

MATHEMATICS

School of Mathematics, Computer Science and Engineering

Dean: Dr. Susan M. Cooper

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CURRICULUM

The Mathematics Department at Irvine Valley College offers a wide range of courses to meet the varied needs of students pursuing their academic and vocational goals. The department offers a comprehensive curriculum for students who plan to transfer to four-year colleges and universities. In addition, the department offers developmental courses taught in a variety of formats. Students can enroll in these courses for personal enrichment and/or to get ready to take courses at the college level. The department offers support for all mathematics students in the Mathematics Tutorial Center, a facility staffed by faculty and tutors.

MAJOR

The completion of the Associate in Arts degree in mathematics demonstrates commitment to the field and provides comprehensive preparation for upper division courses in most professional careers related to mathematics.

CAREER OPTIONS

Occupations that require knowledge of mathematics or, in some cases, a degree in mathematics, include the following:

- Computer Programmer
- Computer Scientist
- Computer Software Engineer
- Computer Systems Analyst
- Database Administrator
- Operations Research Analyst
- Statistician

A strong background in mathematics also facilitates employment for the following:

- Astronomers
- Economists
- Engineers
- Financial Analysts
- Market and Survey Researchers
- Personal Financial Advisors
- Physicists
- Teachers—Postsecondary
- Teachers—Preschool, Kindergarten, Elementary, Middle and Secondary

ASSOCIATE DEGREE

• Associate in Arts Degree in Mathematics

Students must complete a minimum of 60 units of credit, including the courses in the major ("Major Requirements") and general education requirements (pages 65-73), with an overall GPA of 2.0 or better. A minimum of 12 units must be completed at Irvine Valley College. See pages 61-64 for further information.

TRANSFER PREPARATION

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. Students who plan to transfer to a four-year college or university should (1) refer to the University Studies major (page 224) and "Transfer Planning" (page 76); (2) consult the catalog of their 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 beginning their program. It may be helpful to meet with the department faculty at IVC.

MAJOR REQUIREMENTS: MATHEMATICS Associate in Arts Degree

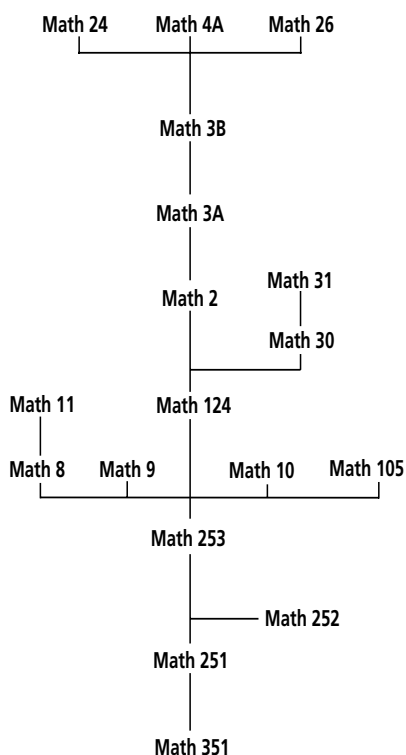
Complete the following courses:

	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 24 Elementary Differential Equations	4
MATH 26 Introduction to Linear Algebra	4

Complete one of the following courses:

PHYS 4A General Physics	4
CS 36 C Programming	4
CS 37 C++ Programming	4
TOTAL UNITS:	27

COURSE SCHEMATIC



COURSES

MATHEMATICS (COLLEGE LEVEL)

MATH 2: PRE-CALCULUS

5 Units

5 hours lecture

Transfers: CSU, UC credit provisions (see UC course list)

Prerequisite: Math 124

Recommended Preparation: 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. (CAN MATH 16) NR

MATH 3A: ANALYTIC GEOMETRY AND CALCULUS I

5 Units

5 hours lecture

Transfers: CSU, UC credit provisions (see UC course list)

Prerequisite: Math 2

Recommended Preparation: 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. (CAN MATH 18; Math 3A+3B: CAN MATH SEQ B; Math 3A+3B+4A: MATH SEQ C) NR

MATH 3B: ANALYTIC GEOMETRY AND CALCULUS II

5 Units

5 hours lecture

Transfers: CSU, UC

Prerequisite: Math 3A

Recommended Preparation: 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: MATH SEQ C) NR

MATH 4A: ANALYTIC GEOMETRY AND CALCULUS III

5 Units

5 hours lecture

Transfers: CSU, UC

Prerequisite: Math 3B

Recommended Preparation: 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: MATH SEQ C) NR

MATH 8: COLLEGE ALGEBRA

5 Units

5 hours lecture

Transfers: CSU, UC credit provisions (see UC course list)

Prerequisite: Math 253

Recommended Preparation: Concurrent enrollment in Math 180 strongly recommended

This course reviews 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. NR

MATH 9: FINITE MATHEMATICS

3 Units

3 hours lecture

Transfers: CSU, UC

Prerequisite: Math 253

Recommended Preparation: Concurrent enrollment in Math 180 strongly recommended

This course is a study of linear functions, 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. (CAN MATH 12) NR

