BRIEF COURSE IN CALCULUS**  
*Prereq: Math 8. Recom: Concurrent enrollment in Math 180 strongly recommended.* This course focuses on the application of concepts in calculus to business, economics, and the social and biological sciences. Topics include limits, derivatives, integrals, and differential equations as applied to functions of one or more variables. The course is designed for students who need only one semester of calculus. UC credit provisions (see UC course list). NR  
*Lecture hours: 4*

**MATH 13** 3 units  
**INTRODUCTION TO ABSTRACT MATHEMATICS**  
*Prereq: Math 2. Recom: Concurrent enrollment in Math 180.* This course provides students with experience in analyzing and creating mathematical work at an introductory abstract level. Students will write original proofs and analyze proofs in a variety of abstract topics using a variety of methods, including the forms of mathematical induction. Topics include symbolic logic, set theory, equivalence relations, number theory, and functions. The course is designed for students who will be taking additional courses in mathematics and is strongly recommended for mathematics majors. NR  
*Lecture hours: 3*

**MATH 24** 4 units  
**ELEMENTARY DIFFERENTIAL EQUATIONS**  
*Prereq: Math 3B. Recom: Concurrent enrollment in Math 180 strongly recommended.* This course includes the study of first-order differential equations; second- and higher-order linear differential equations; equations with constant coefficients; variation of parameters; the Laplace transform; systems of equations; series solutions; and numerical methods of solutions, with applications to physics and engineering. Mathematics 24 may be taken concurrently with Mathematics 26. (CAN MATH 24) NR  
*Lecture hours: 4*

**MATH 26** 4 units  
**INTRODUCTION TO LINEAR ALGEBRA**  
*Prereq: Math 3B. Recom: Concurrent enrollment in Math 180 strongly recommended.* This course introduces the concepts of linear algebra. Studies include vectors; vector spaces and subspaces; matrices; systems of linear equations; dimension; determinants; eigenvalues and eigenvectors; and linear transformations and their applications. Mathematics 26 may be taken concurrently with Mathematics 24. (CAN MATH 26) NR  
*Lecture hours: 4*

**MATH 30** 3 units  
**COMPUTER MATHEMATICS I**  
*Prereq: Math 2. Recom: Concurrent enrollment in Math 180.* This course is designed primarily for computer science majors. Areas of study include Boolean Algebra, propositional calculus, and predicate calculus. Topics include truth tables, minimization, sets, relations, switching networks, digital circuits, and duality. This course is also listed as CIS 6A; credit will be given in either area, not both. NR  
*Lecture hours: 3*

**MATH 31** 3 units  
**COMPUTER MATHEMATICS II**  
*Prereq: Math 2. Recom: Concurrent enrollment in Math 180.* This course is designed primarily for computer science majors. Areas of study include permutations, combinations, binomial coefficients, recurrence relations, graph theory, generating functions, and probability theory. This course is also listed as CIS 6B; credit will be given in either area, not both. NR  
*Lecture hours: 3*

**MATH 99** 0.5-5 units  
**SEMINAR IN MATHEMATICS**  
Mathematics 99 is a lower-division seminar given over to the study of a specific topic, issue, or problem within mathematics which is not part of the regular college curriculum. Granting of UC credit for courses of this kind is contingent upon a review of the course outline by a UC campus. R-E  
*Lecture hours: 0.5-5 Lab hours: 0.5-5*

**MATH 105** 3 units  
**MATHEMATICS FOR LIBERAL ARTS STUDENTS**  
*Prereq: Math 253. Recom: Concurrent enrollment in Math 180 strongly recommended.* This course examines the nature of mathematics and its role in society, stressing the history of mathematical ideas and methods and the use of mathematics in problem solving and communication. The major categories of mathematics will be studied, with emphasis given to the application of mathematics to various disciplines in the liberal arts. (CAN MATH 2) NR  
*Lecture hours: 3*

**MATH 112** 3 units  
**MATHEMATICS FOR ELEMENTARY SCHOOL TEACHERS**  
*Prereq: Math 253. Recom: Concurrent enrollment in Math 180.* This course is an introduction to modern methods in basic mathematics with emphasis on sets, logic, and the structure of number systems. It is recommended for future elementary school teachers. NR  
*Lecture hours: 3*

**MATH 124** 3 units  
**TRIGONOMETRY**  
*Prereq: Math 253. Recom: Concurrent enrollment in Math 180 strongly recommended.* This course introduces circular and trigonometric functions, their inverses and interrelationships, focusing on both the unit circle and right triangle methodologies. Topics include graphing, conditional equations, laws of sines and cosines, vectors, complex numbers, polar coordinates, and DeMoivre's Theorem. NR  
*Lecture hours: 3*

**MATH 180** 1 unit  
**MATHEMATICS TUTORIAL LABORATORY**  
*Coreq: Any mathematics course numbered 1-199 or CIS 6A/6B.* This course is designed to facilitate students' learning of mathematics by offering them individualized, one-to-one instruction. The mathematics tutorial is recommended for all students concurrently enrolled in a Math course. This course will be graded on a credit/no-credit basis. R-E-99  
*Lab hours: 3*

**MATH 189** 0.5-5 units  
**SPECIAL TOPICS IN MATHEMATICS**  
The Special Topics course is a grouping of short seminars designed to provide students with the latest concepts in the field of mathematics. The course content is thematic in nature, and each seminar topic within the course differs from other offerings in the same course. R-E  
*Lecture hours: 0.5-5 Lab hours: 0.5-5*