MATH 10: INTRODUCTION TO STATISTICS

3 Units

3 hours lecture

Transfers: CSU, UC credit provisions (see UC course list)

Prerequisite: Math 253

Recommended Preparation: 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. (CAN STAT 2) NR

MATH 11: A BRIEF COURSE IN CALCULUS**4 Units****4 hours lecture****Transfers:** CSU, UC credit provisions (see UC course list)**Prerequisite:** Math 8**Recommended Preparation:** 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. (CAN MATH 34) NR

MATH 24: ELEMENTARY DIFFERENTIAL EQUATIONS**4 Units****4 hours lecture****Transfers:** CSU, UC**Prerequisite:** Math 3B**Recommended Preparation:** 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 the numerical methods of solutions with applications to physics and engineering. Mathematics 24 may be taken concurrently with Mathematics 26. (CAN MATH 24) NR

MATH 26: INTRODUCTION TO LINEAR ALGEBRA**4 Units****4 hours lecture****Transfers:** CSU, UC**Prerequisite:** Math 3B**Recommended Preparation:** 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

MATH 30: COMPUTER MATHEMATICS I**3 Units****3 hours lecture****Transfers:** CSU, UC**Prerequisite:** Math 2**Recommended Preparation:** 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 Computer Science 6A; credit will be given in either area, not both. NR

MATH 31: COMPUTER MATHEMATICS II**3 Units****3 hours lecture****Transfers:** CSU, UC**Prerequisite:** Math 2**Recommended Preparation:** Concurrent enrollment in Math 180

This course is designed primarily for computer science majors. Major topics include permutations, combinations, binomial coefficients, recurrence relations, graph theory, generating functions, and probability theory. This course is also listed as Computer Science 6B; credit will be given in either area, not both. NR

MATH 105: MATHEMATICS FOR LIBERAL ARTS STUDENTS**3 Units****3 hours lecture****Transfers:** CSU**Prerequisite:** Math 253**Recommended Preparation:** 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

MATH 124: TRIGONOMETRY**3 Units****3 hours lecture****Transfers:** CSU**Prerequisite:** Math 253**Recommended Preparation:** 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

MATH 180: MATHEMATICS TUTORIAL LEARNING CENTER**.5 Unit****1 hour learning center****Transfers:** CSU**Corequisite:** Any mathematics course numbered 1-199 or CS 6A/6B

This credit/no-credit course is designed to facilitate students' learning of mathematics through individualized instruction in a learning center environment. It is recommended for all students concurrently enrolled in a mathematics course. Students must complete at least 16.6 hours in the Mathematics Tutorial Center during the semester in order to receive credit. R-E-3

MATH 251: ELEMENTARY ALGEBRA**5 Units****5 hours lecture****Prerequisite:** Math 351**Recommended Preparation:** Concurrent enrollment in Math 280 strongly recommended

This is the first course in algebra. This course introduces signed numbers, equations and inequalities, graphs and linear equations, functions, and polynomials. NR

MATH 252: PLANE GEOMETRY**5 Units****5 hours lecture****Prerequisite:** Math 251**Recommended Preparation:** Concurrent enrollment in Math 280 strongly recommended

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

MATH 253: INTERMEDIATE ALGEBRA
5 Units

5 hours lecture

Prerequisite: Math 251

Recommended Preparation: 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 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

MATH 280: MATHEMATICS TUTORIAL LEARNING CENTER

.5 Unit

1 hour learning center

Corequisite: Any mathematics course numbered 200-399 or MSS 325

This credit/no-credit course is designed to facilitate students' learning of mathematics through individualized instruction in a learning center environment. It is recommended for all students concurrently enrolled in a mathematics course. Students must complete at least 16.6 hours in the Mathematics Tutorial Center during the semester in order to receive credit. R-E-3

MATHEMATICS (BASIC SKILLS)

MATH 351: ARITHMETIC REVIEW AND PRE-ALGEBRA MATHEMATICS

3 Units

3 hours lecture

Recommended Preparation: Concurrent enrollment in Math 280 strongly recommended

This course reviews the fundamentals of arithmetic computation with whole numbers, fractions and decimals. Students focus on developing estimating skills and solving a variety of problems using ratios and proportions, percents, measurements in U.S. and metric units, and geometric formulas. The course is designed for students who need a rapid review before taking a more advanced mathematics courses. NR

MATHEMATICS (SPECIAL SERVICES)

MSS 325: BASIC ARITHMETIC SKILLS
3 Units

3 hours lecture

Limitation: Placement in this course is based on learning disability assessment, eligibility, and an individual educational plan.

Although this course is open to anyone, it is designed for students with learning disabilities who need to review the fundamentals of arithmetic computation. Course topics include adding, subtracting, multiplying, and dividing whole numbers and fractions; converting fractions, decimals, and percents; solving word problems; and calculating ratios and proportions. R-E-1

“Enhancing critical thinking requires that one be rigorous and careful in following the rules of logic.

Math carries into many areas of academics—computers, physics, economics, biology, chemistry—where mathematical models help one better understand the subject.”

— Dorothy Sherling, Ph.D.
 Professor, Mathematics