**MATH 199** 0.5-5 units  
**SEMINAR IN MATHEMATICS**  
Mathematics 199 is a lower-division seminar given over to the study of a specific topic, issue, or problem within mathematics which is not part of the regular college curriculum. R-E  
*Lecture hours: 0.5-5 Lab hours: 0.5-5*

**MATH 200** 5 units  
**INTRODUCTION TO TECHNICAL MATHEMATICS**  
*Prereq: Math 251. Recom: Concurrent enrollment in Math 280 strongly recommended.* This course is intended for students in the technologies and vocational areas. The mathematical topics are designed to enhance specific job skills. Topics include the real numbers, basic algebra, trigonometry, linear equations, quadratic equations, vectors, and geometry.  
*Lecture hours: 5*

**MATH 250** 3 units  
**ELEMENTARY ALGEBRA REVIEW**  
*Prereq: Math 251. Recom: Concurrent enrollment in Math 280.* This course is designed for students who have already completed beginning algebra but need to review before proceeding to intermediate algebra. Topics include the basic properties of real numbers; operations with real numbers; set operations; solving linear and quadratic equations; solving linear inequalities; operations with polynomials; special products of polynomials; factoring polynomials; operations with fractions; and systems of equations. NR  
*Lecture hours: 3*

**MATH 251** 5 units  
**ELEMENTARY ALGEBRA**  
*Prereq: Math 351. Recom: Concurrent enrollment in Math 280 strongly recommended.* This first course in algebra introduces the basic properties of real numbers; set operations; linear and quadratic equations; linear inequalities in one variable; equations and inequalities in one variable involving absolute values; systems of equations; rational expressions and equations; relations and functions; operations with polynomials; factoring of polynomials; and graphing. NR  
*Lecture hours: 5*

**MATH 252** 5 units  
**PLANE GEOMETRY**  
*Prereq: Math 251. Recom: Concurrent enrollment in Math 280.* This course studies the terminology and theorems of plane geometry, including congruence, parallelism, similarity, areas, volumes, and coordinate geometry. Students will use algebra to solve problems involving geometric figures. NR  
*Lecture hours: 5*

**MATH 253** 5 units  
**INTERMEDIATE ALGEBRA**  
*Prereq: Math 251. Recom: Concurrent enrollment in Math 280 strongly recommended.* This course is the continuation of elementary algebra. It encompasses the study of the real number system, open sentences in one variable, polynomials and factoring, systems of linear equations, functions and sequences, and rational numbers and functions. The course also addresses irrational and complex numbers, quadratic equations and functions, exponential and logarithmic functions, and quadratic relations and systems. NR  
*Lecture hours: 5*

**MATH 260** 6 units  
**INTERMEDIATE ALGEBRA REVIEW AND TRIGONOMETRY**  
*Prereq: Math 253. Recom: Concurrent enrollment in Math 280.* This course is designed for students who have already completed intermediate algebra but need to review and need to complete trigonometry before proceeding to more advanced courses. Topics covered include the real number system; polynomial expressions, equations, and functions; systems of equations; rational expressions, equations, and functions; radical expressions and equations; complex numbers; measure of angles; solving triangles; trigonometric identities; trigonometric equations; logarithms; series; analytical geometry; polar coordinates; DeMoivre's Theorem; vectors; determinants; mathematical induction; probability; the Binomial Theorem; and graphing. NR  
*Lecture hours: 6*

**MATH 280** 1 unit  
**MATHEMATICS TUTORIAL LABORATORY**  
*Coreq: Any mathematics course numbered 200-399.* This course is designed to facilitate students' learning of mathematics by offering them individualized, one-to-one instruction. The mathematics tutorial is recommended for all students concurrently enrolled in a mathematics course. This course will be graded on a credit/no-credit basis. R-E-99  
*Lab hours: 3*

**MATH 289** 0.5-5 units  
**SPECIAL TOPICS IN MATHEMATICS**  
The Special Topics course is a grouping of short seminars designed to provide students with the latest concepts in the field of mathematics. The course content is thematic in nature, and each seminar topic within the course differs from other offerings in the same course. R-E  
*Lecture hours: 0.5-5 Lab hours: 0.5-5*

**MATH 350** 3 units  
**PROBLEM SOLVING USING ARITHMETIC**  
*Recom: Concurrent enrollment in Math 280.* This course reviews the fundamentals of arithmetic computation with whole numbers, fractions, and decimals. Students will solve a variety of problems using ratios and proportions, percents, measurement in U.S. and metric units, and geometric formulas. Students develop estimating skills and learn to use calculators efficiently. NR  
*Lecture hours: 3*

**MATH 351** 3 units  
**PRE-ALGEBRA MATHEMATICS**  
*Recom: Concurrent enrollment in Math 280.* This course is designed for those needing a rapid review of arithmetic before taking algebra. The fundamentals of arithmetic computations with whole numbers and decimals will be discussed very briefly; computations with fractions and integers will be covered in depth. Problem-solving techniques involving ratio, proportion, percent, geometric formulas, and linear equations will be applied to real-world situations. NR  
*Lecture hours: 3*

## Mathematics Special Services Courses

**MSS 325** 3 units  
**BASIC MATH SKILLS**  
*Limitation: Placement in this course is based on learning disability assessment, eligibility, and an individual educational plan.* This course is designed for learning disabled students who need review in the fundamentals of arithmetic computations with whole numbers, fractions, decimals, percents, and word problems. R-E-1  
*Lecture hours: 3*